UDC 338.43:63

ISSN 0352-3462

ЕКОНОМИКА ПОЉОПРИВРЕДЕ
ECONOMICS OF AGRICULTURE

Vol. LXVIII, №1 (1-264), 2021

BELGRADE

UDC 338.43:63

ISSN 0352-3462

ЕКОНОМИКА ПОЉОПРИВРЕДЕ
ECONOMICS OF AGRICULTURE

Journal is indexed and abstracted in Emerging Sources Citation Index.

68.

"Сагласно одлуци из члана 27. став 1. тачка 4), Закона о научноистраживачкој делатности („Службени гласник РС", бр. 110/05, 50/06-испр. и 18/10), утврђена је категоризација домаћих научних часописа

Листа часописа за друштвене науке

5. Економика пољопривреде М24"
(Часопис међународног значаја)
http://www.nauka.gov.rs (28. Jun 2010)

Београд, јануар - март 2021. године
Belgrade, January - March, 2021

Часопис
◊ ЕКОНОМИКА ПОЉОПРИВРЕДЕ ◊

Journal
◊ ECONOMICS OF AGRICULTURE ◊

Основан 1954. године / Established 1954

ИЗДАВАЧИ / PUBLISHERS

Научно друштво аграрних економиста Балкана, Београд
The Balkan Scientific Association of Agrarian Economists, Belgrade
Институт за економику пољопривреде, Београд (Србија)
Institute of Agricultural Economics, Belgrade, (Serbia)
Академија економских наука, Букурешт (Румунија)
Academy of Economic Studies, Bucharest (Romania)

Адреса уредништва / Editorial office
Београд, Волгина 15; тел/факс (+381)11/6972-848; E-mail: economicsofagriculture@ea.bg.ac.rs
Belgrade, Volgina 15; phone/fax (+381)11/6972-858; E-mail: epoljoprivrede@gmail.com

http://ea.bg.ac.rs

INTERNATIONAL EDITORIAL REVIEW BOARD

UDC 338.43:63 ISSN 0352-3462

ECONOMICS OF AGRICULTURE

CONTENT

AGRARIAN STRUCTURE CHANGES IN THE VILLAGE FARMSTEADS ON DURMITOR

Darko Stijepović[1]

**Corresponding author E-mail: agrobiznis@t-com.me*

ARTICLE INFO

Original Article

Received: *12 February 2020*

Accepted: *01 December 2020*

doi:10.5937/ekoPolj2101011S

UDC 316.324.5:711.437(497.16 Durmitor)

Keywords:

agrarian structure, sheep balance, cattle balance, total available land, total utilised agricultural land

JEL*: C41, J21, O11, Q15*

ABSTRACT

The paper presents findings about agrarian structure changes that have occurred in the village farmsteads on Durmitor highlands considering thesis that this area has experienced complex and strong changes. The most important characteristics of these changes relate with , aging, de-agrarian striving; and reduction of the livestock fund, land surfaces and number of homesteads.

The agrarian structure of the Durmitor area, which includes the municipalities of Žabljak, Šavnik and Plužine, is characterized by the dominant participation of individual farms focused on sheep and catlle production.The structure of agricultural land use in the examined region was defined by natural conditions and natural way of production. In the total agricultural area, natural meadows and pastures occupy over 90% of the area, and arable land and orchards occupy a small percentage of the area.The existing land structure determined livestock production as the basic production.

Introduction

Wider area of Durmitor is distinguished by many characteristics as one specific geographical and agricultural region with all the features of extensive production and it is naturally predestined and mostly oriented to cattle breeding. This area includes completely or partially the following municipalities of the northern Montenegro: Žabljak, Plužine and Šavnik with approximately one third of the total surface of Montenegro. Today, about 3% of the total population of Montenegro lives in the given area, of which over 50% is agricultural, in contrast to the republic where only 15% is the agricultural population. However, the agriculture is the basic branch of economy for other branches are still poorly developed here. The under development of the economy in this region is visible upon participation of agriculture and forestry in the national income. According to the statistical data 2010 the agriculture and forestry participate in the national income in Montenegro with 28.1% and private agriculture sector with

1 Darko Stijepović, MSc, Advisor in the Municipality of Žabljak, Address: Javorje bb Žabljak, Phone: +382 69 106 666, E-mail: agrobiznis@t/com.me, ORCID ID (https://orcid.org/0000-0001-8832-7531)

25.2%, while in the region of Durmitor this participation is about 43% or 35%. Of course, there are significant variations in the region regarding development of the economy in its certain parts and intensity of the agriculture. Generally, it can be stated that economy is more developed and agriculture more intensive in the lowland villages of Durmitor contrary to the highlands.

Materials and methods

The goal of the research is monitoring the state of agrostructural changes in the Durmitor area in the period from 1991 to 2016. Data from the Statistical Office of Montenegro and the Federal Statistical Office of the Republic of Yugoslavia were used to achieve the set research goal. The sources of statistical material were data from the Census of households and dwellings in 1991 and 2003, which referred to the agricultural sector, specifically households, agricultural holdings by size of property and sources of income, and agricultural funds. Data for 2010 are from the Census of Agriculture, and refer to the structure of agricultural holdings: livestock, used land and households. Data for 2016 are preliminary data from the Statistical Office obtained on the basis of a survey on the structure of agricultural holdings, where a two-stage stratified sample without repetition was applied with census districts as primary and households as secondary units. Data related to individual municipalities are unofficial and were obtained by the Statistical Office. For that purpose, a comparative analysis of annual statistical data was performed in order to show agrarian structural changes on farmhouseholds.

The following hypothesis is set in the paper „The size of agricultural holdings significantly determines and conditions the representation of land areas, where it is assumed that the highest concentration will be within the group of farms with medium land holdings from 10 to 15 ha. Significantly, the size of holdings will cause changes in the number of heads, on average per farm and per hectare of agricultural land, in a way that with the increase in holdings per farm, the number of head of livestock will also increase".

In accordance with the established hypothesis and the scientific goal studied in this paper, the relevant quantitative and qualitative methods were applied, as well as the procedures of analysis and synthesis of processes and tendencies that take place under the influence of the ownership structure of agricultural holdings.Quantitative analysis of production resources and agricultural potentials in the observed period included an absolute analysis in hectares, and a relevant one that referred to the percentage of the total represented areas.This analysis was necessary for a quantitative assessment of the current trends and the state of the agricultural structure.

In connection with the study of relevant internal factors of farms, especially the size of holdings and land used in production, the procedures of groupingof rural farms according to several criteria were applied, such as: size of land holdings, share and structure of labor force, and share of livestock. Accordingly, appropriate statistical procedures are applied, such as mathematical and statistical methods, in order to see the mutual reciprocity. They were applied in order to make a comparison between the

intensity of phenomena by groups of farms that were analyzed. Based on quantitative and qualitative analyzes, with the application of statistical procedures, a performed synthesis confirmed the hypothesis and considered the answers to the questions posed in the research. The results were interpreted in accordance with the criteria, and in order to achieve better visibility, they are presented in tabular form.

Results of the research – Some indicators with individual farmsteads as subjects of production

Individual farmsteads in this region represent important subject of the agricultural production. Having in mind this fact we can ask what is the supply in these homesteads with the work force, means of work, land capacities, livestock and what is the economic power of these households. Analyzing all these indicators, together with other already mentioned factors, we will get better insight in this production subject and its potentials for higher goods production. In the former paragraph were raised some general conditions and factors in the agrarian landscape of this region and their effects to the livestock breeding in the individual sector, while here we wish to discuss about basic structures of the individual homesteads making their production within such settings. Sources of data for this work are census of the agricultural households 1991, 2003, 2010, and 2016. These collections can fully serve for exploration of the main structural framework features in the individual households when it is in question supply with land, livestock or means of work.

The importance for studying changes in the ownership structure was the selection of methods on which the analysis on the impact of the size of the land ownership on agricultural production processes was carried out. The subject of the research was agro-structural balances, which related to: household fund, population structures, land and livestock. All holdings are grouped according to the size of the landed property into the following groups: for the total holding, without land, then 1ha, from 1 to 3ha, 3 to 5ha,5 to 8ha, 8 to 10ha, 10 to 15ha, 15 to 20ha and over 20ha. The statistical method interpreted the numerical data obtained during the survey using certain statistical indicators, depending on the availability of data from both primary and secondary data sources. Agriculture is subordinated to the natural conditions rather than to the market. The natural conditions determine the production structure and the yield are mostly depended on the climatic factors since technology survived in the same form as supply of the household with the means of work.

One of the facets of the individual household regarding organization of the goods production and increase of the income and existence of the family is supply of the household with land surfaces. This aspect is particularly interesting in conditions of extensive agricultural production as in this case study.

However, supply with land surfaces still keeps higher significance in the areas with intensive production since technique and technology are not widely implemented in the practice of these homesteads and natural and economic conditions survived as demanding and unfavourable and they will be the same in the future.

Table 1.Total household and holdings

TYPS OF HOUSEHOLDS	1991		2003		2010		2016	
	Number of households	Per land size(ha)	Number of households	Per land size(ha)	Number of households	Per land size(ha)	Number of households	Perland size(ha)
TOTAL DOMESTIC	4053	<1->20	3619	<1->20	3108	<1->20	3027	<1->20
Represented	709	1-3	694	1-3	658	1-3	702	1-3
Represented	223	15-20	194	15-20	9	15-20	156	15-20
AGRICULTURAL HOUSEHOLDS	2659	<1->20	2210	<1->20	2282	<1->20	2242	<1->20
Represented	636	1-3	694	1-3	600	1-3	650	1-3
Represented	42	-	90	15-20	35	-	33	-
MIXED HOUSEHOLDS	558	<1->20	564	<1->20	314	<1->20	297	<1->20
Represented	150	-	157	-	81	-	80	-
Represented	8	>20	23	>1	6	>20	6	>20
NON AGRICULTURAL HOUSEHOLDS	836	<1->20	845	<1->20	512	<1->20	488	<1->20
Represented	280	-	263	-	148	-	139	-
Represented	32	3-5	50	>20	1	>20	1	>20

Source: Population, households, dwellings and agricultural holdings Census in 1991 and 2003, Agriculture Census 2010- structure of agricultural holdings, Press release No. 234: "Structure of agricultural holdings in 2016 (p) 1", Statistical Office - MONSTAT

Table 1. Illustrates that total number of the households was the highest in 1991 (4053) and the highest concentration was in the category of the land ownership of 1-3 ha with 709 in total or 17.49%. Total number of the households in 2016 was 3027 representing 25% less when compared with 1991. In this year the highest concentration of the households was also in the category of the land ownership of 1-3ha with 702 in total or 28%, while the lowest concentration was in the category of the land ownership of 15/20 ha (156). Total number of the village households in 1991 was 2659 and this is the highest number of all examined years. In the light of this data, the highest concentration of the households in the category of 1-3 ha of the land ownership is with 636 units or 23%. The number of the agricultural households in 2016 was 2242 and this represents 74% of total number of households and 15.68% less in comparison with 1991.

The highest concentration of the households is in the category of 1-3 ha with 650 units or 28.88%. **Mixed households** of total number of the households in 1991 were represented with 13% and in 2016 with 9%. The **non-agricultural households** in 1991 were in 836 units or 20% of total number of the households and 488 units in 2016 or 16% and this is less for 41.62%.

Table 2. Land funds

LAND FUNDS	Years			
Size of the holdings according to the size of property	**1991**	**2003**	**2010**	**2016**
Available land (000) ha				
Total available land in ha	67176	42553	46836	49805
Up to 5 ha	3383	2797	3144	3395
From 5-10 ha	5302	2981	3314	3265
From 10-15 ha	3564	1788	1684	2140
Over15 ha	54927	34987	33494	41005
Per holding	25,26	19,52	20,52	22,21
Per farmer	15,78	17,18	16,03	17,31
Agricultural land (000) ha				
Total agricultural land in ha	63674	32987	37172	35166
Up to 5 ha	3388,25	1816,6	2428,3	2358,22
From 5-10 ha	51854	2164	2431,4	2079,81
From10-15 ha	5053,15	1319	1392	1381,32
Over15 ha	23,94	27412	30920	29347,32
Per holding	3378,54	14,92	16,28	15,68
Per farmer	14,96	17,18	16,03	17,31
Arable land (000) ha				
Total arable land in ha	18713	8133	9333	9456
Up to 5 ha	3250,16	1760	2319,7	2256,13
From 5-10 ha	4169,43	1843	2073,6	2131,34
From 10-15 ha	2372,90	1039	1067,7	1088,38
Over 15 ha	8919,87	3493	3872,1	3980,18
Per holdings	7,03	3,68	4,08	4,21
Per farmer	4,39	3,28	3,19	3,28
Meadows (000) ha				
Total meadow in ha	16739	8015	9146,5	8977
Up to 5 ha	3071,76	1830	1941,9	2230,08
LAND FUNDS	**Years**			
Size of the holdings according to the size of property	**1991**	**2003**	**1991**	**2016**
Meadows (000) ha				
From 5-10 ha	7974,87	1957	2043,8	1532,47
From 10-15 ha	3558,89	1096	1042	1090,80
Over 15 ha	6,29	3132	3818,3	3543,87
Per holding	2125,96	3,62	4,00	4,00
Per farmer	3,93	3,23	3,13	3,12
Pastures (000) ha				
Total pastures in ha	44953	24854	27839	25710
Up to 5 ha	134,84	57,39	56,6	104,37
From 5-10 ha	876,59	321	357,4	418,81
From 10-15 ha	1002,47	280	323,85	365,08
Pastures (000) ha				
Over 15 ha	42926,4	23919	27049,1	24822
Per holding	10,56	11,24	12,19	11,46

Source: Population, households, dwellings and agricultural holdings Census in 1991 and 2003, Agriculture Census 2010- structure of agricultural holdings, Press release No. 234: "Structure of agricultural holdings in 2016 (p) 1", Statistical Office - MONSTAT

Table 2. illustrates that the total available land in 2016 amounted to 49805 ha, which is 25.85% less compared to 1991. The largest share of land in both 2016 and 1991 was in the category of over 15 ha. The total available land per farm in 2016 was 22.21 ha and in 1991 it was 25.21 ha, which is 11.90% less compared to 1991. The average farm size in the EU is 17 ha, in Montenegro 6 ha and in the Durmitor area is 15 ha, which indicates approximately the same farm size as the EU, and 2.5 times larger than the national average in Montenegro. Agricultural land in 2016 amounted to 35,166 ha or 70.60% of the total available. Compared to 1991, when that number was 63674, it is 44.77% less.The largest share of agricultural land in both cases is in the category of land over 15 ha. Agricultural land per farm in 2016 amounted to 15.68 ha while in 1991 it was 23.94 ha, which is 34.50% less. Agricultural land per farmer in 2016 amounted to 17.31 ha, while in 1991 it was 14.96 ha, which is 13.57% less.The agricultural area per agricultural inhabitant in the EU is 7.47 ha, in the Alpine countries (Austria and Switzerland 8.50 ha) in Montenegro is 4.25 and in the Durmitor area 17.31 ha, which is 2.42 times more than in the EU and the Alpine countries and 4.25 times more than in Montenegro. This is a great comparative advantage of the Durmitor area. Arable land in 2016 amounted to 9456 ha or 26.88% of the total agricultural. Compared to 1991 when the number was 18713 ha, it is less for 49.46%. The highest share of arable land for all observed years is in the category of over 15 ha.

Arable land per farm in 2016 amounted to 4.21 ha, while the same in 1991 amounted to 7.03 ha, which is 40.11% less. Arable land per farmer in 2016 amounted to 3.28, while the same in 1991 was 4,39 ha which is 25,28% less. The largest share is in the category over 20 ha. Arable land per farm is 9.49 ha, in the Alpine countrie 6.80 ha, in Montenegro 2.37 ha, and in Durmitor area 4.21 ha. This shows that the arable area is 2.25 times smaller on the Durmitor compared to the EU and 1.61 times less compared to the Alpine countries. While it is 1.77 times bigger compared to Montenegro. Meadows in 2016 amounted to 8977 ha or 25.52% of the total agricultural land. Compared to 1991, when that number was 16739 ha, it is 46.37% less. The highest share in both years is in the category of over 20 ha. Meadows per farm in 2016 amounted to 4.00 ha, while in 1991 the amount was 6.29, which is 36.40% less. Meadows per farmer in 2016 were 3.12 and in 1991 were 3,93 ha or 20.61% less. The area of meadows per farm in the EU is 5.31 ha in the Alpine countries from 7.32 to 10.48 ha. In Montenegro it is 1.88 ha, while in the Durmitor area it is 4 ha. Compared to the EU, they are approximately the same and compared to the Alpine countries 2 times smaller and 2 times larger compared to Montenegro. The total share of pastures is 25710 ha, which represents 73.11% of the total agricultural land in 2016. Compared to 1991, when the number was 44953 ha, it is less by 42.80%. The highest share of pastures in both years is in the category of over 20 ha. Pastures per farm in 2016 amounted to 11.46 ha, which is compared to 1991, decrease of 32.18%, when that number was 16.90 ha. Pastures per farmer amounted to 8.93 ha in 2016, which is 15.43% less compared to 1991, when that number was 10,56 ha. The area of pastures per farm in the EU is 5.67 ha, in the Alpine countries is about 10 ha, in Montenegro 3.21 ha, while in the Durmitor area it is 11.46 ha. Compared to the EU it is 2.02 times even larger than the Alpine countries, and 3.57 times more than Montenegro.

Table 3. Livestock fund-cattle breading

CATTLE	1991	2003	2010	2016
NUMBER OF HOUSEHOLDS WITH CATTLES	1832	1535	1460	1385
Number of cattle in (000)	21138	8552	7629	7138
Number of cattle per household	11,53	5,57	5,22	5,18
Number of cattle on 100 ha of	11,28	25,99	20,56	21,77
Number of cattle per ha of arable surface	1,12	0,34	0,27	0,27
Number of cattle per ha of meadow	0,47	0,34	0,27	0,27
HOUSEHOLDS PER NUMBER OF CATTLE				
1-2	437	362	429	337
3-4	596	563	513	505
5-6	359	279	216	238
7-8	252	175	132	149
>8	182	154	167	153
HOUSEHOLDS WITH COWS				
1-2	516	750	601,52	549
3-4	926	710	673,6	745
5-6	261	59	172,28	101,90
>7	128	13	94,9	26,31
CATTLE	**1991**	**2003**	**2010**	**2016**
NUMBER OF CATTLE PER CATEGORY				
Total	21138	8552	7629	7183
Calf and young cows	6271,64	2373	3067	1424
Cows and pregnant cows	13471	5209	4113	5490
Oxen and bull	1392	970	449	269
AGRICULTURAL HOUSEHOLDS PER NUMBER OF CONDITIONAL HEADS				
Total	15735	6772	5328	6115
Number of households	1832	1535	1460	1385
Cows	13471	5209	4113	5490
CONDITIONED HEADS PER HOUSEHOLD				
Total	8,58	4,71	3,64	4,41
Cows	7,35	3,39	2,81	3,96

Source: Population, households, dwellings and agricultural holdings Census in 1991 and 2003, Agriculture Census 2010- structure of agricultural holdings, Press release No. 234: "Structure of agricultural holdings in 2016 (p) 1", Statistical Office - MONSTAT

It is visible from the *Table 3.* that number of households with cattle in 2016 was 1385 and in 1991 was 1832 which is for 24.39% less. The largest representation of the households in both years is in land category of 1-3ha. The number of cattle in 2016 was 7183 and in 1991 this was 21138, or for 66.01% less. The largest representation of cattle in 2016 was in category of land over 20 ha and in 1991 it was in category of 3-5ha.

Number of cattle per household in 2016 was 5.18 heads, while in 1991 this was 11.53 heads which is for 55.07% less. Number of cattle on 100ha of surface in 2016 was 21.77 heads and in 1991 this was 11.28 heads. Number of cattle per ha of arable land in 2016 was 0.75 heads and in 1991 this was 1.12 heads, or 33% more when compared with 2016. Number of cattle per ha of meadow in 2016 was 0.27 heads and in 1991 this was 0.47 heads, or 42.53% less than in 2016. Households per number of cattle are the most represented in category of 3-4 heads of cattle and this was 505 heads in 2016 and 596 heads in 1991, or 15.26% less. As well, the number of households with cows is the most

represented in category of households of 3-4 heads of cattle. This was 745 heads in 2016 and 926 heads in 1991, or 19.54% less. Number of cattle according to categories illustrates the largest representation of cows and pregnant cows in total number in 2016 that was 5490 or 76.43% and in 1991 this number was 13471 heads, or 63.72% of total number.

Agricultural households per number of conditioned heads in 2016 were 1385 and in 1991 were 1832, or 24.39% less. Total number of conditioned heads of cattle in 2016 was 6115 heads and in 1991 it was 15735 heads or 61.13% less. Total number of conditioned heads per household in 2016 was 4.41heads and in 1991 this was 8.58 heads or 48.60% less. Number of cattle heads per EU household is 5.86 and in Alps countries 20 heads, in Montenegro 1.94, and on Durmitor territory this is 5.18 heads of cattle. In comparison with EU this is at the same level, and with Alps countries this parameter value is 4 times lower or 2.67 times higher than in Montenegro.

Table 4. Livestock fund- sheep breeding

SHEEP	1991	2003	2010	2016
NUMBER OF HOUSEHOLDS WITH SHEEP	688	368	496	350
Number of sheep in (000)	84037	25684	36986	21065
Number of sheep per household	122	69	74	60
Number of sheep on 100 ha of agricultural surface	132	78	99	63
Number of sheep per ha of arable surface	4,49	3,15	3,96	2,22
Number of sheep per ha of meadow	1,86	1,03	1,32	0,81
HOUSEHOLDS PER NUMBER OF SHEEP				
10	20,56	7,84	14,1	10
HOUSEHOLDS PER NUMBER OF SHEEP				
20-50	294	93,85	139,85	136
60-100	183	99,24	134,87	116
110-150	129	91,98	119,38	62
>150	60	74,8	87,59	26
HOUSEHOLDS WITH SHEEP FOR MILKING				
10	28,20	13,8	14,08	10,67
20-50	317,44	112,6	151,08	144
60-100	201,58	105,8	156,43	128
110-150	92,87	97,40	132,77	66,5
>150	48,16	38,89	40,82	0,105
NUMBER OF SHEEP PER CATEGORIES				
Total	84018	25684	36986	21065
Lambs	21353	4676	16834	7485
Breeding sheep	59657	18285	18965	12692
Other sheep	3008	2723	1187	888
AGRICULTURAL HOUSEHOLDS PER NUMBER OF CONDITIONED HEADS				
Number of households	688	368	496	350
Sheep for milking	5965	1828	1896	1269
Total	8403	2568	3698	2106
CONDITIONED HEADS PER HOUSEHOLD				
Total	12,21	6,97	7,45	6,01
Sheep for milking	8,67	4,96	3,82	3,62

Source: Population, households, dwellings and agricultural holdings Census in 1991 and 2003, Agriculture Census 2010- structure of agricultural holdings, Press release No. 234: "Structure of agricultural holdings in 2016 (p) 1", Statistical Office - MONSTAT

Number of households with sheep in 2016 was 350 households and the most were in category of over 20 heads. In 1991 the number of households with sheep was 688 or 49.12% more in comparison with 2016. Number of sheep in 2016 was 21065 heads and mostly were in the land category of 5-8ha while this number in 1991 was 84037 or 74.93% less. Number of sheep per household in 2016 was 60 heads and in 1991 this was 122 heads or 50.81% more when compared with 2016. Number of sheep on 100ha of agricultural surface in 2016 was 63 heads of sheep and in 1991 this was 132 heads or 52.27% less. Number of sheep per ha of arable land in 2016 was 2.22 heads and in 1991 this was 4.49 heads or 50.55% more in comparison with 2016. Number of sheep per ha of meadow in 2016 was 0.81 heads and in 1991 this was 1.86 heads or 56.45% less. Households in accordance with number of sheep show higher representation in group of 20-50 heads of sheep and there were136 households in 2016, while in 1991 there were 294 households or 53.74% less, more. Households with milking sheep were the most represented in the group of 20-50 heads of sheep and there were 144 households in 2016, while in 1991 there were 317 households or 54.57% less. Regarding the number of sheep per categories it was observed that the most numerous had been category of breeding sheep, and in 2016 this number was 12692, while in 1991 this was 59657 heads of sheep or 78.72% more when compared with 2016.

Agricultural households per number of conditioned heads in 2016 were 350 and in 1991 were 688 heads or 49.12% less. Number of conditioned heads per household in 2016 was 6.01 and in 1991 this was 12.21 or 50% less. Number of head of sheep per household in EU is 0.87, in Alps countries 0.50 heads, in Montenegro 4.19 heads, and on Durmitor territory 60 heads of sheep. When compared with EU and Alps countries this is 60 times more and when compared with Montenegro it is 15 times more.

Comparative data relating to the Alpine countries, the EU and Montenegro are presented in detail in the following table.

Table 5. Statistical indicators of the agrarian structure of Alpine countries, EU and Montenegro

Statistical indicators	Switzerland	France	Austria	Italy	Alpine - together	EU	Montenegro
Size of agricultural holdings (ha)	17,72	42,00	17,00	6,1	20,70	17,00	6,00
Agricultural areas per agricultural population (ha)	8,59	29,56	8,65	3,88	12,67	7,47	4,25
Arable land per holdings (ha)	6,85	27,86	6,89	3,25	11,21	9,49	2,37
Meadow area per holdings (ha)	10,48	12,07	7,23	1,59	7,99	5,31	1,88
Pasture area per holdings (ha)	10,86	15,70	9,76	2,02	9,58	5,67	3,21
Number of head of cattle per holdings	19,69	20,87	0,2	0,31	10,26	5,86	1,94
Number of head of sheep per holdings	0,73	1,12	0,2	0,31	0,59	0,87	4,19

Source: Eurostat (2017). Questionnaire about farm structure

Conclusion

During the research, relevant issues related to the perception of tendencies and factors that affect the constitution of the ownership structure and its impact on agricultural production were analyzed. Under the influence of the general trends, significant changes were made in the agrarian and ownership structure of land areas on rural farms. There were periodic changes in all land areas, especially in 2003, when there was a large decrease compared to 1991, so that this trend went upwards from 2003 to 2010. When there was an increase, and from that year to 2016, the trend of decreasing land areas continued. The exception to this was arable land, where after the fall in the period from 1991 to 2003, there was a constant increase ofareas. In the total agricultural area, meadows and pastures occupy over 90%, with a more dominant share of pastures, which led to livestock-dominated extensive production. In accordance with the established hypothesis, it is concluded that the highest concentration of households according to the ownership structure of land areas is in the category over 15 ha, which confirms the same that these are properties with larger land areas. In the researched area, there was a decreasing trend in the number ofcattle on rural holdings, especially in 2003 compared to the baseline, when this trend was most emphasised. Also, the size of the holdings significantly determined the changes in the share of the number of cattle in average per farm and per hectare of land used. Throughout all analyzed annual periods, it was noticed that the highest concentration of farms was according to the number of farms with cattle and according to the number of cattle in the category of 3-4 heads. Major changes also took place in the share of sheep breeding. The total number of sheep significantly decreased, as well as the number of sheep farms compared to 1991, and especially in 2003. The largest share of farms according to the number of sheep and sheep for the milking was in the category of 20 to 50 heads. In the Durmitor area, according to this research, there was a significant connection between the general tendencies of socio-economic development and changes in the ownership structure of agricultural holdings. This correlation was indicated by changes in the socio-economic holdings structure under the influence of economic development and deagrarization.

Conflict of interests

The authors declare no conflict of interest.

References

1. Alexandrov, A. (2016). The Bulgarian mountain agricultural resources, International conference. Sustainable development of mountain areas-experiences, challenges and perspectives, Žabljak, Montenegro, 33-35.
2. Bogdanov, N. (2016). Rural development and rural policy. Institute of Economics, Belgrade.
3. Cvijanović, G. (2015). Management of organic plant production.Institute for Agricultural Economics, Belgrade.

4. Cvijanović, D., Popović, V., & Subić, J. (2014). State and possibilities of development of sustainable agriculture and rural development in the Danube region. Institute for Agricultural Economics, Belgrade.
5. Eurostat (2017). Questionnaire about farm structure 2015-2017.
6. Federal Statistical Office (1991). Population, households, dwellings and agricultural holdings Census (households, agricultural population, agricultural funds of households - municipalities and settlements). Federal Bureau of statistics, Beograd.
7. Lazarević, R., & Stošić, M. (2016). Livestock breeding is a mainstay of the sustainable development of the mountainous area in Serbia.Academy of Engineering Sciences of Serbia, Belgrade.
8. Lazarević, R. (2018). Agriculture and village of Serbia in agroecological development. Academy of Engineering Sciences of Serbia, Belgrade
9. Marković, M., Marković, B., Dubljević, R., & Radonjić, D. (2017). Mountain range agriculture. Manufacturers Manual. University of Montenegro, Biotechnical Faculty, Podgorica.
10. Marović, Č. (2018). Agriculture and Village in Montenegro in the Transition Period (1990-2016).Vijesti, Podgorica.
11. Matej, O. (2016). Sustainable mobility in mountain regions-examples from the alps. International conference; Sustainable development of mountain areas-experiences, challenges and perspectives. Žabljak, 76-80.
12. Mihailović, B., & Simonović, Z. (2016). Strategic planning for sustainable development of agriculture and rural areas in Serbia, Institute for Agricultural Economics, Belgrade.
13. Statistical Office (2007). Population, households and dwellings Census in 2003. Book 1.Agricultural funds 2007. Book 2. Agricultural holdings by activity and source of income 2007. Statistical Office – MONSTAT.Podgorica.
14. Statistical Office (2010). Structure of agricultural holdings. Book 1. Key variables - land and livestock funds. Book 2. Livestock fund 2011. Book 3. Utilised land 2011. Book 4. Topics of special interest 2011. Book 5. Typology of agricultural holdings. Statistical Office – MONSTAT.Podgorica.
15. Statistical Office (2016). Press release No. 234: "Structure of agricultural holdings in 2016 (p) 1". Statistical Office – MONSTAT.
16. Stijepović, D. (2018). Organizational-economic characteristics and production results in rural areas of durmitorian area. Sustainable primary agricultural production in Serbia - status, opportunities, limitations and a chance.Faculty of Biofarming, Bačka Topola, 78-86.
17. Šarović, R. (2017). Sociological survey of rural and family farms in Montenegro, Faculty of Philosophy, Nikšic, 30-36.

SPATIAL AND TEMPORAL PATTERN OF RICE YIELD GROWTH IN ASIAN COUNTRIES FROM 1961 to 2016: AN EXPLORATORY ECONOMETRIC ANALYSIS

Debabrata Mukhopadhyay[1]

**Corresponding author E-mail: debu1641975@yahoo.co.in*

ARTICLE INFO

Original Article

Received: *14 September 2020*

Accepted: *11 January 2021*

doi:10.5937/ekoPolj2101023M

UDC 330.34.014 -026.23:633.18"1961/2016"(292.5)

Keywords:

rice production, yield, structural break, technology innovations, environmental challenges

JEL: *C22, Q10, Q18*

ABSTRACT

The present paper attempts to find out the spatial and temporal movement of rice yield in twelve countries in Asia which is its lifeline over the period 1961 to 2016 by following Bai-Perron multiple structural break tests. The results based on endogenous multiple structural break analysis show that many of these countries passed through several phases of acceleration and deceleration in rice yield over this period The results also demonstrate that except Japan, all the twelve countries considered in our study experienced at least one structural break in rice yield at level during the period 1961 to 2016. The acceleration phases of rice yield growth observed mostly during 1970's and 1980's are resulted from improved technological innovations in agriculture whereas deceleration phases observed in the last two decades are mainly caused by environmental challenges on rice production. Cross country yield gaps have been showing declining trend since early 80's.

Introduction

Agricultural development is still an important economic policy commitment to reduce poverty and for ensuring sustainable food security in many parts of the developing world. Rice is the most important staple crop in South and South-East Asia (John & Fieding, 2014). Although rice (Oryza sativa species) was domesticated in Asia thousands of years ago, it is still the leading cereal in human food systems (Trébuil, 2004).

About 87% of global production of rice takes place in Asia in the year 2018 as per the latest report of the Food and Agricultural Organization (FAO) of the United Nations(UN). Rice plays a major role in global food security, as it is the staple food for over half of the world's population (Bandumula, 2017). Asia is the centre of global food security with more than half of the world's population and one-third of global

1 Debabrata Mukhopadhyay, Ph.D., Professor, Department of Economics, West Bengal State University, Kolkata, India, PIN-712126. E-mail: debu1641975@yahoo.co.in, ORCID ID (https://orcid.org/0000-0002-3159-8928)

hungry and poor (Monika, 2013). Recent research in food and nutrition science shows that eating rice makes general health better and still is considered as 'grain of life'. The recent data also show that 15% of the global farm area and almost a quarter of the world's cereal croplands are occupied by rice lands. More than 200 million rice farmers are involved in this production. This is one of the most important human activity on earth. Its importance is also evident from the fact that rice became the first-ever agricultural commodity to be declared 'Crop of the Year' in the year 1966 by the UN.

During the mid-sixties, the largely agricultural economies of Asia were failing to produce sufficient food to feed the region's rapidly rising populations (FAO Rice Conference, 2004). Asia, once a net exporter of food, the domain of some of the world's lushest rice bowls and wheat lands, home of some of the world's most skilled and industrious farmers, was a food-deficit region, literally dependent on the West to stay alive (Davies, 1967). However, there are two integral major challenges—for now and well into the future— involving rice in Asia. The first is the ability of economies to meet their national and household food security needs with a declining natural resource base, two of the critical resources being water and land. Secondly,—as has been stated so eloquently by the United Nations as one of its eight Millennium Development Goals (www.undp.org/mdg)—the eradication of extreme poverty and hunger. Rice is so central to the lives of most Asians that any solution to global poverty and hunger must include research that helps poor Asian farmers reduce their risks and earn a decent profit while growing rice that is still affordable to poor consumers (FAO Rice Conference, 2004).

Several studies have shown that global crop production needs to double by 2050 to meet the projected demands from rising population, diet shifts, and increasing biofuels consumption. (Ray et al. 2013). As a result, despite showing an overall surplus in production, consumption or trade of rice, situations in future decades may be affected. Three major kinds of cereals namely, rice, wheat and maize take up the largest areas under cultivation and yield the highest quantities of output which are predominantly used for food and animal feed production. More than 50% of world daily caloric intake is derived directly from rice consumption (Awika,2011), and this goes to 70% for the Asian countries. For many years rice has remained a staple food and a cultural identity for a large segment of the Asian countries. Millions of people around the globe depend on rice as the bulk of their daily diet (Elert, 2014)). While addressing the issue of long term movement of rice production across the ten Asian countries, it is observed that most of the Asian counties experienced a structural change in rice production growth in the 1970s and/or 1980s and started to experience slowdown since 1990s (Mukhopadhyay, 2019).

With a total harvested area of approximately 167 million hectares, producing more than 782 million tons annually in the year 2018. Nearly 678 million tons of rice are grown in Asia. But, nearly a fourth of the Asian population is still poor and has a considerable unmet demand for rice. It is in these countries that rice consumption will grow faster(FAO). Despite rice being deeply rooted in cultures and identities of Asian countries, 'rice as self' for Japanese in his famous book, however, these countries differ

in terms of changing perspective vis-à-vis overall economic focus (Ohnuki-Tierney, 1994). Recent crop yield growth in China has been slow following a county-level crop production data between 1980 and 2010 from eastern and middle China and analyzed rice, wheat and maize yield in five major farming systems of China's cereal production (Li et al. 2016). It is observed that the centre of cereal production has shown a tendency to move towards northern China (Tong et al.,2003; Liu et al., 2009). Japan has also been exhibiting deceleration in yield growth of rice production in recent times along with shrinking of the area under cultivation as their focus has shifted towards rapid industrialization and urbanization. Countries like Cambodia, Nepal, Myanmar still being agrarian have been looking on yield growth for accelerating rice production.

The FAO and the World Bank have identified eight broad classification of farming systems which have been further categorized into 70 farming systems across six developing regions of the world (Dixon, 2012). Among these six regions, two regions namely South Asia and East Asia-Pacific are our central focus. It may be noted that there exists heterogeneity within each farming system in South Asia and East Asian countries for rice production. However, within each farming system prevailing in a region/country understanding the needs of those living in that system are crucial for finding out proper strategies/practices to escape out from poverty and hunger. Despite presence of eleven farming systems in Asia, rice-wheat system is dominant in South Asia and lowland rice farming is the major farming system in East Asia. There are some stylized facts about Asia's rice economy. First of all, at the farming household level, a large proportion of production is self-occupied i.e., marketable surplus is very insignificant. Secondly, rice can be produced in extremely ecological conditions from large and flat coastal plains to mountainous terraces. Next, the production of rainfed lowland rice accounts for a quarter of the total rice-growing areas. Lastly, Soil degradation is a critical issue in most of the farming systems of the region. For instance, in the Rice-Wheat Farming System which is a dominant system in South Asia's rice production, where intensive cultivation and unbalanced fertiliser applications have led to a deterioration in soil structure and fertility, which need some immediate solutions.

Against this backdrop, the present paper attempts to find out the spatial and temporal movement of rice yield(output per hectare cultivated area) in twelve countries[2] in Asia over the period 1961 to 2016. This study also investigates the presence of structural change in rice-yield over this period by following Bai-Perron multiple structural break tests published in the years 1998,2001 and 2003 for each of the twelve countries which is an important and pertinent issue for understanding the role of technology versus institutions in the country specific perspective. The study also examines whether land productivity of rice i.e., rice yield spread have narrowed over time across these countries through technology spill over by following conventional measures of dispersion standard deviation and coefficient variation.

2 Bangladesh, Cambodia, China, India, Indonesia, Japan, Myanmar, Nepal, Pakistan, Philippines, Thailand and Vietnam.

Materials and methods

The data on area(in hectare), production (in tonnes) and yield(hectagram/hectare) are taken from the FAOSTAT of the Food and Agricultural Organization of the UN (http://www.fao.org/faostat/en/#data/QC) for the period 1961 to 2016. Assuming y as the crop yield , A as area under cultivation and Y as output, then y= Y/A, implying the growth of output is the sum growth of area and yield in accounting terms. In our analysis, the growth over 1961 to 2016 has been considered.

We now consider the following semilogarithmic equation for each twelve country to determine structural break in rice yield by following Bai-Perron Sequential-F test , for the period 1961 to 2016 (Bai & Perron(1998); Bai & Perron (2001); Bai & Perron (2003)). The estimated growth rate are thus obtained ($\beta_{\text{coefficient}}$).These estimates enable us to understand variation in estimated growth rates across these nations.

$$\ln y_t = \alpha + \beta t + u_t \quad ,t=1,2,\ldots,58. \tag{1}$$

α : Intercept

β : Growth coefficient

u_t : Error term

Now, it is evident that productivity or yield differ across the Asian countries. Therefore, whether differences are narrowing down over time is pertinent to investigate. We, then, apply an exploratory analysis in terms of inequality measures such as standard deviation(sd) and coefficient of variation(cv). Considering μ_t is the mean of the logarithm(natural) of the rice yield of all twelve Asian countries at time *t* and σ_t is the standard deviation of these values at time *t*. Then, CV_t defined as $CV_t = \frac{\sigma_t}{\mu_t}$, is the coefficient of variation of these values at time *t*. We compare such measures of disparities in crop yield like CV_t and σ_t at different time points across the Asian countries. Declining values of these measures indicate lowering of regional disparities in rice yield.

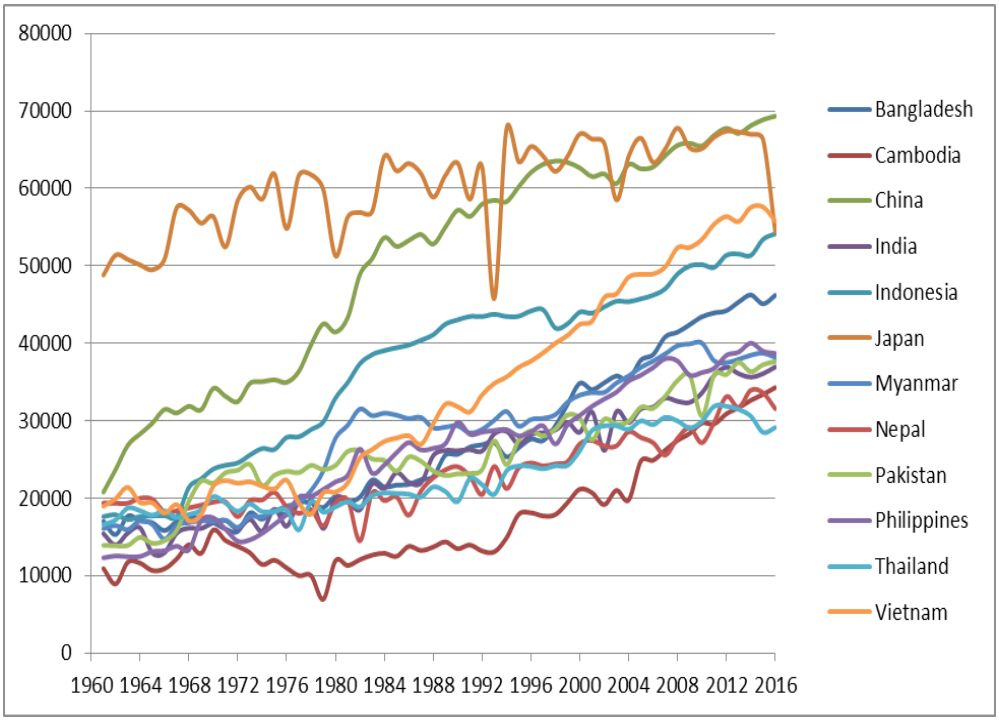
All econometric computations have been carried out by using the econometric software Eviews 9.

Results and Discussions

We now discuss the empirical results in this section. The movement of rice yield for all the selected countries has been presented in figure 1 below. As shown in table 1 below in the year 2016, China produced 211 Million metric tonnes(MMT) of rice followed

by India with 159 MMT. As such, in rice production, twelve Asian countries contribute more than 90% in the world. Two countries China and India together have 50% and 30% shares in world production and area of cultivation, respectively. However, in terms of output growth and yield growth, China has better performance compared to India during the period 1961 to 2016. However, China has been experiencing very slow growth in cropped area in recent times. Again, in terms of present yield (kg/hectare) for rice crop, China is ahead of India. Indonesia has notable performance in enhancing output growth by increasing both productivity as well as increasing cropped area.

Figure 1. Movement of Rice yield of 12 Asian countries during 1961 to 2016



Source: FAOSTAT

Table 1. Rice Production, yield and area of cultivation in twelve Asian Countries in 2016

Country	Production(tonnes)	Area (hectare)	Yield per hectare(in kg)
Bangladesh	52590000	11000809	4618.8 kg
Cambodia	9827001	2908564	3427.7kg
China	211090813	31019837	6932.2 kg
India	158756871	43190000	3695 kg
Indonesia	77297509	15156000	5414.8 kg
Japan	10055000	1479000	5438.8 kg
Myanmar	25672832	6723986	3818.1

Country	Production(tonnes)	Area (hectare)	Yield per hectare(in kg)
Nepal	4299079	1362908	3154.3 kg
Pakistan	10412155	2724000	3764.9 kg
Philippines	17627245	4556043	3869 kg
Thailand	25267523	9340007	2911.8
Vietnam	43437229	7734722	5581 kg

Source: FAOSTAT

As the table 2 given below shows that for most of the countries except Indonesia and Pakistan who experienced 2.201% and 2.60% in area under cultivation of rice production, respective, rice production growth has been caused more by yield growth compared to area growth, we now compare the yield growth of these countries.

In terms of average growth of rice yield during the period 1961 to 2016, China experienced highest growth of 4.245% followed by Philippines experiencing 3.901%. India has exhibited a moderate yield growth of 2.539%, however, Japan experienced only 0.208%. Seven countries namely, Bangladesh, Cambodia, China, Indonesia, Pakistan, Philippines and Vietnam achieved more than 3% growth in rice yield. Again, average growth of area under rice cultivation was less than 1% for most of the countries. Japan experienced a negative growth in are under rice cultivation during this period. It may be pointed out in this context that China, the largest producer of rice on earth has experienced a very low growth of area at 0.267%.

Table 2. Average growth of rice production, yield and area under cultivation during 1961 to 2016

Country	Average Yield growth(%)	Average Area growth(%)	Average Production growth(%)
Bangladesh	3.12	0.540	4.81
Cambodia	3.888	0.605	5.7
China	4.245	0.267	5.501
India	2.539	0.445	3.578
Indonesia	3.768	2.201	9.812
Japan	0.208	-1.006	-0.687
Myanmar	2.503	1.056	5.011
Nepal	1.141	0.459	1.89
Pakistan	3.101	2.260	9.383
Philippines	3.901	0.787	6.378
Thailand	1.374	0.957	2.708
Vietnam	3.532	1.146	6.959

Source: Author's own calculation based on FAOSTAT data

Comparing average production growth across these countries establish that Indonesia achieved highest growth in rice production with 9.812% during the last 55 years followed by Pakistan of 9.383%. This growth in these two countries have been possible

due to remarkable progress achieved in terms of bringing more area under cultivation. But for other except which experienced a negative overall growth of -0.687%, for all other countries yield has contributed mainly to cause high growth in rice production.

We now report the changes in yield growth in different sub-periods for different countries by following Bai-Perron multiple structural break tests. The results are presented in Table 3 and 4 below. The results on multiple structural break tests due to Bai-Perron are presented in table 3. The results show that except Japan, all the twelve countries considered in our study experienced at least one structural break in rice yield at level during the period 1961 to 2016. Countries namely, Cambodia, India, Nepal and Philippines have exhibited single structural change as the results show based on Sequential-F test of Bai-Peron. These break years are 1976, 1988, 1983 and 1977, respectively. Again, Bangladesh, Myanmar, Pakistan and Thailand experienced two structural break points during this period in rice yield. China, Indonesia and Vietnam have passed though several changes in their rice yield starting from late 1960's. The earliest structural break year in this study is 1969 as observed in China, Indonesia and Pakistan. The year 1988 was another important break as observed by India, Myanmar and Pakistan. Most of the other break years were observed in 1970's and 1980's. These break years are related with technological applications adopted in the countries and the sustainability of those changes coupled with ecological factors such as soil fertility, water management etc.

After determining structural break in rice yield for these countries during our study period, we now present the estimated rice yield growth for different relevant subperiods of these countries following the methodology stated in the previous section. Estimated growth results are presented in table 4. The results show that countries like Cambodia, China, Indonesia, Pakistan and Vietnam have experienced over 3% yield growth in rice production in some phases of our study period. For instance, Cambodia experienced 3.265% yield growth in rice production on a sustainable basis for the period 1976 to 2016. China has experienced a very high growth over 5% in rice yield for a small span 1961 to 1968. Indonesia has observed 3.197% growth in rice yield for the period 1969 to 1981. Pakistan experienced high growth at 3.745% in rice yield during a small span of 1961 to 1968. India has observed a structural break in rice yield growth in 1988 and exhibited moderate growth throughout the period of our analysis. After experiencing negative growth in rice yield in first two phases of this long span, Vietnam has shown a remarkable progress by passing through an acceleration with 3% growth during 1981 to 2000. These astonishing growth rates are related to technological innovations adopted in agriculture by these countries through are resulted from the gradual expansion of acreage under irrigation and improved high-yielding rice varieties along with use of chemical fertilizer and pesticides. However, these same countries have also experienced several phases of deceleration in rice yield growth before or after acceleration phase. Some of these deceleration phases particularly during the last two decades are caused by environmental challenges as 'new' constraints for rice production. The other most important limiting factor influencing annual production potential is draught, and is

usually associated with an erratic or intermittent rainfall pattern which leaves crops dry for periods of weeks at a time. The rice varieties grown in Southeast Asia are very sensitive to drought stress,

It may further be noted that in recent times Bangladesh and Cambodia are experiencing over 2% yield growth of rice production where many other countries are passing through deceleration in yield growth for rice crop with less than 1%. For instance, during 2001-2016 in our study period China and Thailand were experiencing 0.877% and 0.262% growth in rice yield, respectively. Some of these deceleration phases particularly during the last two decades are caused by environmental challenges as 'new' constraints for rice production. The major ecological challenges in rice production are climate change, natural resource management, biodiversity and sustainability.

Table 3. Structural break in rice yield of Asian Countries during 1961-2016

Country Name	No. of Structural Break under Bai-Perron Test	Break Years
Bangladesh	2	1971,1999
Cambodia	1	1976
China	3	1969, 1982, 2001
India	1	1988
Indonesia	3	1969, 1982, 1998
Japan	0	----------
Myanmar	2	1979, 1988
Nepal	1	1983
Pakistan	2	1969,1988
Philippines	1	1977
Thailand	2	1974, 2001
Vietnam	3	1970, 1981, 2004

Source: Author's calculations based on FAOSTAT data
Note: The results are determined using sequential-F test statistics of Bai-Perron multiple break tests and using 0.15 trimming point and 5% significance level.

Table 4. Estimated growth rates in rice yield of Asian Countries during 1961-2016

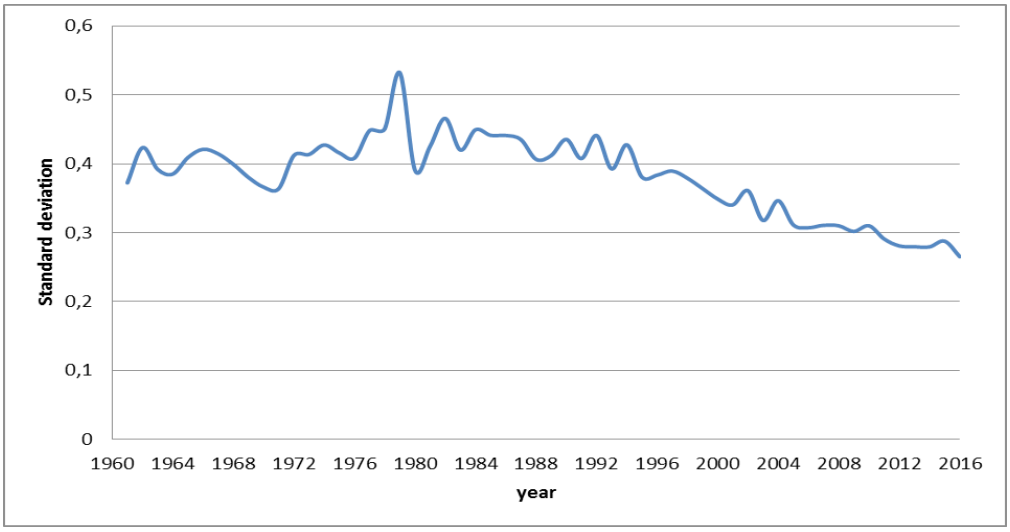
Country Name	Sub-period	Estimated yield growth(%)
Bangladesh	1961-1970	0.004
	1971-1998	2.140
	1999-2016	2.199
Cambodia	1961-1975	1.810
	1976-2016	3.265
China	1961-1968	5.783
	1969-1981	2.518
	1982-2000	1.386
	2001-2016	0.877
India	1961-1987	1.772
	1988-2016	1.329

Country Name	Sub-period	Estimated yield growth(%)
Indonesia	1961-1968	1.641
	1969-1981	3.197
	1982-1997	1.119
	1998-2016	1.361
Japan	1961-2016	0.435
Myanmar	1961-1978	1.219
	1979-1987	2.270
	1988-2016	1.329
Nepal	1961-1982	-0.005
	1983-2016	1.526
Pakistan	1961-1968	3.745
	1969-1987	0.677
	1988-2016	1.796
Philippines	1961-1976	2.315
	1977-2016	1.632
Thailand	1961-1973	0.917
	1974-2000	1.344
	2001-2016	0.262
Vietnam	1961-1969	-1.652
	1970-1980	-1.180
	1981-2000	3.018
	2001-2016	1.560

Source: Author's estimation carried out using a Semilogarithmic model (1) following least squares method under break based on Bai_Perron Sequentially determined break tests

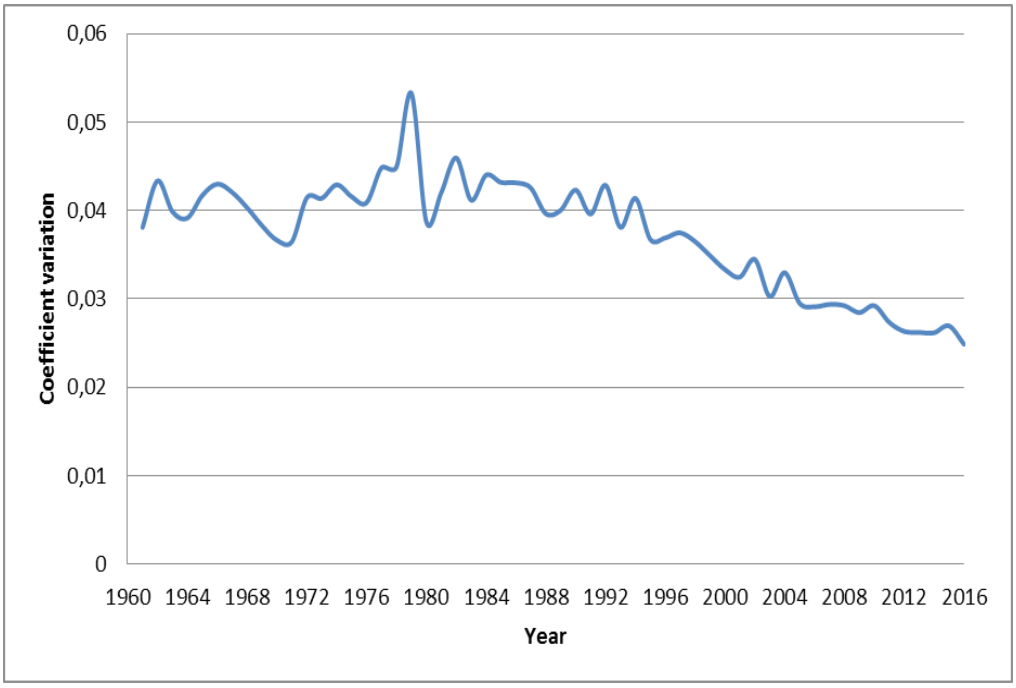
We present the results on trend of productivity spread across these countries by using the figures 2 and 3 below. The cross sectional standard deviations of the logarithm(natural) of rice yield for 12 Asian countries over the period 1961 to 2016 has been presented in Figure 2. This shows a clear declining trend since 1982 after showing some phases of upward trend during first two decades. For instance the values of standard deviations were 0.372, 0.532 and 0.265 in the years 1961, 1979 and 2016, respectively. The coefficient of variation , which is a relative measure of dispersion, also shows downward movement as presented in Figure 3. Its value has reduced from 0.038 in 1961 to 0.025 in 2016. These figures are indicating that rice yield gaps are reducing across these countries in South and South East Asia.

Figure 2. Standard Deviation of rice yield(Productivity) of 12 Asian Countries from 1961 to 2016



Source: Author's calculations based on FAOSTAT data

Figure 3. Coefficient of variation of rice yield(Productivity) of 12 Asian Countries from 1961 to 2016



Source: Author's calculations based on FAOSTAT data

It becomes clear from the above analysis that the production of rice for the major Asian countries have been contributed by yield growth rather than the slow expansion of acreage. Again, during this long period, several changes including technology, institutions and ecological factors have led to structural change in yield growth for these countries.

There have been both phases of acceleration as well as a deceleration in growth experienced by the major rice producers of the world. Thus it is interesting to understand whether yield gaps among these countries have declined over time of our study period indicating convergence of productivity across the countries.

Conclusions

At the initial level, some econometric exercise based on the identity (i.e., growth of production is the sum of the growth of area and yield) that for most of the Asian countries, the Rice bowl of the World Economy that technology-led yield growth has mainly contributed to feeding 3.5 billions of global population. Exhaustive and comprehensive country-level studies have been carried out to determine the period and sustenance of this rice yield growth for 12 countries in South and South-East Asia over the period 1961 to 2016. The spatial movement of technology spillover led to declining yield gaps across these countries over time are also addressed using conventional absolute and relative measures of dispersions.

The results show based on endogenous multiple structural break analysis that many of all the twelve countries of our study except Japan have passed through several phases of acceleration and deceleration as far as the temporal movement of rice yield is concerned. Moreover, the applications of technology, policy decisions and ecological limitations in terms of soil fertility, availability of water resources have played a significant role in understanding these phases of acceleration and deceleration in this important crop yield the country. It is also further understood that technology and policy innovations must follow proper coordination to promote crop yields and the sustainable use of agricultural resources to maintain food security in the region.

The policies should consider both the ecological and environmental concerns faced by the major rice producing countries of Asia in order to address the food security problem of increasing population that may arise in view of deceleration of yield growth in recent times. Except, Bangladesh no major rice producing coutry has exhibited yield growth of over 2% in the last two decades. China has experienced only 0.877% yield growth during the period 2001 to 2016.

A strategy for the future would be to further strengthen the two-pronged approach of increasing productivity in favourable environments while developing rice technologies that have minimal adverse effects on the resource base of fragile environments (IRRI, 2003).

Conflict of interests

The authors declare no conflict of interest.

References

1. Awika, J.M. (2011). Major Cereal Grains Production and Use around the World. *ACS Symposium Series*, 11-13. https://doi.org/10.1021/bk-2011-1089.ch001
2. Bai, J., & Perron, P. (1998). Estimating and Testing Linear Models with Multiple Structural Changes. *Econometrica, 66*(1), 47–78. https://doi.org/10.2307/2998540
3. Bai, J., & Perron, P. (2001). *Multiple and Structural Change Models: A Simulation Analysis*, Columbia University Press.
4. Bai, J., & Perron, P. (2003). Computation and Analysis of Multiple Structural Change Model. *Journal of Applied Econometrics*, *18*, 1-22. https://doi.org/10.1002/jae.659
5. Bandula, N. (2017). Rice Production in Asia: Key to Global Food Security. *Proc. Natl. Acad. Sci., India, Sect. B Biol. Sci*, *88*(4), 1323-1328. https://doi.org/10.1007/s40011-017-0867-7
6. Davies, D. (1967). Empty rice bowls. Far Eastern Economic Review Year Book, 19-34.
7. Dixon, J., Gulliver, A., Gibbon, D., & Hall, M. (2012). Farming systems and poverty. FAO.
8. Elert, E. (2014). Rice by the Numbers: A Good Grain. *Nature, 514*(7524), 50-61. https://doi.org/10.1038/514s50a
9. FAOSTAT, Retrieved from http://www.fao.org/faostat/en/#data/QC (July 22, 2020).
10. FAO (2004). Proceedings of the FAO Rice Conference.
11. IRRI (2003). IRRI's environmental agenda. Unpublished draft document.
12. John, A., & Fielding, M. (2014). Rice production constraints and 'new' challenges for South Asian smallholders: insights into de facto research priorities. *Agriculture & Food Security*, *3*. https://doi.org/10.1186/2048-7010-3-18
13. Li, X., Liu, N., You, L., Ke, X., Liu, H., & Huang, M. (2016). Patterns of Cereal Yield Growth across China from 1980 to 2010 and Their Implications for Food Production and Food Security. *PLoS ONE, 11*(7). https://doi.org/10.1371/journal.pone.0159061
14. Liu, Y., Wang, J., & Guo, L. (2009). The spatial-temporal changes of grain production and arable land in China. *Scientia Agricultura Sinica, 42*(11), 4269–4274.
15. Monika, B.D. (2013). *Food security in Asia: challenges, policies and implications*. International Institute for Strategic Studies(IISS), London.
16. Mukhopadhyay, D. (2019). Structural break in rice production: A study with rice production. *International Journal of Food and Agricultural Economics, 7*(1), 47-61. https://doi.org/10.22004/ag.econ.283882
17. Ohnuki-Tierney, E. (1994). Rice As Self, *Princeton University Press*.
18. Ray, D.K., Ramankutty, N., Mueller, N.D., West, P., & Foley, J. (2012). Recent Patterns of crop yield growth and stagnation. *Nature Communications, 3*. https://doi.org/10.1038/ncomms2296

19. Trébuil, G. (2004). *Rice production systems in Asia: The constant presence of an essential cereal on a continent in mutation Geo-agronomist, Management of renewable resources and environment research unit (Green)*, Environments & Societies Department, Cirad, Montpellier, France. Co-Author with M. Hossain of "Le Riz: enjeux écologiques et économiques" published in 2004 by Editions Belin, Paris.
20. Tong, C., Hall, C.A.S., & Wang, H. (2003). Land use change in rice, wheat and maize production in China (1961–1998). *Agriculture Ecosystems & Environment, 95*(2), 523–536. https://doi.org/10.1016/S0167-8809(02)00182-2

INVESTMENT POLICY FACTORS OF ENTEPRISES IN SERBIA – AGRICULTURE AND PROCESSING INDUSTRY SECTORS

Jugoslav Aničić[1], Svetlana Vukotić[2], Dušan Aničić[3], Vesna Petrović[4], Dejan Čavić[5]

**Corresponding author E-mail: svetlana.vukotic@mef.edu.rs*

ARTICLE INFO

Original Article

Received: *09 December 2020*

Accepted: *28 December 2020*

doi:10.5937/ekoPolj2101037A

UDC
331.107.266:338.43(497.11)

Keywords:

agriculture, processing industry, investments, enterprise, Serbia
JEL*: D04, D25, Q14*

ABSTRACT

In this paper, the authors research and analyze the impact of factors that decisively influence making investment decisions in enterprises operating in the agriculture and processing industry sectors. The fact is that significant foreign direct investments have been coming to Serbia for many years, but the development gap with comparable countries in Central and Eastern Europe is not decreasing. Analysis show that economic development cannot be left only to the market and foreign investments, but an appropriate economic policy is needed to encourage public and private investments, based on domestic savings. Authors believe that companies from agriculture and processing industry should be carriers of economic growth and development, employment, exports and the creation of new value, but they need a stable and predictable business environment, as well as the support of official economic policy.

1 Jugoslav Aničić, Ph.D., Full Professor, Faculty of Economics and Finance, University Union-Nikola Tesla, Cara Dušana 62-64, Belgrade, Serbia, Phone: +381 64 24 77 199, E-mail: ajugoslav@yahoo.com, ORCID ID (https://orcid.org/0000-0003-3467-7071)

2 Svetlana Vukotić, Ph.D., Full Professor, Faculty of Applied Management, Economics and Finance, University Business Academy in Novi Sad, Jevrejska 24, Belgrade, Serbia, Phone: +381 63 80 16 186, E-mail: svetlana.vukotic@mef.edu.rs, ORCID ID (https://orcid.org/0000-0002-5179-7537)

3 Dušan Aničić, Ph.D., Assistant Professor, Faculty of Economics and Finance, University Union-Nikola Tesla, Cara Dušana 62-64, Belgrade, Serbia, Phone: +381 64 40 82 692, E-mail: dusan.anicic@yahoo.com, ORCID ID (https://orcid.org/0000-0003-1201-0532)

4 Vesna Petrović, Ph.D., Assistant Professor, Faculty of Economics and Finance, University Union-Nikola Tesla, Cara Dušana 62-64, Belgrade, Serbia, Phone: +381 60 71 70 071, E-mail: al.petrovicpn@gmail.com, ORCID ID (https://orcid.org/0000-0001-5476-8371)

5 Dejan Čavić, MSc, Ph.D. student, Faculty of Hotel Managment and Turism in Vrnjačka Banja, University of Kragujevac, Vojvođanska bb, 36210 Vrnjačka Banja, Serbia, E-mail: dejancavic@gmail.com, ORCID ID (https://orcid.org/0000-0002-7955-2099)

Introduction

One of the reasons for insufficient economic growth in Serbia is low public and private investments, which results in a significant lag behind comparable countries in Central and Eastern Europe in terms of living standard - GDP per capita. In period 2010-2018, Serbian economy grew cumulatively by 16%, developed Western Europe by 15%, and Central and Eastern Europe by 29% (Petrović, et al. 2019). The consequence is that the standard in Serbia, measured by GDP per capita, is one third of that in Western Europe, and at the level of 55% of that in the CEE countries. In period from 2013 to 2017, total investments in Serbia averaged about 16.8% of GDP, which is about 5% of GDP lower than the average of the CEE countries and the Western Balkans. Total investments are lower compared to the observed countries due to significantly lower public and domestic private investments. Domestic private investments in this period amounted to only 8.9% of GDP, which is 3.5% lower than the average of the Western Balkans, and as much as 7% of GDP lower than the average of CEE countries. On the other hand, net FDI in this period averaged about 5% of GDP, which is about 3.6% more than the average of CEE countries.

Economic policy has a stimulating effect on private investments if macroeconomic stability is maintained, which is reflected in low inflation, a stable exchange rate, low and relatively stable interest rates, etc. In Serbia, private and public investments are very low, while foreign direct investments (FDI) are relatively high. The causes of low domestic private investments are unfavorable general business conditions and low domestic savings. Public investments are low due to the inefficiency of the state and its development institutions. On the other hand, FDI is high due to cheap labor, low taxes, high subsidies as well as the possibility of leaving the host country without any significant negative consequences for investors. Also, FDI mostly comes in labor-intensive and low-accumulation activities, which do not require high technology. All this indicates the unsustainability of such macroeconomic policy, but that it must turn to domestic companies and improve the investment environment, which would make the development of the economy much more based on domestic savings and investments. Empirical research has also shown that countries with higher domestic savings have higher investments and faster economic growth.

The aim of this paper is to point out the negative consequences of economic and investment policy conducted in the transition period, which has led to a further lag of the economy in relation to the countries of Central and Eastern Europe (CEE). The paper presents a comparative analysis of the most important factors influencing the investment activity of companies from sector Agriculture, forestry and fishery, and sector Processing industry. With this research, the authors of this paper try to point out the existing shortcomings and weaknesses to economic policy makers, as well as to give suggestions for improvements and solutions in this area, which would reduce the gap in Serbia's development in relation to other countries, primarily CEE.

Wide range of empirical studies have addressed issues of the impact of public and private investment on short-term economic activity and medium-term economic growth. A number of empirical studies have studied the effect of public investment in the short and long term, and in particular the impact of the 2008 crisis has reinforced the question of whether increasing public investment can accelerate economic growth (Ilzetzki et al. 2013, Zdravković & Peković 2020, Gechert 2015, Auerbach and Gorodnichenko 2012 , Petrović et al. 2018; Ignjatijević et al., 2020). Research has shown that public investment has a short-term effect on aggregate demand but also a significant medium-term effect on production, on overall employment and encouraging of private sector's investments.

Investments are a key direct factor in economic growth because the level and efficiency of investments reflects the quality of economic policy and institutions. Investments also affect other factors of economic growth, such as technical progress and employment. The impact of investment on economic growth depends on the institutional environment, the openness of the economy and the intensity of competition. Levin & Renelt (1992) indicate that investment and openness of the economy are the most important factors of economic growth, while Mankiw et al. (1992) estimate that investment in physical capital explains 1/3 of economic growth. De Long and Summers (1991), on the example of the USA, show that an increase of investments in equipment by 1% of GDP raises the growth rate by 0.33%.

Empirical research has also shown that countries with higher domestic savings have higher investment and faster economic growth. Thus, e.g. Feldstein & Horioka (1981) show that the differences between countries in terms of investment rates are almost equal to the differences that exist in terms of domestic savings. Aizenanmann et al. (2007) show that developing countries finance about 90% of their capital with their own savings and that countries in which domestic savings have a larger share in financing investments also have higher economic growth. In addition, high domestic savings reflect good institutions, a good business environment and adequate economic policies. Aghion et al. (2006) underline the importance of domestic savings in developing countries as they enable the adoption of advanced technology. This is especially important because part of the FDI is placed in low-accumulation and labor-intensive activities, which do not contribute to the technological progress of the host country.

According to Besley (1995) and Lim (2014), three groups of factors determine differences in investment efficiency between countries. These are the institutions on which the security of property rights and the equality of market participants depend. The second factor is the structural characteristics of the economy, such as the development of the financial system, the openness of the economic system, the demographic characteristics of the population and similar. The third factor is economic policy in whose domain are tax policy, the level of inflation, the amount of public debt, the dynamics of wages and productivity, etc.

In addition to low domestic savings, the level of investment is affected by other factors that significantly affect the risks and return on investment such as macroeconomic policy, quality of institutions and economic structure. Economic policy stimulates private investment if macroeconomic stability is maintained, embodied in low inflation, a stable exchange rate, low and relatively stable interest rates, and as long as there is no danger of a public or private debt crisis (Aizenman & Nancy, 1993). Fatas & Mihov (2003 and 2013) point out that it is better for investment policy that economic policy is conducted on the basis of permanent rules, rather than on the basis of government decisions.

In Serbia, domestic investments (both public and private) are very low, while foreign direct investments (FDI) are relatively high. The main causes of low domestic private investments are unfavorable general business conditions and low domestic savings. Thus, for example, according to Dimitrijević et al, (2020, 595) the macroeconomic environment supported by the state should encourage private investment in agriculture and the further development of agricultural enterprises. Public investments arelow due to government's inefficiency as well as the fact that current consumption is preferred to investment. On the other hand, FDI is high due to cheap labor, free trade, low taxes, high subsidies as well as due to ad-hoc protection of foreign investors from inefficient legal and administrative system (Arsić, et al.2019; Pantić et al., 2020).

In period 2010-2018, the Serbian economy grew cumulatively by 16%, developed Western Europe by 15%, and Central and Eastern Europe by 29% (Petrović, et al. 2019). These data indicate a large decline in the Serbian economy compared to comparable CEE countries. The consequence is that the standard in Serbia, measured by GDP per capita, is one third of that in Western Europe, and at the level of 55% of that in the CEE countries.

In the period from 2013 to 2017, total investments in Serbia averaged about 16.8% of GDP, which is about 5% of GDP lower than the average of the CEE countries and the Western Balkans. Total investments are lower compared to the observed countries due to significantly lower public and domestic private investments. Domestic private investments in this period amounted to only 8.9% of GDP, which is 3.5% lower than the average of the Western Balkan countries, and as much as 7% of GDP lower than the average of CEE countries. On the other hand, net FDI in this period averaged about 5% of GDP, which is about 3.6% more than the average of CEE countries. It is important to point out that the CEE countries are not only recipients of foreign capital, but also as significant investors abroad. High investments of this group of countries abroad are a consequence of high economic growth as well as high domestic savings (Arsić, et al. 2019).

According to the World Bank, the average level of domestic savings in Serbia in the period 2013 to 2017 was only 9.3% of GDP, while the average of CEE countries is 25.4% of GDP, and in the Eurozone 24% of GDP. At the same time, the average of East Asian countries is around 34.4% of GDP. These data indicate that low domestic savings are one of the key causes of low domestic investment.

Low total investments negatively affect labor productivity, employment and future real wages, which encourages emigration trends. For the growth of total investments, it

is necessary to increase productive public investments and, through economic policy, create systemic incentives for savings and investments. In the transition period, inadequate forms of foreign direct investments were represented in Serbia, which were realized mostly through privatization, and less through greenfield investments (Maksimović, Kostić, 2019).

Investment and development policy of an enterprise

No element of financial management is so much related to the achievement of long-term goals, as is the investment policy of the company. Within the basic goal of the company, the global goal of investment is defined, as the selection and implementation of investment actions that realize the development goals of the company (Žarkić-Joksimović, et al, 2013).

Making investment decisions of a company is one of the most important and most difficult decisions that business people need to make. These decisions affect the operational environment of the company throughout the life of the investment, and the quality of such decisions will largely determine the future prosperity and health of the company itself (Pike, Dobbins, 1987).

Making investment decisions is not a one-time act, but a process of research and evaluation of a whole range of different parameters. Investment decisions can be tactical and strategic. Tactical decisions are related to investments that do not represent significant deviations from the previous business practice of the company and require less financial resources for their implementation. Strategic investment decisions, for the most part, result in major changes from what the firm has done in the past (Bierman, Smidth, 1975).

The company's growth strategy is a concretization of its development policy (Todorović, Milisavljević, 1991). Only a small number of companies have a clearly defined growth and development strategy. Growth policy is a business policy that requires that growth goals be based on the objective reality of the company, its strengths and weaknesses, markets, technologies, and not on financial fantasy (Senić, 1993). For Serbian economy, the connection between foreign direct investments and domestic small and medium enterprises is becoming increasingly important, in order to achieve the transfer of knowledge of foreign companies to domestic companies (Kovačević, 2019).

In the field of agriculture (as well as in other activities), agri-food conglomerates organized as multinational companies or as regional monopolies and oligopolies dominate today. There is convergence, ie vertical integration in which these organizations control the industry and eliminate competition because they determine all aspects of the market. The extension arm of these processes are large shopping centers which, through "social dumping", eliminate competition from small retailers. In this way, the principles of the free market were circumvented and the globalist period brought low economic growth rates and high unemployment rates (Aničić, et al. 2016).

Different types of investments encourage different problems and have a specific relative impact on the company. At the same time, there is an interdepenence between the character of investments and the goal to be achieved, the form of investment, the term of exploitation and the nature of the effects that are achieved (Todorović, Milisavljević, 1990). Investments appear as an expression of the need for companies to adapt to changing production, technical and personnel business conditions.

From the point of view of cash and cash inflow periods, Bierman and Smidth (1975) distinguish between conventional investments, loan-type investments, and unconventional investments. According to Jovanović (1991), strategic investments are a type of investment that is based on the strategic component of expected effects. A special type of investment is investing in a portfolio or group of goods. According to Francis, 1988, investing in a portfolio includes two important categories: 1) investing in real estate, and 2) investing in financial goods (securities and deposits).

Capital investments of a company represent a complete investment process. They require large sums of money and can result in a large deviation from everything that and how the company did until then (Cvetković, 2002). An integral part of each company's strategy is to determine the market determinants of its future appearance, such as market demand growth, profitability, economic, technological and socio-political turbulence, or its future competitive position (Ansoff, McDonnell, 1990). The success of a company in the market is also determined by its size, barriers to entry into a new market, as well as exit from the market and the intensity of rivalry between companies (Burke et al. 1991).

Environmental factors that stimulate the investment process can be stimulated by community measures, legislation, development of science and technology, the position of companies in the industry, the life cycle phase and the degree of development of financial markets and its instruments (Todorović, et al, 1997). In addition to the above, it is possible to identify other factors that serve as incentives for investment activity of the company, and it is possible to single out the position of the company in its branch in relation to competitors and the life cycle phase of the branch in which the company operates (Hill & Jones, 1998).

Methodology

The research for the purposes of this paper was conducted in the period January - April 2020 on a sample of 60 respondents, one half of whom are employed in sector Processing industry and the other half in sector Agriculture, forestry and fishering. The structure of the respondents consisted of managers and executives of the financial sector, and the companies by their size belong to medium and large legal entities, in accordance with the valid Law on Accounting of the Republic of Serbia.

Respondents assessed the impact of the following factors on investment decisions in the company: 1) stability of the business environment; 2) legislation; 3) financing sources; 4) competition; 5) risk of investment decisions. The answers were statistically

processed in the SPSS program, tested by the Kramer test and the significance of statistical differences in the answers of the two groups of respondents were tested by the Chi square test.

Descriptive indicators

From Table 1, it can be noticed that the measures of average values of the assessment of the factors Stability of the business environment, Legislation, Sources of financing, Competition and Risk of investment decisions are higher in relation to the theoretical average (AS = 3).

Table 1. Expression of factors

Factors	Theoretical minimum	Theoretical maximum	Empirical minimum	Empirical maximum	AS	SD
Business environment's stability	1	5	2,00	5,00	3,833	0,959
Legislation	1	5	2,00	5,00	3,633	0,822
Financing sources	1	5	2,00	5,00	3,716	0,958
Competition	1	5	2,00	5,00	3,766	1,047
Investment decisions' risk	1	5	2,00	5,00	3,800	0,953

Source: Authors' research

The paper also identifies differences in factor estimates with respect to the sector in which the respondent is employed – processing industry or agriculture. Differences in factor estimates were represented by the Chi-Square test ($\chi 2$) with the significance of the difference for Sig values. (significance of difference) ≤ 0.05. The strength of the relationship between the variables was determined by Cramer's (V) indicator. The values of the bond strength of the variables are: 1) 0 - 0.1 slight correlation; 2) 0.1 - 0.3 small association; 3) 0.3 - 0.5 mean correlation; 4) V> 0.5 high correlation.

Discussion and research results

Stability of the business environment

In formulating an investment strategy, the company should identify favorable opportunities that can improve the company's position and risks from the environment that act in the opposite direction. The investment strategy must be harmonized with the factors of the external environment, which can be stable, dynamic and uncertain. The dynamism of the environment is reflected in constant changes, which requires continuous assessment and monitoring of events in it. The changing environmental conditions have different implications for the overall strategy and thus for the investment. The macroeconomic environment contains economic, demographic, social, political, technological and other factors that determine the current and future position of the company and its strategy. The stability and predictability of the legislative framework

is a very important factor for a company's investment policy. Especially companies in the field of agriculture are largely exposed to seasonal and other influences that complicate the process of formulating and implementing investments.

Table 2. Distribution of respondents' answers in the assessment of Business environment's stability factor considering the enterprise's sector (Crosstabulation)

Marks	Economy sector	
	Processing industry	Agriculture, forestry and fishing
2	0	4
3	9	12
4	9	7
5	12	7

Source: Authors' research

The largest number of employees in the processing industry (12) gave the highest score to the factor Stability of the business environment, while in agriculture the largest number of respondents (12) gave the mentioned factor a good grade (3). No statistically significant differences were found ($\chi 2 = 5.994$, $p > 0.05$) in the assessment of the factor Stability of the business environment with regard to the enterprise sector. Kramer's index is $V = 0.316$, which indicates a mean correlation between the variables. The sector from which the company is does not affect the assessment of the factor Stability of the business environment, given that for all variables $Sig > 0.05$, with the existence of a mean correlation between the variables.

Legislation

Many countries have achieved economic development thanks to the role that the state played by eliminating market shortcomings through economic policy measures, such as monopoly positions, exchange rate movements, labor market rigidity, etc. These countries respected market laws, but significantly influenced and participated in economic flows. In Serbia, significant monopoly and oligopolistic structures and a bank-centric financial system emerged in the transition period, which is the reason for more significant corrections by state institutions in order to create conditions for equal participation of all actors in economic life. The instruments of fiscal and monetary policy are in the competence of state institutions, and it is in the interest of companies to have transparency and predictability of regulations, without frequent changes. Income tax, VAT and other tax forms have a great impact on business results and strategic moves of the company, as well as a stable exchange rate, low inflation, stimulating credit policy, low interest rates which are greatly influenced by the NBS over the reference interest rate, etc. Citizens' income taxes must be progressive and the entire tax mechanism must stimulate investment. The tax system must be predictable and stable over long periods of time. At the same time, it is necessary to disable the gray economy, doing business through tax havens and preventing foreign companies from avoiding paying taxes in Serbia. It is also important to have a clear division of responsibilities in the introduction of tax levies and other duties between republican and local authorities in order to avoid duplication of taxes and reduce the number of tax levies, fees and charges.

Table 3. Distribution of respondents' answers in the assessment of Legislation factor considering the enterprise's sector (Crosstabulation)

Marks	Economy sector	
	Processing industry	Agriculture, forestry and fishing
2	0	5
3	9	11
4	18	9
5	3	5

Source: Authors' research

The largest number of employees in companies engaged in production (18) evaluates the importance of the factor Legislation very well, while the largest number of respondents in companies in the field of trade (11) evaluates the importance of the factor Legislation (Table 3). The results show that statistically significant differences were found ($\chi 2$ = 8,700, $p < 0.05$) in the assessment of the factor Legislation with regard to the enterprise sector. Kramer's index is V = 0.381, which indicates a mean correlation between the variables. The sector in which the company operates affects the assessment of the impact of the factor Legislation, given that for all variables Sig <0.05, with the existence of a moderate relationship between the variables.

Financing sources

Appropriate sources of financing, own or borrowed, are necessary for the realization of investment strategy of the company. A serious problem of companies in Serbia is insufficient own capital for development needs, so companies are forced to borrow on the financial market for the needs of financing investments, most often in the form of bank loans. Banks prefer to give short-term, consumer and even housing loans because they all carry less risk than long-term investment loans. Credit conditions are largely not adjusted to the needs of the company, especially in terms of approval maturity and interest rates. In addition, most loan agreements contain a currency clause which in turn carries the risk of exchange rate fluctuations. The small business sector is not attractive to the banking sector, so the formation of microcredit financial institutions would be a significant step forward in the field of their financing. On the other hand, specialized agro-banks have disappeared in the last ten years, which has intensified the problems of financing with companies in the agricultural field. It is also a well-known practice that some western countries have introduced credit quotas in order to force banks to direct loans in the interest of development.

Table 4. Distribution of respondents' answers in the assessment of Financing sources factor considering the enterprise's sector (Crosstabulation)

Marks	Enterprise's sector	
	Processing industry	Agriculture, forestry and fishing
1	0	1
2	3	2
3	7	10
4	14	10
5	6	7

Source: Authors' research

The largest number of employees in companies from the processing industry sector (14) evaluates the importance of the factor Sources of financing with a very good grade, while the largest number of employees in companies engaged in agriculture (10) evaluates this factor with a good and very good grade (Table 4). No statistically significant differences were found ($\chi 2 = 2.473$, $p > 0.05$) in the assessment of the factor Sources of financing with regard to the enterprise sector. Kramer's index is $V = 0.203$, which indicates a small correlation between the variables. The sector from which the company originated does not affect the differences in the assessment of funding sources, given that for all variables $Sig > 0.05$, with little correlation between the variables.

Competition

The development model of underdeveloped countries is mainly based on the effort to integrate their economies into global production chains, relying exclusively on foreign investments, offering cheap labor and subsidies, as the most important trump cards. Such model is unsustainable, especially in the conditions of great crises that we are witnessing. Using the financial crisis or pandemic as an excuse, developed countries are helping their economies without restraint, without the risk of being accused of violating the rules of global market competition.

Competition is manifested in the fight for the best possible position on the market. In the conditions of changing and intensified competition, in the conditions of economic and technological changes, the company must protect the acquired positions on the market with appropriate strategic actions. The competitive environment encompasses current and future competition, their strategies and domains, as well as their weaknesses and strengths. Each economic sector has specific competitive forces that arise under the influence of fundamental technological and economic characteristics. Diversification strategy, cost leadership, economies of scale, the emergence of substitutes and numerous entry-exit barriers are elements that the company continuously takes into account in order to survive in the market. Entering foreign markets is a particularly important issue for the SME sector, and their future growth and development.

Table 5. Distribution of respondents' answers in the assessment of Competition factor considering the enterprise's sector (Crosstabulation)

Marks	Enterprise's sector	
	Processing industry	Agriculture, forestry and fishing
1	0	2
2	4	2
3	7	4
4	10	16
5	9	6

Source: Authors' research

The largest number of employees in enterprises from the processing industry (10) and agriculture (16) rate the Competition factor with a very good rating (Table 5). No statistically significant differences were found ($\chi 2 = 5.469$, $p > 0.05$) in the assessment of the Competition factor with regard to the enterprise sector. Kramer's index is $V = 0.302$, which indicates a moderate relationship between variables. The area from which the company is does not affect the differences in the assessment of the impact of competition factors on the investment policy of the company, given that for all variables Sig> 0.05, with the existence of a medium correlation between the variables.

Investment decisions' risk

The process of making investment decisions is accompanied by a certain degree of risk or uncertainty, because investing is an investment of funds in the present in order to achieve appropriate effects in the future. The risk cannot be eliminated, but with certain efforts it can be predicted and thus reduced. Risk is an integral part of strategic decision-making that goes back several years. As a rule, the longer the forecast period, the greater the variability of possible effects, which means that the risk in terms of the possibility of their realization increases. Investment decisions generally imply long-term and irrevocable consequences, and their adoption must be primarily imbued with research on the amount and certainty of business results that will be achieved through their implementation. An attractive investment alternative for a company is one that should improve its strategic position in the foreseeable future. Good decisions are those that are based on timely and comprehensive information, obtained by applying appropriate criteria, that are made at the optimal time, and that are tested in terms of the sensitivity of the decision to the accuracy of the assumptions on which it is based.

Table 6. Distribution of respondents' answers in the assessment of Investment decisions' risk factor considering the enterprise's sector (Crosstabulation)

Marks	Enterprise's sector	
	Processing industry	Agriculture, forestry and fishing
1	1	0
2	1	3
3	8	8
4	14	10
5	6	9

Source: Authors' research

The largest number of employees from the processing industry (14) and agriculture (10) rate the Investment decisions' risk factor with a very good score (Table 6). No statistically significant differences were found ($\chi 2 = 3.267$, $p > 0.05$) in the assessment of the Risk of investment decisions factor with regard to the enterprise sector. Kramer's index is $V = 0.233$, which indicates a small correlation between the variables. The area from which the company comes does not affect the differences in the assessment of the impact of risk factors of investment decisions of the company on its investment policy, given that for all variables Sig> 0.05, with a weak correlation between the variables.

At the end of the research, it was determined which factors have the highest average value and the greatest importance in the respondents. Table 7 shows that respondents from the processing industry estimate that the most important factor is the stability of the business environment (AS = 4,100), while respondents from companies engaged in agriculture, forestry and fishing assessed that the risk of investment decisions (AS = 3,833) is the most important factor with an impact on making investment decisions.

Table 7. Average values of respondents' marks in the assessment of most significant factors in the enterprises of the manufacturing and agriculture sectors (Mean)

Factors	Sector	
	Processing industry	Agriculture, forestry and fishing
Business environment's stability	4.100	3.566
Legislation	3.800	3.466
Financing sources	3.766	3.666
Competition	3.800	3.733
Investment decisions' risk	3.766	3.833

Source: Authors' research

Conclusions

Economic policy in the coming period must create equal conditions for domestic and foreign investors who aim to invest in the economic development of the country. For its part, the state should, through public investments, primarily in infrastructure, influence the increase of private investments, domestic and foreign. In such conditions, domestic companies, regardless of their relatively modest own funds, would find it easier to decide on investments. With its economic policy, the state should support incentives for investment and reduce the influence of limiting factors. There are numerous instruments by which this is achieved, from import substitution, through export stimulation, credit and monetary policy, predictable conditions for business, stable exchange rate and controlled inflation, etc.

Research in our work has shown that companies in their investment policy attach great importance to the factors on which their long-term investments depend. Although many of these factors are not individually influenced by companies individually, their understanding contributes to a more efficient business policy overall, as well as in the field of long-term investments and assessment of their profitability. In our research, companies from the processing industry sector individually gave the greatest importance to the factor of business environment stability, although other factors (legislation, sources of financing, competition and risk of investment decisions) received above-average ratings. On the other hand, companies from the agriculture, forestry and fishing sector gave the greatest importance to the factor risk of investment decisions, which indicates the characteristics of this sector in relation to other economic sectors, from seasonal influences to other specifics in business.

Conflict of interests

The authors declare no conflict of interest.

References

1. Agencija za privredne registre, (2020). *Godišnji izveštaj o poslovanju privrede u 2019. godini*, Beograd. [*In English:* Serbian Business Registers Agency (2020) Annual Business Report on Operations in 2019, Belgrade]
2. Aghion, P., Diego, C., & Howit, P. (2006). When Does Domestic Saving matter for Economic Growth? *Working Paper* 12275 NBER.
3. Aizenman, J., & Nancy, M. (1993). Policy Uncertainty, Persistence and Growth. *Review of International Economics, 1*(2), 145-63. https://doi.org/10.1111/j.1467-9396.1993.tb00012.x
4. Aizenman, J., Pinto, B., & Radziwill, A. (2007). Sources for Financing Domestic Capital – Is foreign Saving a Viable Option for Development Countries. *Journal of International Money and Finance, 26*(5), 682-702.
5. Aničić, J., Vukotić, S., & Krstić, S. (2016). The strategic aspects and results of agriculture development in Serbia in the transition period. *Economics of Agriculture, 63*(1), 175-187. https://doi.org/10.5937/ekoPolj1601175A
6. Ansoff, I., & McDonnell, E. (1990). *Implanting Strategic Management,* Prentice – Hall, New York.
7. Auerbach, A., & Gorodnichenko, Y. (2012). Measuring the Output Responses to Fiscal Policy, *American Econ. J.: Econ, Policy 4*(2), 1-27. https://doi.org/10.1257/pol.4.2.1
8. Arsić, M., Ranđelović, S., & Nojković, A. (2019). *Uzroci i posledice niskih investicija u Srbiji, Zbornik radova Ekonomska politika Srbije u 2019. godini*, Naučno društvo ekonomista Srbije, SANU i Ekonomski fakultet Beograd, 43-61. [*In English:* Arsić, M., Ranđelović, S., & Nojković, A. (2019), Causes and consequences of low investments in Serbia, Collection of Articles - Economic policy of Serbia in 2019, Serbian Scientific Society of Economists, Serbian Academy of Sciences and Arts and Faculty of Economics, Belgrade, 43-61]

9. Besley, T. (1995). Property Rights and Investment Incentives: Theory and Evidence from Ghana. *Journal of Political Economy, 103*(5), 903-937.
10. Bierman, H., & Smidth, S. (1975). *The Capital Budgeting Decision: Economic Analysis and Financing of Investment Projects,* Macmillan Publishing Company, New York.
11. Burke, T., Genn-Bash, A., & Haines, B. (1991). *Competition in Theory and Practice,* Ruotledge, London and New York.
12. Cvetković, N. (2002). *Strategija investicija preduzeća,* Institut ekonomskih nauka, Beograd. [In English: Cvetković, N. (2002), *Investment Strategy of Enterprises,* Institute of Economic Sciences, Belgrade].
13. De Long, J., & Summers, L. (1991). Equipment Investment and Economic Growth. *The Quarterly Journal of Economy, (106)*2, 445-502. https://doi.org/10.3386/w3515
14. Dimitrijević, M., Vržina, S., & Leković, M. (2020). Agricultural Enterprises and Economic Growth: Regional Analysis in the Republic of Serbia. *Economics of Agriculture*, *67*(2), 585-600. https://doi.org/10.5937/ekoPolj2002585D
15. Gechert, S. (2015). What fiscal policy is most effective? A meta-regresion analysis, *Oxford Economics Papers, 67*(3), 1-28.
16. Ignjatijević, S., Aničić, A., Vapa-Tankosić, J., & Belokapić-Čavkunović, J. (2020). Determining relationship between economic growth and environmental protection. *Oditor-časopis za menadžment, finansije i pravo, 6*(1), 38-48. https://doi.org/10.5937/Oditor2001036I
17. Ilzetzki, E., Mendoza, E.G. & Végh, C.A. (2013). How big (small?) are fiscal multipliers? *Journal of Monetary Economics, 60*(2), 239-254. https://doi.org/10.1016/j.jmoneco.2012.10.011
18. Fatas, A., & Mihov, I. (2013). Policy Volatility, Institutions, and Economic Growth. *The Review of Economics and Statistics, 95*(2), 362-376. https://doi.org/10.1162/REST_a_00265
19. Feldstein, M., & Harioka, C. (1980). Domestic Saving and International Capital Flows. *The Economic journal,* 90(358), 314-329. https://doi.org/10.2307/2231790
20. Francis, J.C. (1988). *Management of Investments,* McGraw-Hill Book Company, City University of New York.
21. Jovanović, P. (1991). *Upravljanje investicijama,* Fakultet organizacionih nauka, Beograd. [*In English:* Jovanović, P. (1991), *Investment Management,* Faculty of Organizational Sciences, Belgrade]
22. Hill, C., & Jones, R. (1998). *Strategic Management Theory – an Integrated Approach,* Houghton Mifflin Company, Boston.
23. Kovačević, R. (2019). Uticaj stranih direktnih investicija na izvozne performanse i platni bilans Srbije, Zbornik radova Ekonomska politika Srbije u 2019. godini, Naučno društvo ekonomista Srbije, SANU i Ekonomski fakultet Beograd, 111-126.

[*In English*: Kovačević, R. (2019), The influence of foreign direct investments on export performance and balance of payments of Serbia, Collection of Articles - Economic policy of Serbia in 2019, Serbian Scientific Society of Economists, Serbian Academy of Sciences and Arts and Faculty of Economics, Belgrade, 111-126]

24. Lim, J.J. (2014). International and Structural Determinants of Investment Worldwide. *Journal of Macroeconomics, 41*(C), 160-167. https://doi.org/10.1016/j.jmacro.2014.05.007
25. Levine, R., & Renelt, D. (1992). A Sensitivity Analysis of Cross-Country Growth Regressions. *American Economic Review, American Economic Association, 82*(4), 942-963.
26. Mankiw, N.G., Romer, D., & Weil, D. (1992). A Contribution to the Empirics of Economic Growth. *Quarterly Journal of Economics, 107*(2), 407-437. https://doi.org/10.2307/2118477
27. Maksimović, Lj., & Kostić, M. (2019). *Dinamika i implikacije odnosa stranih direktnih investicija i tekućeg bilansa odabranih zemalja Balkana*, Zbornik radova Ekonomska politika Srbije u 2019. godini, Naučno društvo ekonomista Srbije, SANU i Ekonomski fakultet Beograd, 61-74. [*In English:* Maksimović, Lj., & Kostić, M. (2019), Dynamics and implications of the relationship between foreign direct investments and the current account of selected Balkan countries, Collection of Articles - Economic policy of Serbia in 2019, Serbian Scientific Society of Economists, Serbian Academy of Sciences and Arts and Faculty of Economics, Belgrade, 61-74]
28. Pantić, N., Krunić, N., & Matić, I. (2020). The Possibility of using international project financing for defence systems. *Vojno delo, 72*(1), 56-70. https://doi.org/10.5937/vojdelo2001056P
29. Pike, R., & Dobbins, R. (1987). *Investment Decisions and Financial Strategy,* Philip Alan, Great Britain.
30. Petrović, P., Arsić, M., & Nojković, A. (2018). *Is Increase in Government Investment Effective Policy in Bad Times: Evidence from Emerging EU Economies*, Working Paper.
31. Petrović, P., Brčerević, D., & Šaranović, S. (2019). *Javne investicije i ekonomski rast: lekcije za Srbiju, Zbornik radova Ekonomska politika Srbije u 2019. godini*, Naučno društvo ekonomista Srbije, SANU i Ekonomski fakultet Beograd, 11-43. [*In English:* Petrović, P., Brčerević, D., & Šaranović, S. (2019), Public Investment and economic growth: lessons for Serbia, Collection of Articles – Economic Policy of Serbia in 2019, Serbian Scientific Society of Economists, Serbian Academy of Sciences and Arts and Faculty of Economics, Belgrade, 11-43]
32. Senić, R. (1993). Upravljanje rastom i razvojem preduzeća, Savremena administracija, Beograd. [*In English:* Senić, R. (1993), *Management of Enterprise's Growth and Development,* Contemporary Administration, Belgrade]

33. Todorović. J., & Milisavljević, M. (1991). *Strategijsko upravljanje,* Ekonomski fakultet, Beograd. [*In English:* Todorović. J., & Milisavljević, M. (1991), *Strategic Management,* Faculty of Economics, Belgrade]

34. Todorović. J., & Milisavljević, M. (1990). *Planiranje i razvojna politika preduzeća,* Savremena administracija, Beograd. [*In English:* Todorović. J., & Milisavljević, M. (1990), *Planning and Development Policy of an Enterprise,* Contemporary Administration, Belgrade]

35. Zdravković, S., & Peković, J. (2020). The analysis of factors influencing tourists' choice of green hotels. *Hotel and Tourism Management*, *8*(1), 69-78. https://doi.org/10.5937/menhottur2001069Z

36. Žarkić-Joksimović, M., Benković, S., & Milosavljević, M. (2013). *Finansijski menadžment,* Fakultet organizacionih nauka, Beograd. [In English: Žarkić-Joksimović, M., Benković, S., & Milosavljević, M. (2013), Finance Management, Faculty of Organizational Sciences, Belgrade]

A PERSPECTIVE ON AGRICULTURAL LABOR PRODUCTIVITY AND GREENHOUSE GAS EMISSIONS IN CONTEXT OF THE COMMON AGRICULTURAL POLICY EXIGENCIES

Marius Constantin[1], Iuliana Denisa Rădulescu[2] Jean Vasile Andrei[3], Luminița Chivu [4], Vasilii Erokhin[5], Tianming Gao[6]

**Corresponding author E-mail: dennisaradulescu@gmail.com*

ARTICLE INFO

Original Article

Received: *01 February 2021*

Accepted: *02 March 2021*

doi:10.5937/ekoPolj2101053C

UDC 504.7:338.43.02

Keywords: agriculture, environment, CAP, labor productivity, greenhouse gas emissions, convergence.

JEL*: Q15, Q24, R14*

ABSTRACT

European agriculture is the result and experiences of a numerous and md determinant reforms during last period of time. Labor productivity and green gas emissions represents two major turning points in analyzing the Common Agricultural Policy evolution. The main aim of this research is to make a synoptic analysis of the agriculture evolution in context of the new Common Agricultural Policy paradigm transformation from the perspective of sectorial structural changes determined by the new environmental exigencies and labor productivity.

1 Marius Constantin, Ph.D. student, The Bucharest University of Economic Studies, Doctoral School Economics II, Mihail Moxa Street no. 5-7, Bucharest, Romania, Phone: +40 732 776 886, E-mail: constantinmarius15@stud.ase.ro

2 Iuliana Denisa Radulescu Ph.D. student, The Bucharest University of Economic Studies, Doctoral School Economics II, Mihail Moxa Street no. 5-7, Bucharest, Romania, Phone: +40 769 323 710, E-mail: dennisaradulescu@gmail.com

3 Jean Vasile Andrei, Ph.D., Full Professor, Petroleum-Gas University of Ploiesti, 39, B-dul Bucuresti, Ploiesti, 100680, and Researcher, National Institute for Economic Research 'Costin C. Kiritescu', Romanian Academy, Romania, Phone: +407 27 615 540, E-mail: andrei_jeanvasile@yahoo.com, ORCID ID (https://orcid.org/0000-0002-8332-6537)

4 Luminita Chivu, Ph.D, Senior Researcher, National Institute for Economic Research 'Costin C. Kiritescu', Romanian Academy, Casa Academiei, Calea 13 Septembrie nr. 13, Sector 5, Bucharest, 050711, Romania, E-mail: chivu@ince.ro, ORCID ID (https://orcid.org/0000-0003-3661-2626)

5 Vasilii Erokhin, Ph.D., Associate Professor, School of Economics and Management, Harbin Engineering University, 145, Nantong Street, Harbin, 150001, China, Phone: +861 56 367 09 072, E-mail: basilic@list.ru, ORCID ID (https://orcid.org/0000-0002-3745-5469)

6 Tianming Gao, Ph.D., Associate Professor, School of Economics and Management, Harbin Engineering University, 145, Nantong Street, Harbin, 150001, China, Phone: +861 56 367 09 072, E-mail: gaotianming@hrbeu.edu.cn, ORCID ID (https://orcid.org/0000-0002-5202-8684)

Introduction

Agriculture represents more than a source of food production and it is a sector that brings many contributions, except consolidating the GDP – more in the case of Romania, than in the case of the European Union (EU). Agriculture involves much more: rural communities rely on agricultural activities; agriculture involves natural resources management, preserves the specific lifestyle in rural areas and much more. Not only that, but also agriculture acts as an important generator of jobs in rural areas, especially in developing countries, where the share of the population living in the rural area from total population is considerable.

As it is already argued in literature (Burlacu, 2018; Galluzzo, 2018; Lupu, 2020), the Common Agricultural Policy has had a significant impact on the Romanian agricultural sector in both financial frameworks: 2007-2013 and 2014-2020. Not only that, but CAP will also continue to have a major influence on the Romanian agricultural sector, as the next financial framework approaches: 2021-2027. This policy is one of the most important European policies affecting such an important part of the economy and population, which passes through a new reform at the beginning of the 2021-2027 financial framework.

Through its pillars, the Common Agricultural Policy is not only affecting EU farmers, but it is actually affecting all the EU citizens, in many ways. As is already highlighted (Matthews, 2018; Lovec et al., 2020), Common Agricultural Policy is structured on two complementary pillars. Pillar I concerns direct payments and market-oriented measure, aiming to contribute to achieving a higher level of environmental and climate ambition. Pillar II is meant to aid development in rural areas through economic and social schemes. According to (Kiryluk-Dryjska and Baer-Nawrocka, 2019; Pawłowski and Piotr, 2020), there are two essential mechanisms at designed to finance measures the CAP, specific to each of the two pillars: EAFRD (The European Agricultural Fund for Rural Development) and the EAGF (European Agricultural Guarantee Fund).

The latter finances expenditure meant to support the direct payments to farmers, measures designed to inform and promote agricultural products on the Community's internal market, intervention measures aimed at regulating agricultural markets and other specific measures. On the other hand, the EAFRD corresponds to Pillar II of the CAP and it designed to finance rural development measures in the EU. In this context, CAP has multiple dimensions: the market-oriented and financial support dimension and the rural development dimension. Both dimensions are interconnected and sustainable, considering that they act complementary and the each EU Member State must co-finance the projects which contribute to the rural development in their country. CAP is not only helping farmers ensure food security in the EU, but it also has a significant contribution to developing rural areas and to building a more sustainable and environmentally-friendly economy in the rural areas.

Even on the verge of the 2014-2020 financial frameworks' end, Romania's agriculture is still trying to catch up to the competitiveness and green criteria of the European

Union. Reducing the gaps in productivity and competitiveness represents Romania's main focus when approaching the agricultural sector. Romanian rural areas are the evidence of an intense out emigration to urban agglomerations and wealthy cities. Mitigating the negative socio-economic impact of this transition and the lack of competitiveness in the agriculture, the CAP represents the main instrument for improvement in the case of Romania.

The main aim of this research is to study the evolution of the Romanian agriculture in the context of the new Common Agricultural Policy paradigm transformation from the perspective of sectorial structural changes determined by the new economic exigencies. This research paper contributes to an explicit understanding of the CAP problems as a specific policy with great impact on Romanian agricultural system and rural community's development.

Literature Review

Agriculture in the EU countries is differentiated in many regards, similar to the many ways each of the CAP measures have different results, based on the specificities of each state. Romania tries to converge to the sustainable development of agriculture in the European Union by using CAP instruments in order to adopt measures that fit best the national circumstances; measure meant to mitigate the effects of the declining rural population, poor development of non-agricultural activities in rural areas which generates dependence on subsistence agriculture; low level of labor productivity are other issues (Comanescu, Foris and Foris, 2019). Additionally, through adopting CAP measures, agricultural entrepreneurial income is meant to increase among all EU Member States (Marcuta and Marcuta, 2019). This can also be achieved by empowering the diversification of entrepreneurial initiatives in the rural economy – financeable through the second pillar of the CAP (Răzvanță, 2020).

Divergence still exists between the EU Member States when approaching the agricultural sector. Denmark is a country with a low population and high-income potential. On the other hand, Poland and Romania are countries with high population potential, with an important share of people working in agriculture, but with low-income potential (Tluczak, 2020).

However, converge must be achieved in the agricultural sector in the EU. The measures supported by the CAP must be constantly updated according to the needs of farmers and according to the market situation at different moments and eventually trying to anticipate future outcomes (Dumitru et al., 2017a). For developing countries such as Romania and Bulgaria, both CAP pillars are critical for agriculture, but with an emphasis on the first pillar. Adopted measures need to be taken in order to eliminate the existing gaps with the other countries, especially in the Northwestern EU (Dumitru et al., 2017b).

Galluzzo (2016) demonstrated the existence of a direct correlation between the Single Area Payments Schemes and crop specialization. Mack, Fintineru and Kohler (2020)

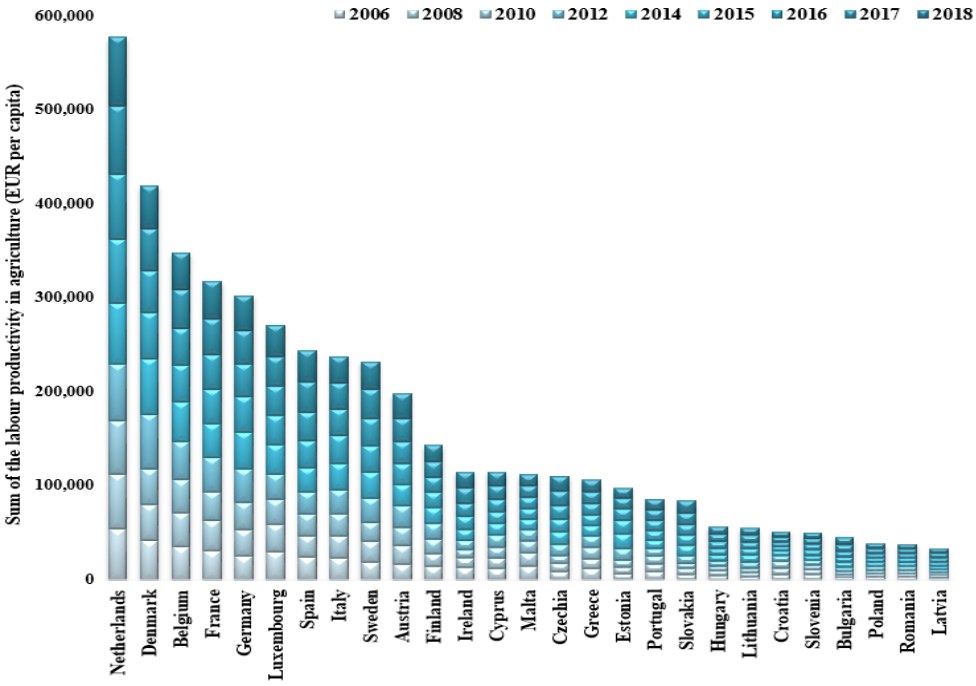
demonstrated that the results of implementing the CAP in Romania have positive outcomes: higher the treatment intensity imply the generation of more new enterprises and that funds higher than €50 per capita significantly contribute to the generation of newly established in rural areas. Through the first pillar of the CAP, the financial subsidies allocated for Romania have had an effect on the development of agritourism, yet this is in contrast with the subsidies disbursed under the second pillar have had no unique effects in any Romanian development region (Galluzzo, 2020).

As it is remarked by Lupu,(2020), during the 2014-2020 financial framework, Romania encountered several difficulties related to the CAP structure: Romania has a deeply fragmented agricultural land and there are many small and very small farms, therefore there is a lack of cooperatives; the population working in agriculture is aged and the labor force involved in agriculture is inefficient (Lupu, 2020).

Research findings

When analyzing the evolution of the labour productivity in agriculture (EUR per capita), one can notice the divergence between the Northwestern European countries and those from the Eastern Europe and the Baltics.

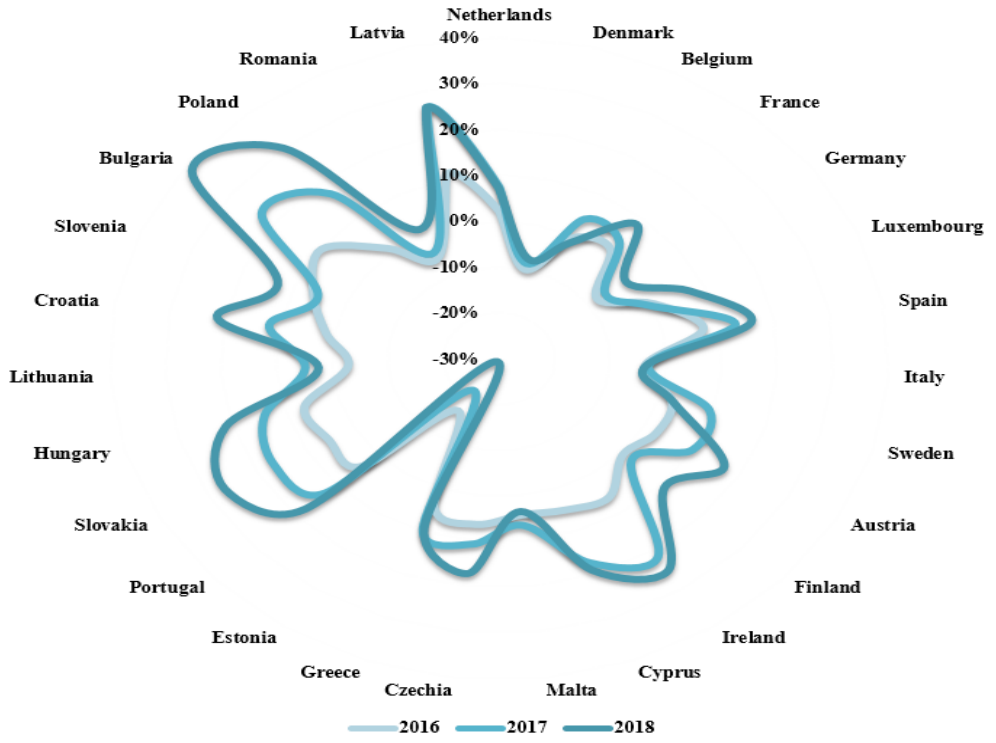
Figure 1. The evolution of the labour productivity in agriculture (EUR per capita), per country and year in the EU-27



Source: Own representation, based on the CTX_SOC_12_1 raw data Eurostat, 2020

During the 2006-2018 period, even though the CAP tried to adjust the existing labour productivity discrepancies between the EU-27 members via various changes made at the level of the measures and of the budget structure, those initiatives could not and still cannot successfully and completely mitigate the huge progress made in terms of the agriculture labor productivity by Northwest EU-27 members, such as: Netherlands (72,825 EUR/capita in 2018), Denmark (45,506 EUR/capita in 2018), Belgium (39,082 EUR/capita in 2018), France (39,736 EU/capita in 2018) and Germany (37,165 EUR/capita in 2018). Even though the mean of the labour productivity in agriculture in the EU-27 in 2018 was 20,829 EUR/capita, the Baltics and Eastern European members are below average and in need to align with the European competitiveness in terms of the labour productivity. The most affected countries by the labour productivity gap: Romania (4,955 EUR/capita), Latvia (5,075 EUR/capita), and Poland (5,692 EUR/capita) should try to identify those measures in the CAP that are meant to transform traditional agricultural labor patterns into modern models of agriculture: precision agriculture highly digitized. Romania's agriculture needs to harness its development potential by mixing digitalization with performant equipment and technologies, as this could increase the labour productivity.

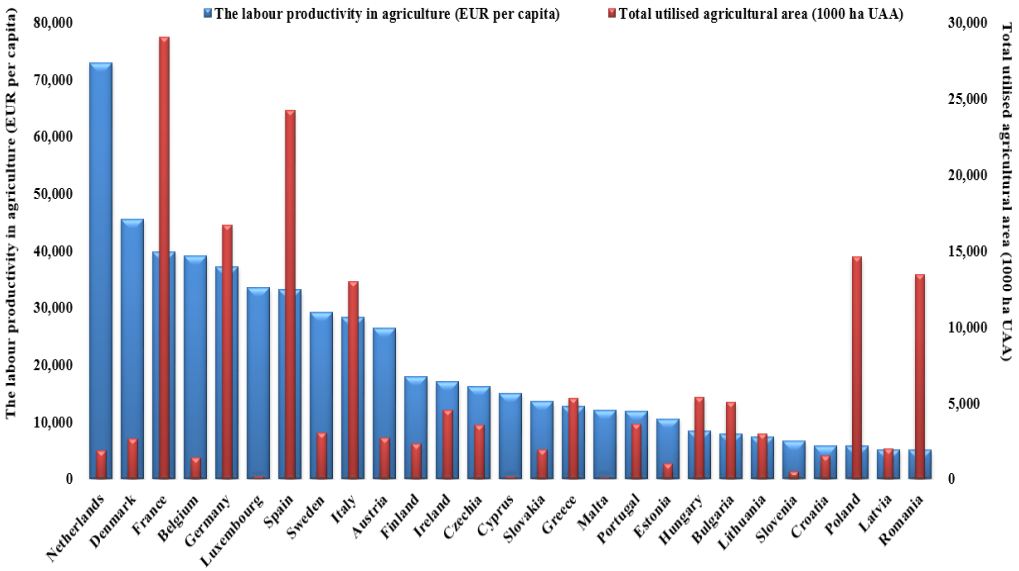
Figure 2. The dynamics of the labour productivity in agriculture (percentage change), per country and year in the EU-27, base year = 2015



Source: Own calculations and representation, based on the CTX_SOC_12_1 raw data Eurostat, 2020

Regarding the dynamics of the labour productivity in agriculture (percentage change) one can notice the tendency for convergence in the case of the Baltics and Eastern European states to the EU-27 average. Even though these states are facing issues in terms of the labor productivity in agriculture, they are catching up to the labour of the Northwestern European countries through harnessing the instruments of CAP. The Northwestern European states have a slower rate of growth in terms of the labor productivity in agriculture, since they are already ahead of the Baltics and Eastern European states. For these findings, there is evidence: huge increases (expressed procentually) of the labor productivity in agriculture in country such as: Bulgaria (38.6%), Poland (30%), Slovakia (26.73%), Latvia (26.41%) and Hungary (21.07%), along with decreases or small increases in the case of the Northwestern EU-27 countries, such as: Denmark (-7.51%), Belgium (-1.65%), Germany (-1.66%), Netherlands (7.19%) and France (8.35%). Unfortunately, Romania is still behind of the Baltics and other Eastern European States in terms of converging to the EU-27 mean, mainly due to the small increase rate (1.62%) in terms of labor productivity in agriculture, while simultaneously having the least labor-productive agriculture in the EU-27 in 2018.

Figure 3. The labour productivity in agriculture (EUR per capita) in relation with the total utilised agricultural area (1,000 ha UAA) per country UE-27, reference year: 2018

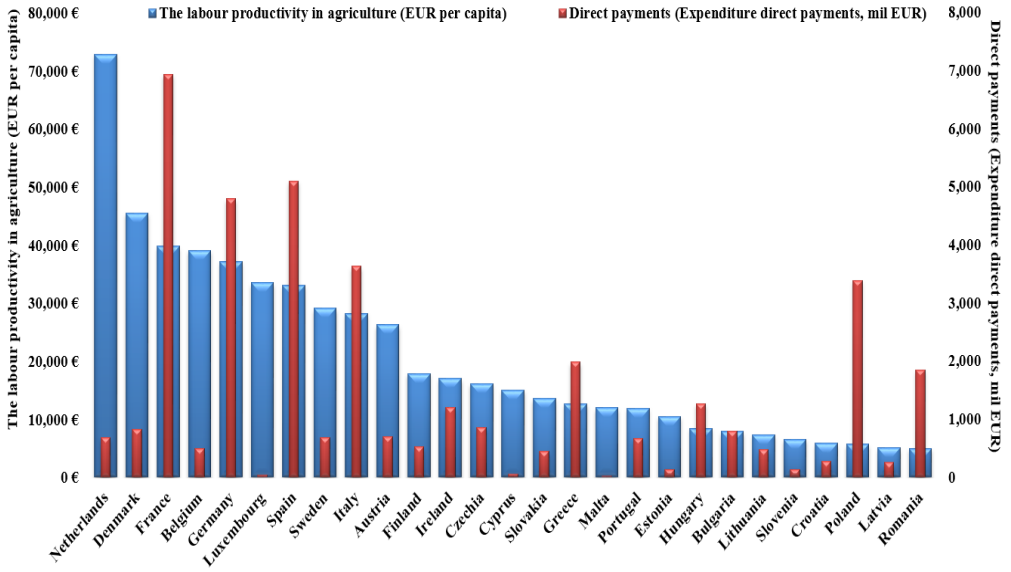


Source: Author's own representation, raw data source: Eurostat, 2020

Correlating the labor productivity in agriculture with the total utilized agricultural area in the EU-27, more discrepancies are observed. With the exception of France, Germany and Spain, the Northwestern European countries and more specifically: Netherlands, Denmark and Belgium are among the most labor-productive countries in the EU-27 in terms of agriculture, yet the total utilized area in those countries is below the average of the EU-27. With extremely limited areas dedicated for agriculture, the Netherlands

(1,822.4), Denmark (2,632.5) and Belgium (1,356.08) registered high values of labor productivity in agriculture in 2018 and they are in the top 5 best performing countries regarding this indicator. Unfortunately, Poland and Romania are not successfully harnessing their agricultural potential when reported to their total utilized agricultural area: 14,539.55 and 13,413.77 (1,000 ha UAA). Their labor productivity in agriculture represents only 6.76% of the Denmark's, Belgium's and Netherland's labor productivity in agriculture. On the other hand, Denmark's, Belgium's and Netherland's utilized agricultural area represents only 20.79% of Romania's and Poland's utilized agricultural area. The gap between the previously analyzed countries can be mitigated through specific measures through the CAP.

Figure 4. The labour productivity in agriculture (EUR per capita) in relation with the direct payments (expenditure direct payments, million EUR) per country UE-27, reference year: 2018



Source: Author's own representation, raw data source: Eurostat, 2020

The same type of relationship can be observed when considering the CAP direct payments (expenditure, expressed in million EUR) in relation with the labor productivity in agriculture. Results confirm that Romania's and Poland's labor productivity represents only 6.76% of the Denmark's, Belgium's and Netherland's labor productivity in agriculture, while the latter's direct payments sum up only to 38.02% of the expenditure made in Romania and Poland.

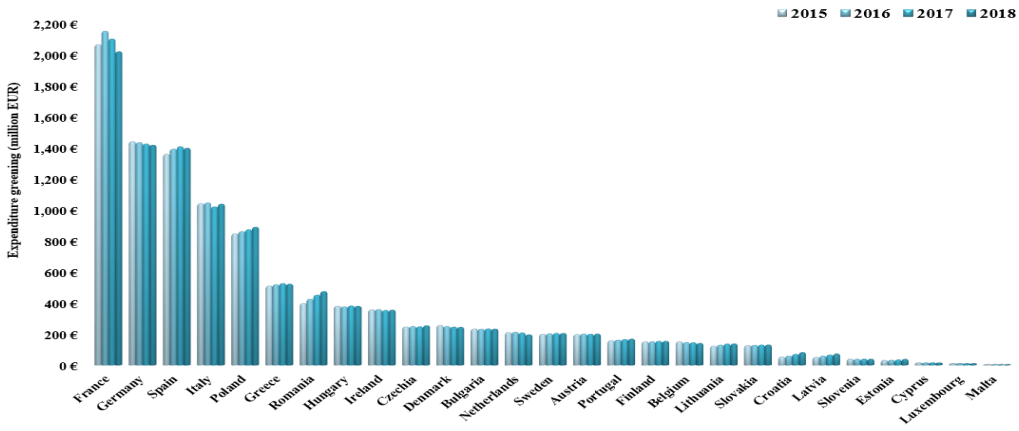
Consequently, through the CAP, the EU supports countries like Romania and Poland, with huge labor productivity gaps, yet countries with impressive agricultural areas when reported to the mean recorded in the EU-27. An emerging question is whether the CAP should be reevaluated in order to include the necessary instruments to finance investments and the transition to a more digitized agriculture with modern technologies

and equipment. Is the current distribution of the CAP budget structured well enough in order to ensure the success of countries such as Poland and Romania in their mission to converge to at least the average labor productivity in agriculture in the EU-27?

Countries such as France and Germany are competitive in terms of the labor productivity in agriculture and still the direct payment expenditure in these countries sum up to 30.75% on the total direct payments in the EU-27. Taking all these findings into account, one can notice that labor productivity in agriculture is definitely not tied to the direct payments expenditure, nor is it with the utilized agricultural area. Mitigating efforts in the sense of labor productivity convergence in the EU-27 is dependent on factors such as: fostering precision agriculture, ensuring investments in highly performant technologies and equipment, knowledge transfer and others. However, the volume of the direct payment expenditure needs to be considered differently in less productive countries, mainly because an important share of the total population relies on subsistence farming. In this context, CAP budget allocation becomes a double-edged sword.

One of the components of the first pillar of the CAP is meant to provide an additional support to offset the cost of delivering public environmental goods not remunerated by the market. This component can be referred to as the 'greening' component. Through this component of the first pillar, the CAP brings its contribution to the 13th goal of sustainable development, by integrating climate change measures and fostering green initiatives in the EU's agriculture.

Figure 5. The evolution of the greenhouse gas emissions from agriculture (1,000 tonnes of CO_2 equivalent), per country and year in the EU-27

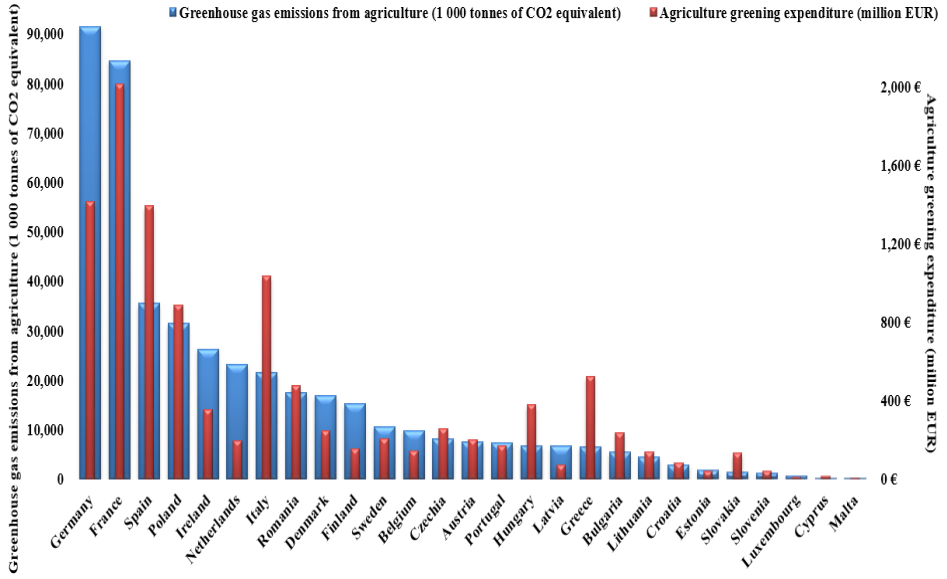


Source: Author's own representation, raw data source: Eurostat, 2020

Considering this, it is important to analyze the evolution of the greenhouse gas emissions generated by the agriculture of the EU-27 members. The trend should be descending judging from the perspective that the CAP finances green agricultural practices. At the level of the EU-27, the CAP successfully managed to decrease the volumes of the greenhouse gas emissions in 2018 by 0.32% (reported to 2017).

The biggest EU-27 contributor to the generation of greenhouse gas emissions, France, has reduced the volume of emissions by 2.34% in 2017 (reported to 2016) and 3.89% in 2018 (reported to 2017). By empowering green practices in agriculture, the EU-27 members converge towards a cleaner and sustainable agriculture. Regarding the Romania, the latter is the 7th biggest generator of greenhouse gas emissions from agriculture in the EU-27, with an average of 437.13 (1,000 tones of CO_2 equivalent) or 4.05% of the EU-27 members' emissions in the 2015-2018 period. The contribution of France, Germany and Spain (top 3 contributors) sum up to 34.2% of the total greenhouse gas emissions generated from agriculture (2015-2018).

Figure 6. The greenhouse gas emissions from agriculture (1,000 tonnes of CO_2 equivalent) in relation with the agriculture greening expenditure per country UE-27, reference year: 2018



Source: Author's own representation, raw data source: Eurostat, 2020

Correlating the greenhouse gas emissions from agriculture with the agriculture greening expenditure through the first pilar of the CAP, very few discrepancies can be noticed:

– The Netherlands and Ireland generate high volumes of greenhouse gas emissions (11.08%), yet receive only 5.1% of the sum of greening expenditure (EU-27), which signals the lack of green initiatives and practices in their agriculture;

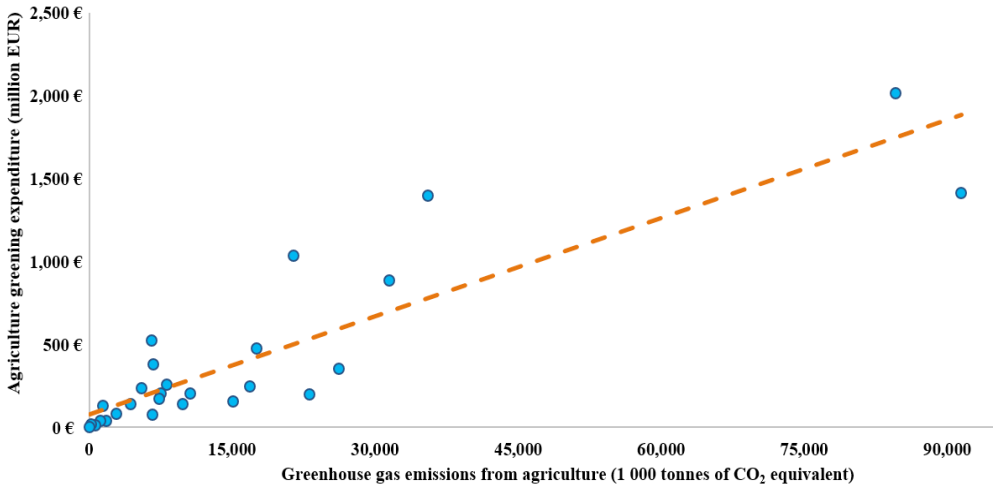
– Spain, Italy, Poland, Romania, Czechia, Hungary and Bulgaria are fond of eco-friendly practices in agriculture (14.70% of the total greening expenditure is allocated to those states) and produce only 16.60% of the greenhouse gas emissions in the EU-27

Even though the Netherlands is the most labor-productive country in agriculture in the EU-27, the same country encounters issues in the transition toward applying eco-friendly practices in agriculture. Germany, the biggest greenhouse gas emissions

generation from agriculture, follows the same pattern: even though 13.09% of the total greening expenditure is redirected to Germany, this percentage is not sufficient when considering that 20.56% of the total greenhouse gas emissions is generated by the German agriculture.

Regarding Romania's greening expenditure – greenhouse gas emission ratio, the latter is in the favor of the greening expenditure: 1.11. A much more favorable situation than in the case of Germany (0.63), let alone Ireland (0.55) the Netherlands (0.35), but greening the agriculture requires changes at the top of the list of the greenhouse gas emissions generators. Spain is the best example to be followed in this regard, the third generator of greenhouse gas emissions, yet with a greening expenditure – gas emissions ratio of 1.61. In the EU-27, the average of this ratio is 1.26, with a maximum value in the case of Slovakia (3.82) and minimum in the case of the Netherlands (0.35).

Figure 7. The scatter point of the greenhouse gas emissions from agriculture (1,000 tonnes of CO_2 equivalent) in relation with the agriculture greening expenditure per country UE-27, reference year: 2018



Source: Author's own representation, raw data source: Eurostat, 2020

Discussions

In 2018, in the EU-27, the greenhouse gas emissions from agriculture are highly positively correlated with the agriculture greening expenditure: 88.59%, which is statistically significant (*p-value* is 0.00). The existence of the high positive correlation and the scatter plot in Figure 7 confirm that a linear regression model can be constructed. This research method is quantitative, based on cross-section statistical data. The cross–sectional linear regression method was applied and the econometric model was designed in Table 1, considering the greenhouse gas emissions from agriculture as the independent variable and the agriculture greening expenditure was considered the dependent variable.

Table 1. The results of the cross–sectional linear regression performed in EViews

Estimation Command				
LS GreeningExpenditure C GreenhouseGasEmissions				
Estimation Equation				
GreeningExpenditure = C(1) + C(2) × GreenhouseGasEmissions + ε				
Substituted Coefficients				
GreeningExpenditure = 74.56021 + C(2) × 0.019771 + ε				
Dependent Variable: GreeningExpenditure; **Independent Variable**: GreenhouseGasEmissions				
Method: Least Squares				
Observations: EU-27, **Reference Year**: 2018				
Variable	**Coefficient**	**Standard Error**	**t–statistic**	**Prob.**
C	74.56021	57.50949	1.296485	0.2066
GreenhouseGasEmissions	0.019771	0.002070	9.553005	0.0000
R^2	0.784965	**Mean dependent var**	400.2304	
Adjusted R^2	0.776363	**S.D. dependent var**	508.9083	
S.E. of regression	240.6640	**Akaike info criterion**	13.87587	
Sum squared resid	1447979	**Schwarz criterion**	13.97186	
Log likelihood	-185.3242	**Hannan–Quinn criter.**	13.90441	
F–statistic	91.25990	**Durbin–Watson stat**	2.857815	
Prob (F–statistic)	0.00000			

Source: Author's own representation in EViews

R^2 indicates that 78.49% of the variation of the agriculture greening expenditure is explained by the greenhouse gas emissions from agriculture. In order to mitigate the mechanical increase in the coefficient of determination, Adjusted R^2 validates the model, taking into account that there is a drop only from 78.49% to 77.76% between the coefficient of determination and the Adjusted R^2. The Durbin–Watson statistic, a test for autocorrelation in the residuals of the model, indicates that successive error terms are slightly negatively correlated, because the value corresponding to this statistic is 2.857815. However, the value is considered acceptable, as the number of observations is limited.

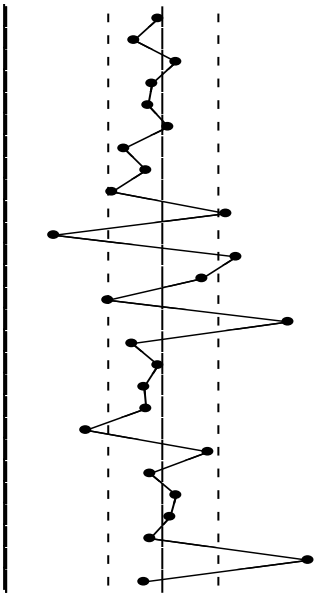
The Student-t values of the parameters are calculated in the t–Statistic column. In the case of this econometric model, the value associated to the independent is below the 0.05 threshold, but 0.20 in the case of the dependent variable. Despite being above the 0.05 threshold, this can be accepted considering that the model only refers to a small group of observations: EU-27. This result signals the fact that generating more

greenhouse gas emissions from agriculture in the case of the EU-27 members involves higher expenditure through CAP for greening the agriculture sector.

Considering the equation of the econometric model, should the greenhouse gas emissions be situated around the mean in the EU-27, 16,472 (1 000 tonnes of CO_2 equivalent), then these explain expenditure for agriculture greening in that respective country of 400.228122 million EUR (calculated: 74.56021 + (0.019771 × 16.472)). The model successfully predicted the agriculture greening expenditure, considering that the EU-27 mean in 2018 was 400.23036 million EUR. The equation of the designed econometric model signals the fact that, through the CAP, sustainable production patterns in agriculture is financed, especially in those countries where the transition to a cleaner agriculture is considered a priority.

Table 2. The residuals and the residual plot of the econometric model

Austria	200.916	223.754	-22.8384
Belgium	141.591	268.268	-126.677
Bulgaria	233.376	182.603	50.7733
Croatia	82.4704	131.743	-49.2722
Cyprus	14.4434	78.9189	-64.4756
Czechia	254.411	235.427	18.9838
Denmark	244.420	407.546	-163.126
Estonia	39.1140	109.442	-70.3284
Finland	154.602	373.900	-219.298
France	2015.33	1746.01	269.322
Germany	1414.44	1882.70	-468.264
Greece	521.450	204.395	317.055
Hungary	379.344	208.109	171.234
Ireland	354.718	592.852	-238.134
Italy	1035.47	498.524	536.947
Latvia	73.6721	206.683	-133.011
Lithuania	137.986	160.865	-22.8793
Luxembourg	9.77344	87.8705	-78.0970
Malta	0.53170	75.9072	-75.3755
Netherlands	196.252	530.660	-334.408
Poland	887.361	696.905	190.456
Portugal	169.206	220.493	-51.2865
Romania	474.579	421.710	52.8693
Slovakia	130.958	102.462	28.4959
Slovenia	39.8166	97.5648	-57.7482
Spain	1394.88	777.064	617.818
Sweden	205.107	283.844	-78.7366



Source: Author's own representation in EViews, raw data source: Eurostat, 2020

Based on Table 2 Germany, Italy and Spain are the most important outliers which cause divergence between the EU-27. These three countries encounter issues in fitting into the linear regression model, as it can be noticed in the residual plot from Table 2. One the one hand, Germany generates more greenhouse gas emissions than it can attract funds for greening its agriculture. On the other hand, Italy and Spain act as role models for sustainable production patterns in agriculture, since they successfully attract more funds for practicing a cleaner agriculture. Another question emerges in this context: should the CAP adjust and limit the amount of funds distributed to countries which generate less greenhouse gas emissions (reported to the EU-27 mean) in order to influence other EU-27 members (such as Germany) to foster sustainable production patterns in agriculture through higher volumes of agriculture greening expenditures?

Conclusions

In today's knowledge society, agriculture still has a crucial role in meeting the goals of sustainable development. Agriculture significantly contributes to capitalizing the national economic potential through harnessing the natural capital's potential.

In the European Union, the Common Agricultural Policy aims to increase agricultural productivity through various methods; to stabilize markets; to ensure fair standard of living for farmers and reasonable prices for consumers – therefore CAP aims at providing food security for the EU citizens, but in a complex manner that ensures sustainable development, the transition toward the green and circular economy, diverse and prosperous in the rural areas. The latter should not be dependent on agricultural activities.

This study aimed at analyzing the evolution of the Romanian agriculture through the lens of the new CAP paradigm, which is much more focused on the need for agriculture to become green and circular. This study's contribution resides in highlighting the major issues related to the effects of the evolution of the Common Agricultural Policy on the Romanian agriculture in terms of accelerating or decelerating the convergence, divergence or imposing a major need for adjustments.

The evolution of the labor productivity in agriculture (EUR per capita) points to the divergence between the Northwestern European countries and those from the Eastern Europe and the Baltics. The most negatively affected countries by the labour productivity gap are Romania (4,955 EUR/capita), Latvia and Poland. Correlating the labor productivity in agriculture with the total utilized agricultural area in the EU-27, more discrepancies are observed. Northwestern European countries such as: Netherlands, Denmark and Belgium are among the most labor-productive countries in the EU-27 in terms of agriculture, yet the total utilized area for agriculture in those countries is below the average of the EU-27 – which is a favorable situation for those countries. The same type of relationship can be observed when considering the CAP direct payments in relation with the labor productivity.

Regarding the sustainable development in agriculture, the link between the greenhouse gas emissions from agriculture and the agriculture greening expenditure through the first pilar of the CAP were analyzed and very few discrepancies were noticed in the EU-27. Because the greenhouse gas emissions from agriculture are highly positively correlated with the agriculture greening expenditure (88.59%), a simple linear estimation model was designed. Based on the coefficient of determination, 78.49% of the variation of the agriculture greening expenditure is explained by the the greenhouse gas emissions from agriculture. Germany, Italy and Spain are the main EU-27 Member States that act as outliers (divergence causes) in the constructed econometric model.

The next financial framework should act as a main vector for delivering convergence in the agricultural sector in the EU-27. Romanian agriculture is facing multiple challenges: catching up to the competitiveness gap and meeting the sustainable development goals.

Acknowledgements

The authors are deeply thankful for all the comments and inputs received during the academic symposium "The East-West divide within the European Union", 1st – 2nd of December 2020, co-hosted by Studio Europa at Maastricht University and the Bucharest Academy of Economic Studies (ASE), Romania.

Conflict of interests

The authors declare no conflict of interest.

References

1. Comanescu, I.S., Foris, D., & Foris, T. (2019). *Dimensions of the funding programmes for sustainable rural development in Romania*. In: Economic Science for Rural Development. Jelgava, LLU ESAF, 9-10 May 2019, pp.44–51.
2. Dumitru, E.A., Tudor, V.C., Micu, M.M., & Micu, A.R. (2017a). Analysis on the Granting of Direct Payments in Romania and Bulgaria. Scientific Papers Series Management. *Economic Engineering in Agriculture and Rural Development*, *17*(4).
3. Dumitru, E.A., Tudor, V.C., Micu, M.M., & Micu, A.R. (2017b). Analysis Regarding the Direct Payments in the European Union. Scientific Papers Series Management. *Economic Engineering in Agriculture and Rural Development, 17*(4).
4. Eurostat (2020). Indicators Database. Accessed Online in October 2020.
5. Galluzzo, N. (2016). Analysis of Subsidies Allocated by the Common Agricultural Policy and Cropping Specialization in Romanian Farms using FADN Dataset. Scientific Papers Series Management. *Economic Engineering in Agriculture and Rural Development, 16*(1).
6. Galluzzo, N. (2020). The evolution of Romanian agritourism and the role of European Union subsidies in rural areas. *Open Agriculture, 5*(1), 159–165. https://doi.org/10.1515/opag-2020-0017
7. Lupu, G.V. (2020). Evolution of the Common Agricultural Policy in Romania Between 2014-2020. Scientific Papers Series Management. *Economic Engineering in Agriculture and Rural Development, 20*(2), 295–302.
8. Mack, G., Fintineru, G., & Kohler, A. (2020). Effects of EU rural development funds on newly established enterprises in Romania's rural areas. European Planning Studies, 1–21.
9. Marcuta, A. (2019). Analysis of Agricultural Entrepreneurial Income and Its Role in Agriculture Financing. Case Study Romania. Scientific Papers Series Management. *Economic Engineering in Agriculture and Rural Development, 19*(3), 399–404.
10. Puie, F.R. (2020). The role of European funds in developing and sustaining rural entrepreneurship in Romania. *Proceedings of the International Conference on Business Excellence, 14*(1), 134–148.

11. Tluczak, A. (2020). Diversity of the selected elements of agricultural potential in the European Union countries. *Agricultural Economics, 66*(6), 260–268. https://doi.org/10.17221/381/2019-AGRICECON

12. Galluzzo, N. (2018). A preliminary quantitative analysis of rurality in Romania and the impact of Common Agricultural Policy subsidies. *Review of Agricultural and Applied Economics (RAAE), 21*(2), 128-135. https://doi.org/10.15414/raae.2018.21.02.128-135

13. Burlacu, F. (2018). Romania and the Implementation of the Common Agricultural Policy. *Cogito-Multidisciplinary research Journal*, 1, 59-65.

14. Lupu, G.V. (2020). Evolution of the common agricultural policy in Romania between 2014-2020. *Evolution, 20*(2), 203-210.

15. Matthews, A. (2018). The CAP in the 2021–2027 MFF Negotiations. *Intereconomics, 53*(6), 306-311.

16. Kiryluk-Dryjska, E., & Baer-Nawrocka, A. (2019). Reforms of the Common Agricultural Policy of the EU: Expected results and their social acceptance. *Journal of Policy Modeling, 41*(4), 607-622. https://doi.org/10.1016/j.jpolmod.2019.01.003

17. Pawłowski, W.C., & Piotr, K. (2020). Sustainable economic development of farms in Central and Eastern European Countries driven by pro-investment mechanisms of the Common Agricultural Policy. *Agriculture, 10*(4), 93. https://doi.org/10.3390/agriculture10040093

18. Lovec, M., Šumrada, T., & Erjavec, E. (2020). New CAP Delivery Model, Old Issues. *Intereconomics, 55*(2), 112-119.

THE RELATION BETWEEN GENDER AND DIFFERENCES IN EMOTIONAL INTELLIGENCE OF FEMALE MANAGERS IN MODERN RURAL TOURISM

Milica Čolović[1], Gordana Nikić[2], Milan Stamatović[3]

**Corresponding author E-mail: mcolovic@singidunum.ac.rs*

ARTICLE INFO

Original Article

Received: *14 November 2020*

Accepted: *27 February 2021*

doi:10.5937/ekoPolj2101069C

UDC 316.346.2-055.2:796.075]:338.48-44(1-22)

Keywords:

rural tourism, emotional intelligence, gender differences in emotional inteligence and competencies of managers, tourism and hospitality

JEL: *Z3*

ABSTRACT

The main goal of this research is to examine the relation between gender and differences in affective attachment, emotional intelligence and self-esteem among students population. The scales for self-assessment of emotional intelligence, affective attachment and self-esteem were used in the current research. The sample consisted of 231 respondents, students of tourism and hospitality management, 71 males and 160 females. Considering that our sample is not representative, because there is a large disproportion in the number of male and female respondents, and that distribution of scores on measured variables deviates from normal, we used nonparametric techniques: Mann–Whitney U test and Kruskal-Walis one-way analysis of variance. The results show that female students have more pronounced emotional intelligence in the domain of perceiving and understanding emotions, as well as a better ability to regulate and manage emotions compared to male respondents, while the measured scores at scale of affective attachment and self-esteem did not show statistically significant differences between gender. On further, female managers in our research see the development of rural tourism as their business opportunity.

1 Milica Čolović Ph.D., Assistant Professor, Singidunum University, Danijelova 32, 11.000 Beograd, Phone: +381 64 27 840 78, E-mail: mcolovic@singidunum.ac.rs, ORCID ID (https://orcid.org/0000-0002-8393-2158)

2 Gordana Nikić, Ph.D., Associate Professor, Singidunum University, Danijelova 32, 11.000 Beograd, Phone: +381 63 73 65 817, E-mail: gnikic@singidunum.ac.rs, ORCID ID (https://orcid.org/0000-0003-4349-6539)

3 Milan Stamatović, Ph.D., Full Professor, Principal Research Fellow, University` Union Nikola Tesla`, 11000 Beograd, Knez Mihajlova 33, Phone: +381 63 87 36 229, E-mail: prof.milanstamatovic@gmail.com, ORCID ID (https://orcid.org/0000-0003-0471-6447)

Introduction

One of the important resources for the development of the tourism industry in Serbia is rural tourism. There is a need to implement a policy of sustainable tourism development due to diversity of natural resources, but also the traditional hospitality and diligence of the rural population that sees the opportunity to restore their farms and construct modern rural tourist facilities. There is also a need to educate and train staff which will be able to participate in this important project. In the preliminary interview conducted for the purpose of this research, a larger number of students stated that they see their business chance in the realization of projects in the field of rural tourism. Previous experiences shows that, in addition to professional knowledge, it is absolutely necessary to develop additional competencies, primarily emotional and social, for future professionals in the field of rural tourism.

The development of rural tourism has been recognized as a business opportunity by the Republic of Serbia, which is trying to rapidly develop this neglected industry with non-refundable financial subsidies (IPARD projects). Also, it can be good support the development of local entrepreneurship and household income (Chivu, 2019; Chivu et al., 2015). The first results are encouraging, considering that in a short period of time, tourist farms are springing up, wineries, agricultural cooperatives, modern tourist facilities are opening, and villages are starting to live. One of the resources for the development of the tourist economy in Serbia is rural tourism. The diversity of natural resources (more than 400 natural assets have been protected so far), but also the nurturing of hospitality in rural households that provide comfortable accommodation in ethnic houses, tradition, folklore, gastronomic tradition, are only part of the resources that this industry can offer. It is necessary to implement a policy of sustainable development of rural tourism in the future, adequate infrastructure, legislation, finances, application of international standards, raising environmental awareness of the population, but we also emphasize the education of staff who can respond to the growing interests of domestic and foreign tourists. In the preliminary interview conducted for the purposes of this research, a large number of surveyed students see their business chance in the implementation of projects in the field of rural tourism.

The time when rural tourism provided additional income to households through the sale of agricultural products, as well as the placement of home-made products, should be viewed as a thing of the past. New trends in sustainable tourism set new standards in order to meet the needs of tourists for authentic experience, spiritual and cognitive nature, but also for rest, recreation, learning, adventure and connecting with the local population (Dašić et al., 2020). In that direction, the initiative of students, future male and female managers for training, not only in the field of professional competencies, but also in the field of additional communication skills, teamwork and development of emotional competencies in working with potential customers should be followed, in order to meet modern market needs.

Modern organizations in tourism and hospitality are increasingly looking for employees who can work efficiently and maintain assertive communication with clients in the most efficient way, which requires emotional intelligence skills. It is well known that the damage that can be caused by a dissatisfied customer in tourism and hospitality can greatly outweigh the benefits of a satisfied customer.

Although there are many studies that examine emotional intelligence but only few explore the emotional competencies of future managers in the field of tourism and hospitality, especially in rural tourism.

Emotional competencies are important for hospitality and tourism for two key reasons. In the first place, these competencies are necessary to provide a high level of customer service. Service delivery usually takes place in intense social environment, with numerous interpersonal interactions, so it is important that service providers understand the emotions of their customers. Second, managers are expected, not only to provide better service, but also to work well and cooperate successfully with other employees. The ability of managers to plaine, form and build a strong team that is motivated to do their best, whether in the kitchen, dining room or at the reception, largely depends on their emotional intelligence (Kernbach et al, 2004; Savić & Obradović 2020).

Emotional intelligence has been shown to be positively correlated with job satisfaction and employee performance, especially in food-related jobs (Sy et al., 2019). Success in business largely depends on the persistence, passion, dedication and good interpersonal relationships which can be linked to emotional competence (Lopez-Zafra et al., 2012). Numerous studies have shown that there is a strong correlation between the overall level of emotional intelligence of the service provider and customer satisfaction (Kernbach & Schutte, 2005; Koc, 2019). In practice, the trend of creating innovative programs and developing highly emotionally intelligent managers in order to achieve better results of employees, is becoming increasingly popular (Altındağ & Kösedağı, 2015; Mihailović, et al., 2015; Pantić et al., 2020).

In previous studies, gender differences were obtained when it comes to measuring emotional intelligence. Employed women have been shown to be more likely to interact emotionally with other employees and to have higher scores in emotional competencies than men. Likewise, it has been shown that women are more aware of their emotions compared to men, that they are more empathetic and socially responsible than men. On the other hand, men better cope with stressful situations and have greater self-confidence compared to women (Baron-Cohen, 2003; Hall & Mast, 2008).

A study by Maiers-Levi, & Loken found that women have greater abilities in terms of quality of service in tourism and hospitality given the characteristics of reliability, caution, empathy, and responsibility (Meyers-Levy & Loken, 2015). As women can be patient and conscientious, they may be able to affirm reliability in the work environment. The results of the research show that women more often express positive emotions tan men (Koc, 2019).

Despite numerous studies, it is very difficult and ungrateful to compare the obtaining results so far for several reasons. Besides, additional caution is needed regarding given generalization wich some research suggests, that stereotypes about the behavior of men and women may influence the measurement of emotional intelligence (Lopez-Zafra & Gartzia, 2014).

For the purposes of this paper, the Emotional Competence Questionnaire (Takšić et al., 2006) constructed according to the model of Mayer and Salovey (1990) was used in order to assess these three aspects of emotional intelligence:

1) the ability to perceive and understand emotions,
2) the ability to express and naming emotions and
3) ability to control and manage emotions.

Emotional intelligence is the ability to perceive, understand, manage, control and direct one's own emotions, as well as the emotions of other people (Чоловић & Златановић, 2011; Милошевић & Чоловић, 2019). It could be defined as the ability to perceive and express emotions quickly, the ability to recognize and generate feelings that interfire and facilitate thinking, the ability to understand emotions and be awere of them, and the ability to regulate emotions in order to promote emotional and intellectual development (Mayer et al., 2002).

The ability of an individuals to recognize their own or someone else's feelings refers to their ability to perceive emotions and understand the inner experience of emotions, as well as non-verbal gestures, facial expressions and a whole range of indicators, since the fact that emotions are less often expressed in words (Grobova et al., 2017; Gorbova et al., 2019).

Understanding emotions is related to understanding and predicting what will happen while a person is curently expressing certain emotions and how other people will react to them. Expressing emotions and their adequatly nomination is the ability to express emotion verbally and non-verbally as well as to determine it linguistically. Understanding and expressing emotions are very important for harmonious emotional functioning.

Adequate emotion management involves accepting emotions instead of suppressing them and using them for the purpose of making a more meaningful decisions. Emotional intelligence does not function independently but is closely linked with mental processes and behavior of individuals, as well as the psychological traits and character of the individual (Takšić et al., 2006).

Styles of attachment are important not only for understanding the close relationships but also for work behavior, considering that a large part of the work, especially among managers and in the helping professions, takes place in a social context. The concept of affective attachment was first introduced into science by the English psychoanalyst John Bolby (Bolby, 1969/1982), and the theory of affective attachment became the dominant theory of

emotional personality development, thanks to numerous empirical findings. Initially, this theory exclusively dealt with the child/parent relationship, as well as close relationships, but in recent years, researchers have become more interested in applying the mentioned theory of affective attachment also to the sphere of business. Affective attachment means a specific, asymmetrical relationship that is formed between mother and child in early childhood and lasts throughout life. But even in adulthood, human beings need to be bonded, and in order of that, they are seeking to provide security in relationships.

Numerous studies point to the validity of this theory which come to understanding of work behavior especially when it comes to: job burnout (Leiter et al., 2015), the communication strategy, assessing and developing capacity for leadership (Berson & Yammarino, 2006; Popper & Amit, 2009; Davidovitz et al., 2007), job satisfaction (Ronen & Mikulincer, 2011), etc.

Generally affective attachment styles could be used and they are often use in understanding individual differences in relation toward the environment and to oneself.

Thus, *Secure individuals* have high self-confidence, a positive attitude towards others, and a high intimacy in relationships given that they have a positive model of themselves and a positive model of others.

Preoccupied (Anxious-preoccupied) individuals show a preoccupation with relationships, have a fear of separation and loneliness and a great need for intimacy. Their model of themselves is negative, while the model of others is positive.

People with *Dismissive-avoidant* (*rejective) style of affective attachment* avoid intimacy with others because of negative expectations, maintain a sense of self-worth through compulsive self-confidence. Their model of themself is positive, the model of another is negative.

Fearful-avoidant style characterized by low self-confidence, lack of confidence in themselves and others. They avoid intimacy for fear of rejection and injury. They have both negative model – of themselves and others.

According to Hazan and Shaver, who used a three-category model to explain affective attachment, job security is shown through a secure orientation towards work, a higher degree of success, job satisfaction, and rewards. Anxious/ambivalent individuals use work as an instrument to gain praise, avoid feelings of underestimation, satisfy the need to please others, etc. People with avoidant style prefer to work alone, it is very difficult for them to interrupt obligations, they are very nervousness when they are not working. Generally, for them work is an justified excuse to avoid socialization, which often has a very negative effect on their health (Hazan & Shaver, 1990).

For the purposes of this paper, we were interested in the global self-esteem of individuals which we investigated by measuring positive and negative feelings that they have about themselves.

According to Rosenberg, self-esteem is a set of thoughts and feelings about one's own value and significance, a global attitude that a person has towards ownself as a whole person (Rosenberg, 1979). Rosenberg argues that self-esteem is formed on the basis of feedback that a child receives, during growing up process, from parents, teachers, peers, therapists and other important people around him and that it is reflected as a positive or negative attitude about himself.

Bearing in mind the numerous stereotypes about lower self-esteem among women at work, we were interested in whether these differences will be shown in our sample as well.

Material and metods

In a preliminary interview conducted for the purposes of this research, it was shown that there is an interest of students, especially future female managers, in the design and implementation of projects in the field of sustainable rural tourism.

The ***main goal*** of this research is to examine the relation between gender and differences in affective attachment, emotional intelligence and self-esteem among students population.

Hypothesis

There are gender differences in emotional intelligence, affective attachment, and self-esteem between the examined students.

Sample

In forming the sample, special attention was paid to provide approximately the same number of male and female respondents. However, our sample was suitable type and only partially met these conditions. It consisted of 231 respondents (160 females and 71 males), with an average age of 22 years. It included future managers, students from tourism and hospitality, from three different cities: Belgrade (128), Bijeljina (40) and Nis (63).

Instruments and variables

The SM-ECR-R scale (Faria & Lima Santos, 2000; adaptation by Hanak & Dimitrijević, 2013) was used in the study to assess the affective attachment of the subjects. It is a Serbian version of Experiences in Close Relationships (ECR), revised to measure affective attachment in general. More precisely, the SM-ECR-R Scale was created to measure individual differences in affective attachment in terms of two dimensions: *anxiety* (fear of rejection and abandonment) and *avoidance* (discomfort due to closeness and dependence on others). It contains of 36 items, of which one half refers to anxiety and the other to avoidance. According to the authors it is a reliable and valid scale, although its internal structure and consistency can vary in different patterns, depending on age, education, gender and culture. On our sample both subscales have a high internal consistency: $\alpha = .87$ and $\omega = .89$ for anxiety and $\alpha =$ and $\omega = .88$ for avoidance.

For the purposes of this paper, the *Questionnaire for Emotional Competence* (Takšić et al., 2006) was constructed, in accordance to Mayer and Salovey model, which assesses three aspects of emotional intelligence:

1) ability to observe and understand emotions

2) the ability to express and name emotions

3) ability to manage emotions

All three scales have satisfactory reliability on different samples, from $\alpha = 0.71$ to $\alpha = 0.90$. The Emotional Competence Questionnaire (UEK-45) has been translated and validated in several countries: Slovenia (Avsec, 2005), Spain (Extremera & Fernández-Berrocal, 2005), Portugal (Faria & Lima Santos, 2005), Sweden (Molander et al., 2005), Finland (Räty, 2005) and Japan (Toyota, 2005). Metric characteristics of the mentioned questionnaire was at a satisfactory, statistical significant, level in all of these countries.

The Rosenberg Self-Esteem Scale (RSE) research also used the (Rosenberg, 1979). The scale is one-dimensional and measures the global self-esteem or general value orientation of an individual towards oneself. The scale has 10 items, five in the negative and five in the positive direction. Subjects were asked to mark on a five-point Likert scale assessment to what extent the claims are related or not related to them. The score range is from 0 to 40. A higher score means a higher degree of self-esteem.

Results

Gender differences in emotional intelligence, types of affective attachment and self-esteem were checked by t-test for independent samples in which the grouping variable was the gender of the subjects, while the set of dependent variables consisted of scores on subscales of emotional intelligence, affective attachment and self-esteem scale.

Table 1. Statistical significance of
Mann–Whitney U test for emotional inteligence

EMOTIONAL INTELIGENCE			
Mann-Whitney U	URE	IIE	UE
	4175.500	5000.000	4763.500
Sig.	.001*	.146	..047*

Source: Work of authors based on reserch Čolović, Nikić, Stamatović, 2020

Based on the results of Mann–Whitney U test, gender differences in Emotional intelligence are at statistical significant level on 2 subscales: *URE – Observation and understanding of emotions* (U=4175.500; p<0,01) and *UE – Ability to regulate and manage emotions* (U=-4763.500; p<0,05). The obtained gender differences in emotional inteligence at the second registred subscale *IIE – the ability to express and name emotions* are no at the statistically significant level (U=-5000.000; p>0,05) *(Table 1).*

Both significant differences are in favor of female respondents, so it could be said that, women have significantly more pronounced emotional intelligence in the domain

of perceiving and understanding emotions (MR=125.40), than men (MR=94.81), as well as, better ability to regulate and manage emotions (MR=121.73), than men (MR=103.09) *(Table 2)*.

Table 2. Gender differences in emotional intelligence

EMOTIONAL INTELIGENCE	Gender	N	MR	∑R
URE	Male	71	94.81	6731.50
	Female	160	125.40	20064.50
	Total	231		
IIE	Male	71	106.42	7556.00
	Female	160	120.25	19240.00
	Total	231		
UE	Male	71	103.09	7319.50
	Female	160	121.73	19476.50
	Total	231		

Source: Work of authors based on reserch Čolović, Nikić, Stamatović, 2020

When it comes to the style of affective attachment the results show that men, on average, have a slightly more pronounced fearful and rejecting style of affective attachment, while the safe and preoccupied type is almost the same for both groups of resspondents *(Table 3)*.

Table 3. Gender differences in affective attachment style

AFFECTIVEATTACHMENT STYLE	Gender	N	MR	∑R
Secure	Male	71	121.85	8561.00
	Female	160	114.14	18377.00
	Total	231		
Fearful-avoidant	Male	71	123.96	8801.00
	Female	160	113.21	18227.00
	Total	231		
Preoccupied	Male	71	119.45	8481.00
	Female	160	115.20	18547.00
	Total	231		
Dismissive-avoidant	Male	71	126.73	8998.00
	Female	160	111.99	18030.00
	Total	231		

Source: Work of authors based on reserch Čolović, Nikić, Stamatović, 2020

But obtained differences in scores between male and female are not at the statistical significant level *(Table 4)*.

Table 4. Statistical significance of Mann–Whitney U test for affective attachment style

AFFECTIVE ATTACHMENT STYLE				
Mann-Whitney U	Secure attachment	Fearful-avoidant	Preoccupied	Dismissive-avoidant
	5336.000	5186.000	5506.000	4989.000
Sig.	.421	.261	.657	.123

Source: Work of authors based on reserch Čolović, Nikić, Stamatović, 2020

In the case of *self-esteem*, the result between male (MR=124.30) and female (MR=119.06) is almost equal *(Table 5)*.

Table 5. Gender differences in self-esteem

	Gender	N	MR	∑R
SELF-ESTEEM	Male	71	124.30	8825.00
	Female	160	119.06	18203.00
	Total	231		

Source: Work of authors based on reserch Čolović, Nikić, Stamatović, 2020

As can be assumed based on the previous result, the size of the obtained differences is not at a statistically significant level *(Table 6)*.

Table 6. Statistical significance of Mann–Whitney U test for self-esteem

Mann-Whitney U	**SELF-ESTEEM**
	5162.000
Sig.	.237

Source: Work of authors based on reserch Čolović, Nikić, Stamatović, 2020

In order to test the differences in the scores of the several groups of respondents on the main variables (emotional intelligence, attachment styles and self-esteem), in this particular case – those who studying in different cities: Belgrade, Nis and Bjeljina (control variable), the Kruskal-Walis one-way analysis of variance test was used.

Table 7. Results of Kruskal Wallis test

	EMOTIONAL INTELIGENCE			**AFFECTIVE ATTACHMENT STYLE**				**SELF-ESTEEM**
	URE	*IIE*	*UE*	*Secure*	*Fearful-avoidant*	*Preoccupied*	*Dismissive-avoidant*	*Self-esteem*
X^2	3.436	.736	4.361	8.203	8.995	7.548	8.973	
df	2	2	2	2	2	2	2	2
Sig.	.179	.692	.113	.085	.079	.065	.058	.655

Source: Work of authors based on reserch Čolović, Nikić, Stamatović, 2020

As can be seen, no statistically significant differences were obtained between groups of students from different cities, when it comes to their emotional intelligence, the attachment style they developed and adopted, as well as, the level of their self-esteem (p>0,05) (Table 7).

Discussion

Our analysis showed that women compared to men achieve better results on the two aspects of emotional intelligence: the ability to identify and to understand the emotions and the ability to manage emotions.

This finding is consistent with previous research on emotional intelligence (Ciarrochi et al., 2000, 2005; Day & Carroll, 2004; Palmer et al., 2005). Mayer and his associates

found that there are significant gender differences in favor of female respondents (Mayer et al., 2002).

The research of Vučenović and Takšić showed that there are gender differences in the self-assessment of emotional competencies in favor of female respondents (Vučenović, 2009; Takšić et al., 2006).

In the research from 2014 and 2015 (Nikić et al., 2014a, 2015), it was obtained that managers as well as management students have higher scores on all three scales of emotional intelligence. It was shown that respondents with higher scores on emotional intelligence, show greater activity and sociability and lover levels of neuroticism and aggression, which is important for teamwork. It has also been shown that people with high scores on emotional intelligence show less neuroticism and greater sociability (Nikić et al., 2014b).

Regarding gender differences and emotional intelligence, one should often been consider – research that measures different dimensions of emotional intelligence. It has been shown that women are more aware of their emotions than men, they are more empathetic and socially responsible than men, but it has also been shown that men cope better with stressful situations and have greater self-confidence than women (Baron-Cohen, 2003; Hall & Mast, 2008).

Regarding the difference between men and women, when it comes to affective attachment, no statistically significant differences were obtained in this study. A number of studies have found that men are more likely to have avoidant attachment style, while the women in general have higher anxiety scores than men. However, in a number of studies, women showed a more pronounced avoidant style of affective attachment, while men were more anxious in relation to female respondents (Scharfe, 2017).

It will be interesting to study those men and women who go "against the rules", for example women with higher avoidance scores and men who are more anxious then women.

In this study, gender differences on the self-esteem scale, were not obtained. The self-esteem scale used in this research and the obtained results do not provide an opportunity for some more reliable conclusions when it comes to the differences between male and female subjects.

Our findings support previous research on gender differences in emotional intelligence (Meyers et al., 2015; Koc, 2019) as female show reliability, patience and positive expression of emotions which can be relevant to work in tourism and hospitality.

Given the results of numerous studies, that shown that women are more competent and have greater interest in the field of emotions, and that they are better prepared and motivated, the question of additional training and affirmation of women for tourism and hospitality, especially in managerial positions, becomes urgent and very significant.

However, one should be also keep in mind, in accordance with the increasingly current social trends, that suggest that men should take more care of their emotions and develop

higher emotional competencies. As globalization brings many changes, the market is becoming more and more ready and hungry for emotionally literate managers, which is a challenge especially for women in tourism and hospitality to advance their careers.

Conclusion

In the modern conditions of tourism business, and especially in the field of rural tourism, the important question is how united men and women can achieve high results in working with clients. Researchers' efforts are focused on studying all the factors that affect productivity. On the one hand, it is well known that a manager's strength comes from his/her available power, professional competencies, knowledge, skills, relationships in companies, but on the other hand, the manager's personality as well as his/her emotional and social competencies are crucial. Developing emotional security (low levels of anxiety and avoidance) and emotional intelligence (high ability to perceive and understand emotions, to express and name emotions, and the ability to manage emotions) are key to achieving top results in work, for both, men and women. This research, like many others, gives preference to women's abilities in the field of emotions, but the question remains, how much of these abilities actually use female managers, to achieve better results in tourism and hospitality and how the education system can ensure that its students' competencies improve. One of the assumptions that should, also, be tested is whether current changes in society can affect the emotional intelligence of men in order to improve their competencies in this important field.

The concept of sustainable development of rural tourism brings the establishment of new social values based on knowledge, creativity and human resources. There is a need for education of skilled and professional staff that will help to improve this important activity with respect to the sustainable development strategies that are focused on today but also on the future. Future female managers in our research see the development of rural tourism as their business opportunity.

Conflict of interests

The authors declare no conflict of interest.

References

1. Altındağ, E., & Kösedağı, Y. (2015). The Relationship Between Emotional Intelligence of Managers, Innovative Corporate Culture and Employee Performance. *Procedia – Social and Behavioral Sciences*, 210, 270-282. https://doi.org/10.1016/j.sbspro.2015.11.367
2. Avsec, A. (2005). *Emotional Skills and Competence Questionnaire*: Reliability and validity of a Slovene version at the 9th European Congress of Psychology (3-8 July), Granada, Spain.
3. Baron-Cohen, S. (2003). *The essential difference: the truth about the male and female brain.* New York, Basic Book.

4. Berson, Y., & Yammarino, O. (2006). Attachment style and individual differences in leadership perceptions and emergence. *Journal of Social Psychology*, *146*(2), 165-182. https://doi.org/10.3200/SOCP.146.2.165-182

5. Bowlby, J. (1969/1982). *Attachment and loss: Vol. 1. Attachment. 2.* New York, Basic Books.

6. Chivu, L., Ciutacu, C., & Georgescu, L. (2015). Household income in Romania. A challenge to economic and social cohesion. *Procedia Economics and Finance*, 22, 398-401. https://doi: 10.1016/S2212-5671(15)00310-X

7. Chivu, L. (2019). Local entrepreneurship and social services in Romania. Territorial analysis. *European Research on Management and Business Economics*, 25(2), 79-86. https://doi.org/10.1016/j.iedeen.2019.04.001

8. Čolović, M., & Zlatanović, Lj. (2011). Facial signs of masking, blocking and suppressing experimentally induced emotions of sadness. *Yearbook of Psychology*, 8(10), 152 – 168.

9. Ciarrochi, J.V., Chan, A.Y.C., & Caputi, P. (2000). A critical evaluation of the emotional intelligence construct. *Personality and Individual Differences*, *28*(3), 539-561. https://doi.org/10.1016/S0191-8869(99)00119-1

10. Ciarrochi, J.V., Hynes, K., & Crittenden, N. (2005). Can men do better if they try harder? Gender and motivational effects on emotional awareness. *Cognition and Emotion*, *19*, 133-141. https://doi.org/10.1080/02699930441000102

11. Day, A.L., & Carroll, S.A. (2004). Using an ability-based measure of emotional intelligence to predict individual performance, group performance, and group citizenship behaviours. *Personality and Individual Differences*, *36*(6), 1443-1458. 10.1016/S0191-8869(03)00240-X

12. Dašić, D., Živković, D., & Vujić, T. (2020). Rural tourism in development function of rural areas in serbia. *Economics of Agriculture*, *67*(3), 719-733. https://doi.org/10.5937/ekoPolj2003719D

13. Davidovitz, R., Mikulincer, M., Shaver, P.R., Izsak, R., & Popper, M. (2007). Leaders as attachment figures: Leaders' attachment orientations predict leadership-related mental representations and followers' performance and mental health. *Journal of Personality and Social Psychology*, *93*(4), 632–650. https://doi.org/10.1037/0022-3514.93.4.632

14. Extremera, N. & Fernández-Berrocal, P. (2005). *Emotional Skills and Competence Questionnaire (ESCQ): Adaptation to Spanish, reliability and its relationship with well-being indexes*. In V. Takšić (Chair), Cross-cultural validation of Emotional Skills and Competence Questionnaire (ESCQ). Symposium conducted at the 9th European Congress of Psychology, Granada, Spain.

15. Faria, L., & Lima Santos, N. (2005). *Adaptation of the Emotional Skills and Competence Questionnaire (ESCQ) to the Portuguese context*. In V. Takšić (Chair), Cross-cultural validation of Emotional Skills and Competence Questionnaire (ESCQ). Symposium conducted at the 9th European Congress of Psychology, Granada, Spain.
16. Grobova, J., Čolović, M., Marjanović-Jakovljević, M., Njeguš, A., Demirel, H., & Gholamreza, A. (2017). Automatic Hidden Sadness Detection Using Micro-Expressions. *Proceedings Paper of 12th IEEE International Conference on Automatic Face & Gesture Recognition (FG 2017)*, 828 – 832.
17. Gorbova, J., Čolović, M., Marjanović-Jakovljević, M., Njeguš, A., & Anbarjafari, G. (2019). Going Deeper in Hidden Sadness Recognition Using Spontaneous Database. *Multimedia tools and applications*, *78*(16), 23161 – 23178.
18. Hall, J.A., & Mast, M.S. (2008). Are women always more interpersonally sensitive than men? Impact of goals and content domain. *Personality and Social Psychology Bulletin*, *34*(1), 144-155. https://doi.org/10.1177/0146167207309192
19. Hanak, N., & Dimitrijevic, A. (2013). A Serbian version of modified and revised experiences in close relationships scale (SM–ECR–R). *Journal of Personality Assessment*, *95*(5), 530–538. https://doi.org/10.1080/00223891.2013.778271
20. Hazan, C., & Shaver, P.R. (1990). Love and work: An attachment-theoretical perspective. *Journal of Personality and Social Psychology*, *59*(2), 270–280. https://doi.org/10.1037/0022-3514.59.2.270
21. Kernbach, S., Schutte, N. & Langhorn, S. (2004). How emotional intelligence can improve management performance. *Intern ational Journal of Contemporary Hospitality Management*, *16*(4), 220–230. https://doi.org/10.1108/09596110410537379
22. Kernbach, S., & Schutte, N.S. (2005). The impact of service provider emotional intelligence on customer satisfaction. *The Journal of Services Marketing, 19*(7), 438–444. https://doi.org/10.1108/08876040510625945
23. Koc, E. (2019). *Emotional Intelligence in Tourism and Hospitality*, Turkey: Bandirma Onyedi Eylul University.
24. Leiter, M.P., Day, A., & Price, L. (2015). Attachment styles at work: measurement, collegial relationships, and burnout. *Burnout research*, 2(1), 25-35. https://doi.org/10.1016/j.burn.2015.02.003
25. Lopez-Zafra, E., Garcia-Retamero, R., & Martos, M.P.B. (2012). The Relationship Between Transformational Leadership and Emotional Intelligence from a Gendered Approach. *Psychological Record, 62*(1), 97–114.
26. Lopez-Zafra, E., & Gartzia, L. (2014). Perceptions of Gender Differences in Self-Report Measures of Emotional Intelligence. *Sex Roles: A Journal of Research, 70*(11-12), 479–495. https://doi.org/10.1007/s11199-014-0368-6

27. Mayer, J. D. & Salovey, P. (1990). Emotional intelligence, Imagination, Congition and Personality. *Imagination, Cognition, and Personality, 9*, 185-211.

28. Mayer, J.D., Caruso, D.R., & Salovey, P. (1999). Emotional intelligence meets traditional standards for an intelligence. *Intelligence*, *27*(4), 267-298. https://doi.org/10.1016/S0160-2896(99)00016-1

29. Mayer, J. D., Salovey, P., & Caruso, D. R. (2002). *Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT): User's manual*. Toronto, Canada: Multi-Health Systems.

30. Meyers-Levy, J., & Loken, B. (2015). Revisiting gender differences: What we know and what lies ahead (Review). *Journal of Consumer Psychology, 25*(1), 129-149. https://doi.org/10.1016/j.jcps.2014.06.003

31. Mihailović, B., Cvijanović, D., & Simonović, Z. (2015). The role of business ethics in human resource management, *Institute of Agricultural Economics*, *65*(1), 85-96. https://doi.org/10.5937/ekonomika1501085M

32. Milošević, M., & Čolović, M. (2019). Razvojna i pedagoška psihologija sa primenom u sportu i fizičkom vaspitanju, Beograd: Univerzitet Singidunum. [in English: Developmental and pedagogical psychology with application in sports and physical education, Belgrade: Singidunum University].

33. Molander, B., Holmström, S., & Jansson, J. (2005). ESCQ-45 as related to self-rated job stress and health. *Proceedings Paper at the 9 th European Congress of Psychology*, Granada, Spain.

34. Nikić, G., Mitrović, M., & Travica, V. (2014a). The quality of business communications depending on the attachment style, social emotional competences and personality traits. *Industrija*, *42*(4), 79-97.

35. Nikić, G., Travica, V., & Mitrović, M. (2014b). Differences between employees and managers regarding socio-emotional competences. *Serbian Journal of Management*, *9*(2), 281-292. https://doi.org/10.5937/sjm9-5440

36. Nikić, G., & Mitrović, M. (2015). Emotional intelligence of the employees in Serbia – gender differences. *Journal of Women's Entrepreneurship and Education – JWE*, 67 – 85.

37. Palmer, B.R., Gignac, G., Monocha, R., & Stough, C. (2005). A psychometric evaluation of the Mayer-Salovey-Caruso Emotional Intelligence Test version 2.0. *Intelligence*, *33*(3), 285-305. https://doi.org/10.1016/j.intell.2004.11.003

38. Pantić, N., Milojević, I., & Mićović, A. (2020). Menadžerska analiza mogućnosti upravljanja procesom privatizacije. *Tehnika, 75*(4), 493-497. https://doi.org/10.5937/tehnika2004493P

39. Popper, M., & Amit, K. (2009). Influence of Attachment Styile on Major Psychological capacites to Lead. *The Journal of Genetic Psychology*, *170*(3), 244-267. https://doi.org/10.1080/00221320903218307

40. Räty, H. (2005). Perceived emotional competence and self-concept. *Proceedings Paper at the 9th European Congress of Psychology*, Granada, Spain.

41. Ronen, S. & Mikulincer, M. (2011). *Predicting employees' satisfaction and burnout from managers' attachment and caregiving orientations,* 828-849.

42. Rosenberg, M. (1979). *Conceiving the Self*. New York: Basic Books.

43. Savić, B., & Obradović, N. (2020). Challenges in financial reporting about biological assets. Oditor-časopis za menadžment, finansije i pravo, 6(1), 7-21. https://doi.org/10.5937/Oditor2001007S

44. Scharfe, E. (2017). Sex Difference in Attachment. In T. K. Shackelford & V. A. Weekes-Shackelford (Eds.), *Encyclopedia of Evolutionary Psychological Science*. Springer International Publishing. https://doi.org/10.1007/978-3-319-16999-6_3592-1

45. Sy, T., Tram, S., & O'Hara, L.A. (2006). Relation of employee and manager emotional intelligence to job satisfaction and performance. *Journal of Vocational Behavior*, *68*(3), 461-473. https://doi.org/10.1016/j.jvb.2005.10.003

46. Takšić, V., & Moharić, T., & Munjas, R. (2006). *Emocionalna inteligencija: teorija, operacionalizacija, primjena i povezanost s pozitivnom psihologijom*. Rijeka: Filozofski fakultet. [in English: *Emotional intelligence: theory, operationalization, application and connection with positive psychology*. Rijeka: Faculty of Philosophy].

47. Toyota, H. (2005). Emotional Skills and Competence Questionnaire: Development of a Japanese version *Proceedings Paper 9 th European Congress of Psychology*, Granada, Spain.

48. Vučenović, D., Hajncl, Lj., & Takšić, V. (2014). Razvoj emocionalne inteligencije u obiteljskom okruženju i odnos s problemima u ponašanju. Poglavlje u knjizi: *Psihološki aspekti suvremene obitelji, braka i partnerstva, Sveučilišni udžbenik*, Zagreb, Naklada Slap i HPD, 275 — 296. [in English: Development of emotional intelligence in a family environment and relationship with behavioral problems. Chapter in the book: *Psychological aspects of the modern family, marriage and partnership*, University textbook, Zagreb, Naklada Slap and HPD, 275 - 296].

POSSIBILITIES OF MORE PERSPECTIVE DEVELOPMENT OF THE HUNTING DESTINATION "KARAĐORĐEVO"

Radoslava Manojlović[1], Igor Stamenković[2], Milosava Matejević[3], Zoran Ristić[4], Tamara Gajić[5]

**Corresponding author E-mail: milosava@dgt.uns.ac.rs*

ARTICLE INFO

Original Article

Received: *20 May 2020*

Accepted: *20 November 2020*

doi:10.5937/ekoPolj2101085M

UDC 330.34:639.1.052(497.11 „Karađorđevo")

Keywords:

hunting tourism, tourist preferences, tourist satisfaction, hunting destination, rural development

***JEL**: Z320*

ABSTRACT

In the territory of Vojvodina, there are numerous hunting grounds that are in the ranks of the most elite hunting grounds in Serbia and the wider region. One of them is the hunting ground "Karađorđevo". The aim of the study was to determine what are the characteristics of the hunting destination and elements of the hunting tourism product that are important to hunting tourist when going on a journey. The goal was to determine how much the hunting tourists are satisfied with their hunting experience in this hunting area. The results showed that the most important was the quality of the hunting organization, and the least significant were additional contents of tourist animation. The natural resources of the area are the elements that hunters were most satisfied with. Respondents are less satisfied with the quality of accommodation and are least satisfied with the complementary tourist offer.

1 Radoslava Manojlović, Ph.D. student, Department of Geography, Tourism and Hotel Management, Faculty of Sciences, University of Novi Sad, Trg Dositeja Obradovića 3, 21000 Novi Sad, Serbia, Phone: +381 21 48 52 845, E-mail: manojlovicr.rm@gmail.com, ORCID ID (https://orcid.org/0000-0003-3277-5348)

2 Igor Stamenković, Ph.D., Assistant Professor, Department of Geography, Tourism and Hotel Management, Faculty of Sciences, University of Novi Sad, Trg Dositeja Obradovića 3, 21000 Novi Sad, Serbia, Phone: +381 21 48 52 845, E-mail: igor.stamenkovic@dgt.uns.ac.rs, ORCID ID (https://orcid.org/0000-0001-6901-5946)

3 Milosava Matejević, Ph.D., Assistant Professor, Department of Geography, Tourism and Hotel Management, Faculty of Sciences, University of Novi Sad, Trg Dositeja Obradovića 3, 21000 Novi Sad, Serbia, Phone: +381 21 48 52 845, E-mail: milosava@dgt.uns.ac.rs, ORCID ID (https://orcid.org/0000-0001-5345-774X)

4 Zoran Ristić, Ph.D., Full Professor, Department of Geography, Tourism and Hotel Management, Faculty of Sciences, University of Novi Sad, Trg Dositeja Obradovića 3, 21000 Novi Sad, Phone: +381 21 48 52845, E-mail: zoran.ristic@dgt.uns.ac.rs, ORCID ID (https://orcid.org/0000-0001-7273-1177)

5 Tamara Gajić, senior research, South Ural University, Institute of sport, tourism and service, Chelabinsk, Russia, Phone: +381 63 565 544, E-mail: tamara.gajic.1977@gmail.com, ORCID ID (https://orcid.org/0000-0003-3016-8368)

Introduction

Hunting tourism in Serbia, and especially in Vojvodina (the northern province of Serbia), gradually developed in the second half of the 20th century. Its peak reaches in the 1980s. During this period, when hunting-tourist traffic was the most intensive in these areas, significant foreign funds were generated through hunting tourism both for hunting grounds and for tourism organizations (Ristić, Marković, Dević, 2009; Matejević, 2017; Pantić & Rosić, 2019). Vojvodina was a very popular hunting and tourist destination among foreign European hunters, and the largest part of the proceeds was invested in game production, marketing, import of hunting equipment, realization of scientific research projects in hunting, etc. (Gajić et al, 2018).

After the deterioration of the political stability in the country, in the mid-1990s, the number of hunting tourists dropped drastically (Dragin, 2006). This period was characterized by a decrease in the quantity and trophy quality of the game. Current political situation in Serbia is more favorable for hunting tourism development. Even though there are no ongoing official data on the numbers and revenues from annual hunting tourism in Serbia or Vojvodina region, tourist hunters are starting to return and the number of organized commercial hunts increases. However, potentials for revitalization of hunting tourism in Serbia are, still, not sufficiently exploited (Ristic et al., 2009). Hunting managers in Serbia and outfitters should work on improvement of tourist products in order to restore hunting tourism to its former state and take advantage of the tourist potential of hunting destinations and the country in general.

Hunting ground "Karađorđevo" is located in Vojvodina, about 50 km from Novi Sad, the regional capital. It lies along the left bank of the Danube, between 45° 15' and 45° 22' north latitude and 19° 13' and 19° 22' east longitude. This hunting ground is located in the area of the UNESCO Biosphere Reserve "Bačko Podunavlje" which surface area is 176,635 ha. "Karadjordjevo" is part of a military establishment and has a long tradition. Former Yugoslavian President Josip Broz Tito used this hunting ground as his residence where many significant meetings were held. Until 1980, the hunting ground was closed to the public, and since that time it has become open and commercial. After the political instability in the country, in the beginning of 21. century, the number of tourist hunters in the hunting ground "Karadjordjevo" is increasing, so it should be determined to what extent hunters are satisfied with the tourist product and what elements of this product need to be improved in order to achieve the optimal number of hunters in following years. The hunting ground "Karađorđevo" has retained its most important characteristics and qualities. Its most important attraction is the large number of wild animals. Hunters are most interested for trophy red deer and group hunting of wild boars.

The primary goal of the paper is to find out *what are the preferences of tourist hunters when choosing a hunting tourist destination and what are determinants of hunting tourism satisfaction in hunting ground "Karađorđevo"*, in order to appoint the weakness and advantages of this hunting tourist destination and give guidelines for its

development. This research was conducted on a sample on 206 respondents, and it is of importance in the context of further finding of key problems and defining strategic measures for more profitable development of hunting tourism. The results of this study may indicate to hunting workers in the hunting area how to improve their hunting tourism product.

Literature review

Hunting is a highly popular form of nature recreation, an activity enjoyed by 7 million people in Europe (Brainerd, 2007; Sharp, Wollscheid, 2009). Hunting and hunting management are a very important part of cultural heritage in many communities, as well as a significant form of business (Bauer and Giles, 2004). Hunting tourism is a journey whose main motive is to shoot certain game species (Brainerd, 2007; Leader-Williams, 2009; Nygard & Uthardt, 2011). Hunting activities and successful realization of hunting arrangements are conditioned by the existence of a certain game fund. This is the reason why hunting tourism is a specific form of tourism economy, where natural resources (game) are directly consumed, unlike in most other selective forms of tourism (Prentovic, 2009). Hunting tourism can have a significant positive impact on the rural community (Samuelsson, Stage, 2007; Sharp, Wollscheid, 2009; Mbaiwaa, Stronza, 2010; Naidoo et al., 2016) and can bring significant economic benefits to it (Bauer, Herr, 2004). Funds raised by hunting tourism are returned to these rural regions by direct investment in sustainable wildlife management (Leader-Williams, 2009). Brainerd (2007) defines sustainable hunting as the way of using wildlife that maintain biodiversity for present and future generations. Hunting tourism can be a form of sustainable use of wildlife resources only if it is based on scientific assessments of population numbers, and if it is competently regulated and incorruptible (Baker, 1997). If sustainable, hunting could be an important incentive for biodiversity conservation in areas that are not suitable for the development of other tourism forms (Di Minin, Leader-Williams, & Bradshaw, 2016).

As Prentovic et al. (2012) note, specificity of demand in hunting is in its multiple layers, which is based on the specific needs of tourism-hunters. In addition to hunting, those specific needs are active leisure and recreation; staying in a healthy natural environment; enjoying the natural beauty; the exotic ambience of specific hunting areas and attractive wildlife species; education for successful hunting-tourism activities, etc. (Heberlein, Ericsson, Wollscheid, 2002; Prentovic et al, 2012; Van der Merwe, Saayman, 2013). On the other hand, the hunting-tourism product, in addition to various and trophy valuable hunting game, assumes other types of services, and above all: accommodation, food, transportation, educational services, cultural and recreational conditions and activities, and others (Prentovic et al. 2016). However, hunting represents a delicate activity in terms of safety, since various hunting firearms are used during hunting activities. Therefore, during the organization and maintenance of hunting activities, special security measures must be implemented, in order to prevent unwanted consequences during hunting and achieve the safety of all participants in the hunt (Prentović, 2014; Gačić et al., 2015).

Hunting tourism has a potentially significant function in promoting the rural development of areas correlated with hunting tourist destinations (Prentović, Kurjački, Cvijanović, 2012; Prentović, 2014; Mbaiwa, 2017). Prentovic et al. (2016) indicate that there is high correlation of hunting with rural tourism. They explain this correlation by the fact that hunting areas are fully located in rural areas. For that reason, catering facilities of both rural and hunting tourism may offer its services to the clientele of both of these forms of tourism. The relationship of these two forms of tourism is also reflected in the field of tourist demand, since a significant number of hunter-tourists prefer to spend their stay in hunting-tourist destinations with other people, such as family members business partners, who might not be fans of hunting, but prefer exploring new and unfamiliar areas and gaining new experiences and knowledge (Prentović, et al., 2016). Prentovic et al. (2012) note that rural areas are rich in biodiversity and ecosystems, thus hunting management could represent a significant contribution to rural development, by the economic as well as social and ecological aspects. These authors state that hunting and rural tourism are multiply connected and intertwined, emphasizing that this correlation is also, manifested in the domain of supply and demand, as well as in the provision of tourism services (Prentovic et al. 2012).

Researchers in the phenomenon of hunting tourism, have explored mostly the expectations that hunters have before hunting and satisfaction after the end of hunting activities. A large number of these studies indicate that hunting satisfaction is most influenced by hunting success, that is, successful hunting of preferred game species (Decker, Brown, & Gutierrez, 1980; Vaske, Donnelly, Heberlein, & Shelby, 1982). However, some studies have shown that staying in a pure and unspoiled nature, being able to see game in the natural environment and testing one's own abilities can significantly affect hunter satisfaction than successful harvest itself (Hammitt, McDonald & Patterson, 1990; Gigliotti, 2000; Schroeder et al., 2017; 2019). Some authors indicate that overall satisfaction with hunting also depends on the motivation of hunters to hunt (Kerr, 2017). On the other hand, the overall satisfaction is significantly influenced by the expectations of tourists before hunting and the fulfilled expectations (Brunke & Hunt, 2007). Tourists with high expectations are often less satisfied after visiting a tourist destination. In fact, the difference between expectations and real experience during hunting leads to greater or lesser satisfaction (Brunke & Hunt, 2007, 2008). Han & Radder (2011) analyzed safari hunters` perceptions of service quality and the relationship between perceptions of service quality, satisfaction and behavioral intentions and concluded that only core service (basic benefits sought from the safari and the primary reason for the hunter provider service transaction) have a significant effect on satisfaction.

Materials and methods

Since "Karadjordjevo" hunting ground was a residential hunting ground for many years in former Yugoslavia, it was known for its attractive natural habitats, large game of high trophy value and a characteristic hunting facilities. After this hunting ground was

opened for commercial hunting and became available to domestic and foreign hunter tourists, the attendance of the hunting ground increased. Tourist hunters were attracted to realize their hunting wishes in such a prestigious hunting ground. Therefore, the aim of the paper was to determine to what extent the hunting tourism product of this hunting destination meets the needs of hunters and whether it justifies the image that the hunting ground has. What are the preferences of tourist hunters when choosing a hunting tourist destination and what are determinants of hunting tourism satisfaction in hunting ground "Karađorđevo"?

A questionnaire consisting of three parts was used for the purposes of this research. The first part covered the socio-demographic characteristics of the respondents (gender, age, education, length of hunting experience). In the second part of the survey, the respondents stated the importance of certain elements of the hunting tourism product on a five-level Likert scale (*1 - it does not matter to me at all; 2 - it mostly does not matter to me; 3 - I do not care; 4 - it mostly matters to me; 5 - very important to me*). The items "abundance of game"; "fast service of hunting staff"; "understanding client's needs"; "ethical attitude of hunting workers towards game"; "well-trained hunting guides"; "the professionalism of hunting guides"; "successfully solving the problems of tourists"; "the hunting lodge and other facilities are fitting in the natural environment"; "the comfort of hunting lodge"; "cleanliness of accommodation (hunting lodge)" and "food and beverage quality" were chosen based on research of Han & Radder (2011). The other attributes of hunting experience were added by authors based on interviews with hunting tourism outfitters and managers in hunting destinations.

In the third part of the questionnaire, the respondents were asked how satisfied they are with these same elements of the hunting tourism product in the "Karadjordjevo" hunting area after their stay there. The survey was conducted during 2019 in the "Karadjordjevo" hunting ground, and questionnaires were distributed by the authors of this paper. The sample consisted of 206 subjects, that is, hunters who hunted during the 2019 in the "Karadjordjevo" hunting ground.

In the analysis of the research results, the descriptive statistics methods were used first. By these methods, the description of the sample was made, that is, the description of the hunters of tourists in the Karadjordjevo hunting ground. Within the descriptive statistics, extreme values (minimum and maximum), arithmetic means, standard deviations were determined. Further statistical methods were used for data processing, such as Exploratory factor analysis (EFA), which was used to distinguish factors of preferences and satisfaction from various elements of a hunting tourism product. The frequency distribution of numerical features was examined by Skewness and Kurtosis values. Since all variables are normally distributed, parametric statistics methods (t test and F test / ANOVA) were used to determine the possible existence of statistically significant differences between different hunter groups, with respect to the extracted significance and satisfaction factors. Data were processed using SPSS (Statistical Package For Social Sciences) statistical software.

Results

In the observed sample of traveling hunters, the largest percentage are male respondents (96.6%), which was expected, since hunting is still considered as male activity. Regarding the age of the respondents, the most numerous respondents are hunters between 41 and 60 years of age and together they account 65.1% of the sample (table 1).

Table 1. Demographic characteristics of research participants

Age structure of respondents			**Educational structure of respondents**			**Length of hunting experience**		
Age (Year)	Frequency	(%)	Educational level	Frequency	(%)	Hunting (Year)	Frequency	(%)
21-30	10	4.9	High	79	38.3	1-5	22	10.7
31-40	43	20.9	College	81	39.3	6-10	51	24.8
41-50	72	35.0	MSc	27	13.1	11-20	87	42.2
51-60	62	30.1	PhD	19	9.2	21-30	30	14.6
21-30	19	9.2	-	-	-	31-40	12	5.8
> 60	10	4.9	-	-	-	> 40	4	1.9

Source: author's research

The majority of respondents have completed high school or college (together 77.7%) and 80.1% of them are employed (10.2% are retired and 6.8% are unemployed). The respondents are mostly from Serbia, 77.2% of them. The respondents are mostly from Serbia, 77.2% of them. Others are from Bosnia and Hercegovina (7.3%), Germany (2.4%), Slovenia (4.4%), Montenegro (2.9%), Croatia (1.5%), Republic of Northern Macedonia (1.5%), Switzerland (1%), Hungary (0.5%), Italy (0.5%), Belgium (0.5%) and Belarus (0.5%). The respondents stated how long they have been participating in hunting activities and how long they have been engaged in hunting. Their answers were grouped into 6 groups. The majority of respondents have been hunting for more than ten years, and it can be said that the respondents were quite experienced hunters.

Factor analysis was conducted on 14 items of importance of elements of hunting destination when staying in hunting area. The internal consistency of the measuring instrument was confirmed by the obtained Cronbach's alpha coefficient ($\alpha = .761$). The value of the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) is 0.718, and the value of Bartlett's Test of Sphericity is significant ($p = .000$). Principal component analysis revealed the presence of 3 components with characteristic values over 1. The item "The natural environment of hunting area" were below the threshold of 0.5 and has been discarded from the further analysis. The factors were rotated by Varimax rotation, with Kaiser normalization, and the obtained four factors explain a total of 57,001% of the variance, with the contribution of the first component being 29.4%, the other 16.7% and third 10.8%.

Table 2. Rotated Component Matrix (importance of hunting elements)

	Component		
	1	2	3
Competence and professionalism of hunting workers in hunting grounds	.865	.043	.085
Game health in hunting area	.820	.139	.004
Ethical attitude of hunting workers towards wild game	.804	.074	.124
Way of organizing hunting	.584	.283	-.293
The natural environment of the hunting area	.421	.159	.402
The ambiance hunting lodge	.143	.773	.175
Quality of accommodation (hunting lodge)	.110	.765	.152
The comfort of hunting villas and lodges	.115	.721	.142
Quality of gastronomic specialities	.088	.710	.107
Visiting natural and cultural sites in the surrounding area	.114	.248	.725
Existence of additional facilities - tourist animation programs	-.034	-.007	.716
Meeting the local population and culture	.193	.166	.713
Meeting sports and recreational needs	-.221	.236	.531

[*]Extraction Method: Principal Component Analysis.
[*]Rotation Method: Varimax with Kaiser Normalization.
[*]a. Rotation converged in 5 iterations.

The first extracted factor relates to three items that speak about the quality of the organization of hunting and hunting activities in the hunting area and one item that relates to the quality and health status of the game. This factor has been named as "*Hunting Organization Quality*". The second extracted factor comprises a total of 4 items, which relate directly to the quality of the receptive objects and is named as "*The quality of the receptive objects*". The third factor is called "*Complementary tourist motives*" because it contains 4 items related to tourist values complementary to hunting tourism.

Table 3. Analysis of factors of importance of hunting destination elements

Factors	***Factor saturation***	***Percentage of explained variance***
Factor 1 - Hunting organization quality		**29.386%**
Competence and professionalism of hunting workers in hunting grounds	.865	
Game health in hunting area	.820	
Ethical attitude of hunting workers towards wild game	.804	
Way of organizing hunting	.584	
Factor 2 - The quality of the receptive objects		**16.790%**
The ambiance hunting lodge	.773	
Quality of accommodation (hunting lodge)	.765	
The comfort of hunting villas and lodges	.721	
Quality of gastronomic specialties	.710	
Factor 3 - Complementary tourist motives		**10.825%**
Visiting natural and cultural sites in the surrounding area	.725	

Factors	*Factor saturation*	*Percentage of explained variance*
Existence of additional facilities - tourist animation programs	.716	
Meeting the local population and culture	.713	
Meeting sports and recreational needs	.531	

Source: author's research

As can be seen in table 4, two of the three extracted factors are, on average, very significant for hunters. Factor 1 (*Hunting organization quality*) appears as the highest average scoring factor (m=4.59), while Factor 2 (*The quality of the receptive objects*; m=4.04) is slightly lower. Factor 3 (*Complementary tourist motives*, m=3.22) has a significantly lower power, on average.

Table 4. Descriptive statistics indicators for all 3 factors of importance (N=206)

	Min	*Max*	*m*	*sd*
Factor 1 - Hunting organization quality	2.75	5.00	4.5951	.51472
Factor 2 - The quality of the receptive objects	2.75	5.00	4.0388	.52644
Factor 3 - Complementary tourist motives	1.00	5.00	3.2257	.80661

**Min = minimum; Max = maximum; m = mean; sd = standard deviation*

Using the t-test, it was found that there were no statistically significant differences between subjects of different gender in relation to all three factors. Using the F-test (ANOVA), it was found that there were no differences in the strength of the effect of the three preference factors on the subjects of different educational level.

Table 5. ANOVA - Factor 3 (Complementary tourist motives) and length of hunting experience

	Sum of Squares	*df*	*Mean Square*	*F*	*p*
Between Groups	7.976	5	1.595	2.544	.029
Within Groups	125.403	200	.627		
Total	133.379	205			

**df = degree of freedom; F – statistic; p = statistical significance*

Significant statistical differences were found, using ANOVA analysis, with the Post Hoc LSD test, in Factor 3 - *Complementary tourist motives* (F = 2,544; df = 5; p = 0.029) between respondents with different length of hunting experience. The magnitude of this difference, expressed by the eta square indicator, is 0.06. Subsequent comparisons using the Tukey HSD test indicate that the mean of the hunter group with short experience (m = 3.57) differs significantly from the mean of the hunter group with between 21 and 30 years of experience in hunting (m = 2.83). Thus, for respondents who have been engaged in hunting for much longer complementary tourist value are of less importance.

Table 6. Post Hoc LSD test

(I) hunting experience	*(J) hunting experience*	*Mean Difference (I-J)*	*Std. Error*	*Sig.*	*95% Confidence Interval*	
					Lower Bound	**Upper Bound**
1-5 years	6-10 years	.38681	.20198	.396	-.1944	.9680
	11-20 years	.30094	.18896	.604	-.2428	.8447
	21-30 years	.73485*	.22226	.014	.0953	1.3744
	31-40 years	.15152	.28417	.995	-.6662	.9692
	>40	.19318	.43041	.998	-1.0453	1.4317

** The mean difference is significant at the 0.05 level*

Factor analysis was conducted on 14 items of satisfaction of hunting destination elements when staying in hunting area. Three factors are extracted in this way. The factors were rotated by Varimax rotation, with Kaiser normalization. The internal consistency of the measuring instrument was confirmed by the obtained Cronbach's alpha coefficient (α = .742), and the sampling adequacy is indicated by the obtained .766 KMO (Kaiser-Meyer-Olkin Measure of Sampling). The value of Bartlett's Test of Sphericity is significant (p = .000). Principal component analysis revealed the presence of 3 components with characteristic values over 1. The item "Way of organizing hunting" were below the threshold of 0.5 and has been discarded from the further analysis. and the obtained three factors explain a total of 53.37% of the variance, with the contribution of the first component being 27.64%, the other 15.73% and third 10.003%.

Table 7. Rotated Component Matrix (satisfaction with hunting elements)

	Component		
	1	**2**	**3**
Competence and professionalism of hunting workers in hunting grounds	.847	.045	.108
Ethical attitude of hunting workers towards wild game	.839	.056	.082
Game health in hunting area	.730	.140	.254
The natural environment of the hunting area	.575	.252	.271
Trophy value of game	.551	-.256	-.004
Way of organizing hunting	.452	-.373	.354
Existence of additional facilities - tourist animation programs	-.160	.735	.043
Meeting the local population and culture	.275	.722	.161
Meeting sports and recreational needs	-.128	.684	.106
Visiting natural and cultural sites in the surrounding area	.206	.533	.023
Quality of accommodation (hunting lodge)	-.054	.114	.810
Quality of gastronomic specialties	.115	-.119	.723
The ambiance hunting lodge	.248	.174	.578
The comfort of hunting villas and lodges	.278	.228	.561
**Extraction Method: Principal Component Analysis.* ** Rotation Method: Varimax with Kaiser Normalization.*			
**a. Rotation converged in 4 iterations.*			

**Extraction Method: Principal Component Analysis.*
** Rotation Method: Varimax with Kaiser Normalization.*
**a. Rotation converged in 4 iterations.*

The first extracted factor refers to 5 items that speak about the quality of the hunting tourism offer and to what is the merit of the hunting managers in this hunting ground. This factor has been named as the "*Quality of hunting tourism offer*". The second extracted factor comprises a total of 4 items relating to complementary tourist values in the hunting and the surrounding area. This factor has been named as "*Complementary tourist motives*". The third factor is called "*Quality of receptive objects*", since it includes 4 items that relate directly to the quality of receptive objects.

Table 8. Analysis of factors of satisfaction with hunting destination elements

Factors	***Factor saturation***	***Percentage of explained variance***
Factor 1 - Quality of hunting tourism offer		**27.64%**
Competence and professionalism of hunting workers in hunting grounds	.847	
Ethical attitude of hunting workers towards wild game	.839	
Game health in hunting area	.730	
The natural environment of the hunting area	.575	
Trophy value of game	.584	
Factor 2 - Complementary tourist motives		**15,73%**
Existence of additional facilities - tourist animation programs	.735	
Meeting the local population and culture	.722	
Meeting sports and recreational needs	.684	
Visiting natural and cultural sites in the surrounding area	.533	
Factor 3 - Quality of receptive objects		**10,003%**
Quality of accommodation (hunting lodge)	.810	
Quality of gastronomic specialties	.723	
The ambiance hunting lodge	.578	
The comfort of hunting villas and lodges	.561	

Source: author's research

As can be seen in Table 9, one of the three extracted factors stands out by its average value. The factor with the highest average score (m = 4.30) is Factor 1 (*Quality of hunting tourism offer*). Significantly lower were Factor 3 (*Quality of receptive facilities*; m = 3.84) and Factor 2 (*Complementary tourist motives*, m =2.68). Using the t-test and F-test (ANOVA), it was found that there were no statistically significant differences between different groups of respondents (gender, age, education, hunting experience) with respect to all three satisfaction factors.

Table 9. Descriptive statistics indicators for all 3 factors of satisfaction (N=206)

	Min	*Max*	*m*	*sd*
Factor 1 - Quality of hunting tourism offer	2.60	5.00	4.3019	.53982
Factor 2 - Complementary tourist motives	1.00	4.75	2.6796	.77374
Factor 3 - Quality of receptive objects	2.50	5.00	3.8495	.48808

**Min = minimum; Max = maximum; m = mean; sd = standard deviation*

Discussions

One of the goals of the study was to establish what are the preferences of tourist hunters when choosing a hunting tourist destination. The results were somewhat different comparing to those in previous researches which have indicated that specific needs and preferences of hunting tourists are leisure and recreation, staying in a healthy natural environment, enjoying the natural beauty, the specific ambience of hunting areas, attractive wildlife species and hunting education (Heberlein, Ericsson, Wollscheid, 2002; Prentovic et al, 2012; Van der Merwe, Saayman, 2013). The results of this research showed that the respondents (consumers of the hunting and tourism product of "Karađorđevo" hunting ground) appreciate the most the quality of hunting organization. The expertise and professionalism of hunting workers in the hunting area, their ethical attitude towards wild game and the way they organize tourist hunt have proven to be the most important elements of a hunting tourism product. This shows how important it is for hunters that tourist hunting is organized in a professional manner that will, above all, ensure the safety and security of all participants in the hunt. As other research indicate how important is implementation of security measures during the organization and maintenance of hunting activities (Prentovic, 2014; Gačić et al., 2015), results in this study showed that good expertise and professionalism of hunting workers is of great value to tourist hunters. Previous researches showed that staying in a nature and watching the game in the natural environment are important factor on overall hunters' satisfaction (Hammitt, McDonald, & Patterson, 1990; Šapić et al., 2018 Ognjanović, 2020; Gigliotti, 2000; Schroeder et al., 2017; 2019; Kral et al., 2020). However, factor analysis didn't recognize natural resources of the hunting ground (the trophy value of the game, health status of the game and the natural habitats) as important items.

In study of Han & Radder (2011) core service showed to be of a significant effect on satisfaction. Results of this research showed that the quality of others elements of core hunting product (beside hunting workers' expertise and professionalism) was the factor that satisfied tourist hunters in great extend. Tourist hunters in hunting ground "Karadjordjevo" were very satisfied with the natural resources of the hunting ground, the trophy value of the game, its health status and the natural habitats of this game which, previously, have proven to be significant preferences of hunting tourist (Heberlein, Ericsson, Wollscheid, 2002; Prentovic et al, 2012; Van der Merwe, Saayman, 2013). The quality of service of accommodation and catering facilities has also proven to be a significant element. However, the respondents are somewhat less satisfied with the quality of the offer of accommodation and catering facilities, and least satisfied

with the complementary tourist offer. The results showed that for the hunters are least important the additional contents of the tourist animation, that is, the tourist offer that is not closely related to the hunting contents. These complementary tourist elements are more significant only for beginner hunters and hunters with shorter hunting experience, compared to more experienced hunters, but still not of great importance. Still, it should be borne in mind that, in addition to hunting activities, hunters are not significantly interested in additional tourist programs, and less consumed it. It can be assumed this is the reason that the results showed a lower level of satisfaction with these elements.

After the hunting activities conducted by the respondents in the "Karađorđevo" hunting area, it turned out that the hunters are mostly satisfied with the quality of the hunting tourism offer of this hunting tourist destination. The expertise and professionalism of hunting workers in the "Karađorđevo" hunting area and their ethical attitude towards game proved to be of high quality, given that they were highly rated by the respondents. Considering the results of the analysis of the tourist hunters preferences, then these are very good indicators for hunting workers in hunting ground "Karađorđevo".

Conclusions

Most of previous mentioned studies in their sample included resident hunters, while the aim of our research was to investigate preferences and satisfaction of hunting tourists. There is luck of scientific research in the field of hunting tourism in the area of Balkan region and Serbia. Given that this is one of the first studies in the field of satisfaction with hunting tourism arrangements in Serbia, it can be the basis for further researches that would more accurately establish all the determinants of hunting tourist satisfaction.

Hunting ground "Karađorđevo" with adequate investments and program could become a major factor in the development of hunting tourism at the national level. Since hunting ground is located in the area of the Biosphere Reserve "Bačko Podunavlje", hunting managers could improve tourist offer by including some tourist activities within this whole area. Since, tourist hunters do not show significant interest in additional tourist offer, hunting outfitters and hunting managers could devise such an offer that tourists are interested in other tourist facilities near the hunting ground and upgrade marketing and promotional activities. Accommodation and catering facilities in hunting ground "Karadjordjevo" should be considered for upgrading and reconstruction in order to satisfied hunter tourist needs and preferences. This research may contribute to other more comprehensive and detailed research on the same topic, but at the level of whole region or Serbia.

One of limitations of the research is that the final price of a tourist product is not taken into account when selecting elements that may be of importance for hunting tourists. Further research should be directed towards analyzing a larger number of attributes of the hunting tourist product, as well as implementing analyzes that would more preciously establish specific hunting tourist product's elements that influence on overall hunting tourists' satisfaction.

Conflict of interests

The authors declare no conflict of interest.

References

1. Bauer, J., & Herr, A. (2004*). Hunting and Fishing Tourism, In Higgenbottom, K. (eds)*. Wildlife Tourism: Impacts, Management and Planning. CRC for Sustainble Tourism, Common Ground Publishing, Brisbane, 57-75.
2. Brainerd, S. (2007). *European Charter on Hunting and Biodiversity, Convention on the Conservation of European Wildlife Natural Habitats*, Norwegian Association of Hunters & Anglers.
3. Decker, D.J., Brown, T.J., & Gutierrez, R.J. (1980). Further insights into the multiple- satisfactions approach for hunter management. *Wildlife Society Bulletin, 8*, 323–331.
4. Dragin, A. (2006). *Lovno-turistički resursi Bačke—Stanje, održivi razvoj i korišćenje*. Univerzitet u Novom Sadu, Prirodno-matematički fakultet, Departman za geografiju, turizam i hotelijerstvo, Novi Sad.
5. Kerr, G. (2017). Marginal Satisfaction of Recreational Hunters' Red Deer Harvests, *61st AARES Annual Conference, Brisbane Conference and Entertainment Centre*, Brisbane, 8-10 February 2017.
6. Kral, P., Janoskova, K., Lazaroiu, G., & Suler, P. (2020). Impact of Selected Socio-Demographic Characteristics on Branded Product Preference in Consumer Markets. *Management & Marketing. Challenges for the Knowledge Society*, 15(4), 570-586. https://doi: 10.2478/mmcks-2020-0033
7. Gajić, T., Penić, M., Vujko, A., & Petrović, M.D. (2018). Development Perspectives of Rural Tourism Policy – Comparative Study of Rural Tourism Competitiveness Based on Perceptions of Tourism Workers in Slovenia and Serbia. *Eastern European Countryside*, 24(1), 144-154. https://doi.org/10.2478/eec-2018-0007
8. Gigliotti, L.M. (2000). A classification scheme to better understand satisfaction of Black Hills deer hunters: The role of harvest success. *Human Dimensions of Wildlife, 5*, 32–51. https://doi.org/10.1080/10871200009359171
9. Hammitt, W., McDonald, C.D., & Patterson, M.E. (1990). Determinants of multiple satisfaction for deer hunting. *Wildlife Society Bulletin*, *18*, 331–337.
10. Mbaiwa, J. (2017). Effects of the safari hunting tourism ban on rural livelihoods and wildlife conservation in Northern Botswana, *South African Geographical Journal*, *100*(1), 41-61, https://doi.org/10.1080/03736245.2017.1299639
11. Leader-Williams, N. (2009). *Conservation and hunting: Friends or Foes? in Barney Dickson,Jonathan Hutton,Bill Adams 2009. Recreational Hunting, Conservation and Rural Livelihoods: Science and Practice*, 1st edition, Blackwell Publishing.

12. Matejevic, M. (2017). *Cynological aspects of hunting tourism in Serbia*, Department of geography, tourism and hotel management, Faculty of Science [*in Serbian*: Matejevic, M. (2017). Kinološki aspekti lovnog turizma u Srbiji, Departman za geografiju, turizam i hotelijerstvo, Prirodno-matematički fakultet, Univerzitet u Novom Sadu].

13. Mbaiwaa, J.E., & Stronza, A.L. (2010). The effects of tourism development on rural livelihoods in the Okavango Delta, Botswana. *Journal of Sustainable Tourism*, *18*(5), 635–656 https://doi.org/10.1080/09669581003653500

14. Naidoo, R., Weaver. L.C., Diggle, R.W., Matongo, G., Stuart-Hill, G., & Thouless, C. (2016). Complementary benefits of tourism and hunting to communal conservancies in Namibia. *Conservation Biology*, *30*(3), 628–638, https://doi.org/10.1111/cobi.12643

15. Nygard, M., & Uthardt, L. (2011). Opportunity or threat? Finnish hunters' attitudes to hunting tourism. *Journal of Sustainable Tourism, 19*(3), 383–401. https://doi.org/10.1080/09669582.2010.524701

16. Ognjanović, J. (2020). Employer brand and workforce performance in hotel companies. *Hotel and Tourism Management*, *8*(2), 65-78. https://doi.org/10.5937/menhottur2002065O

17. Pantić, N., & Rosić, M. (2019). Karakteristike projektovanja ekoloških nanada. *Održivi razvoj, 1*(1), 29-42. https://doi.org/10.5937/OdrRaz1901029P

18. Prentović, R. (2008). Correlation of hunting and rural tourism in Vojvodina, *Researches Review of the Department of Geography, Tourism and Hotel Management, 37*, 110-121. [*in Serbian*: Prentović, R. (2008). Korelacija lovnog i ruralnog turizma u Vojvodini, *Zbornik radova Departmana za geografju, turizam i hotelijerstvo*, 37, Departman za geografju, turizam i hotelijerstvo, 110-121 Novi Sad].

19. Prentović, R. (2009). Agency business in hunting tourism. *Researches Review of the Department of Geography, Tourism and Hotel Management, 38*, 210 – 227 [*in Serbian*: Prentović, R. (2009). Agencijsko poslovanje u lovnom turizmu. *Zbornik radova Departmana za geografju, turizam i hotelijerstvo, 38*, 210 – 227].

20. Prentović, R. (2014). *Hunting tourism activities*, Department of Geography, Tourism and Hotel Management, Faculty of Science [*in Serbian*: Prentović, R. (2014). *Lovnoturistička delatnost*, Departman za geografiju, turizam i hotelijerstvo, Prirodno-matematički fakultet, Novi Sad].

21. Prentović, R., Kurjački, A., & Cvijanović, D. (2012). Hunting in rural areas of Backa. *Economics Of Agriculture*, *59*(3), 385-400.

22. Ristic, Z., Marković, V., & Devic, M. (2009). Development of Hunting Tourism in Vojvodina. *Geographica Pannonica*, *13*(3), 105-114. https://doi.org/10.5937/GeoPan0903105R

23. Han, X., & Radder, L. (2011). Measurement And Consequences Of U.S. Tourists Perceptions Of Service Quality: A South African Hunting Safari Case Study. *International Business & Economics Research Journal, 10*(5), https://doi.org/10.19030/iber.v10i5.4229

24. Samuelsson, E., & Stage, J. (2007). The size and distribution of the economic impacts of Namibian hunting tourism. *South African Journal of Wildlife Research*, *37*(1), 41–52. https://doi.org/10.3957/0379-4369-37.1.41

25. Schroeder, S., Cornicelli, L., Fulton, D., & Merchant, S. (2017). Explicit versus implicit motivations: Clarifying how experiences affect turkey hunter satisfaction using revised importance-performance, importance grid, and penalty-reward-contrast analyses. *Human Dimensions of Wildlife*, *23*(1). https://doi.org/10.1080/10871209.2018.1385112

26. Schroeder, S., Cornicelli, L., Fulton, D., & Merchant, S. (2019). The influence of motivation versus experience on recreation satisfaction: How appreciative versus achievement-oriented recreation experience preferences relate to hunter satisfaction. *Journal of Leisure Research, 50*(2). https://doi.org/10.1080/00222216.2018.1557502

27. Sharp, R., & Wollscheid, K.U. (2009). *Recreational Hunting in North America, Europe and Australia, in Dickson, B., Hutton, J., Adams, B. 2009. Recreational Hunting, Conservation and Rural Livelihoods: Science and Practice*, 1st edition, Blackwell Publishing.

28. Šapić, S., Furtula, S., & Durkalić, D. (2018). Prestige and national identity as predictors of food products purchase. *Economics of Agriculture*, 65(2), 643-657., https://doi:10.5937/ekoPolj1802643S

29. Vaske, J.J., Donnelly, M.P., Heberlein, T.A., & Shelby, B. (1982). Differences in reported satisfaction ratings by consumptive and non consumptive recreationists. *Journal of Leisure Research, 14*, 195–206.

AGRICULTURAL ASSETS' INFLUENCE ON BUILDING FARMERS' RESILIENCE IN ROMANIA. FOOD SECURITY APPROACHES

Raluca Andreea-Ion[1], Cristian George-Popescu[2], Marinela Ilie[3], Daniela Popa[4]

**Corresponding author E-mail: popadaniela256@gmail.com*

ARTICLE INFO

Original Article

Received: *03 January 2021*

Accepted: *19 January 2021*

doi:10.5937/ekoPolj2101101A

UDC 338.043:355.225(498)

Keywords:

resilience, agricultural assets, land, machineries, livestock, food supply

JEL: *Q10, Q14, Q20*

ABSTRACT

An increasing number of scientific papers has been written on the topic of resilience. It explains the way individuals and regions face to shocks and stressors. It focuses on farmers' resilience and food security. The main shocks related to food insecurity are weather variability, volatility, and agricultural assets. We assume that the level of assets plays a role in assessing the risk level of individuals' exposure to shocks and stressors. The case of Romania is discussed, using statistical data concerning land, machineries and livestock, as main agricultural assets. The data have been analyzed using simple regression model. The results show medium influences of the agricultural assets on food supply. Significant influences have registered in macro region four: West and South-West, for land, machineries and swine. The results can be used in political frameworks and strategies and to widening the knowledge in the field of farmers' resilience.

Introduction

Resilience is a modern concept which helps understanding the way individuals, households, and regions face to shocks and stressors, and an increasing number of

1 Raluca Andreea Ion, Ph.D., Professor, Department of Agro-food and Environmental Economics, The Bucharest University of Economic Studies, Romania-Bucharest, Phone: 004 072 295 93 53, E-mail: raluca.ion@eam.ase.ro, ORCID ID (https://orcid.org/0000-0001-7182-5809)

2 Cristian George-Popescu, Ph.D., Associate Professor, Department of Economical and Administrative Sciences, The University of Bucharest, Phone: 004 07 582 491 77, E-mail: cristian.popescu@faa.unibuc.ro, ORCID ID (https://orcid.org/0000-0002-1995-1469)

3 Marinela Ilie, Ph.D., student, The Bucharest University of Economic Studies, Romania-Bucharest, Phone: 004 07 480 707 68, E-mail: marinela.ilie93@gmail.com, ORCID ID (https://orcid.org/0000-0002-7534-2852)

4 Daniela Popa, Ph.D., student, The Bucharest University of Economic Studies, Romania-Bucharest, Phone: 004 07 225 630 85, E-mail: popadaniela256@gmail.com, ORCID ID (https://orcid.org/0000-0002-7492-7744)

academic papers and reports has been written on the topic. It is issued from system theory as "the ability of a system to bounce back or return to equilibrium following disturbance" (Holling, 1973). The concept then developed to a complex approach. As regards the food system resilience, it could be considered resilient in the situation in which it can maintain production of enough and nutritious food in the face of both chronic and acute social, economic and environmental perturbations.

The environment is continuously changing. Nowadays, the internal and external business environments are changing more rapidly than ever before (Stankevičiūtė, & Wereda, 2020). When speaking about dynamics and disturbance at the farm level, farmers have been always living and working in changeable environments, where socio-economic, ecological, and political risks are there. As other authors observed, (Berkes and Turner, 2006; Gunderson and Holling, 2002), major economic and social changes alter the farmer-environment relationship, and a new balance develops.

At the microeconomic level, the authors Milestad and Darnhofer (2003) developed a system of criteria for assessing farm resilience. It is based on farming systems literature, mentioned by Röling and Jiggins (1998), Pretty (1998), (2002), and Ellis (2000). Agro-food systems have been analyzed from a variety of angles and with various purposes. One direction of research concerns the knowledge of farmers and their strategies to cope with and adapt to change (Scoones and Thompson, 1994; Sumberg and Okali, 1997; Ellis, 2000; Hoffmann et al., 2007; Burešova et al., 2020; Jokić, 2020).

Milestad (et al. 2009) explored how farmers' experiments can contribute to developing socio-economic and ecological resilience on farms and in the regional food systems.

The resilience could be measures using different methods. One of them is the "Resilience Index Measurement and Analysis" (RIMA), developed by FAO (2016). It consists in assessing the following indicators comprised into four pillars: access to Basic Services, which shows the possibility of a household to meet their members' basic needs, as follows: sending children to school; accessing water supplies, electricity and sanitation facilities; assets, which allow households to produce and consume goods and services; social safety nets that assess the possibility of the household to have access to formal and informal assistance from public and private institutions, likewise from their relatives and friends; and adaptive capacity which consists in the possibility to adapt to new situations and develop new livelihood strategies.

This paper aims to assess the influence of agricultural assets' on building farmers' resilience. Productive and non-productive assets are the key elements of a household, since they allow them to produce and consume goods. The indicators used are agricultural asset, land for cropping, livestock, house value etc.

The hypothesis tested in this piece of research argues that the level of assets plays a role in assessing the risk level of farm's exposure to shocks and stressors and cause the level of food supply of a household.

This paper analysis the economic resilience in relation to food security. Following the introduction, the paper is divided into three main parts, followed by conclusions. Part 2 presents an overview of the regions of development in Romania. The data and methods of determining the resilience are presented in part 3. Part 4 presents the results of the regression models. Finally, part 5 draws the conclusions, and validates the hypotheses.

Overview of the development regions of Romania

Resilience explains how individuals and/or regions face to shocks and stressors. This paper investigates the regional resilience, thus an overview of the development regions in Romania is presented.

Regional policy is one of the key issue of the European Union. It is addressed to all the EU regions, both rural and urban, and it aims to boost economic growth and employment, in order to finally improve the quality of life through strategic financial investments (European Commission, 2020). Regional development focuses on creating and diversifying the economic activities, by stimulating investments meant to reduce the socio-economic differences between various regions (Apostolache, 2014).

A region is defined in EU's documents as "the next level after the state" or "a territory that forms a net unit from geographical point of view. It also means a similar assembly of territories having continuity, and population sharing certain common elements and willing to keep and develop their specificity for stimulating the cultural, social and economic progress" (European Commission).

From statistical point of view and data collection reasons, at the EU level there were created territorial units called NUTS (Nomenclature of Territorial Units for Statistics). They are organized on six territorial levels that depend on the number of inhabitants and the level of development. The European Union regional development policy envisages NUTS II level. At this level, the average size of the regions is 2.5 million people, and 13.000 sq. km (Apostolache, 2014).

According to Law no.315 (2004) on regional development, in Romania there are set up eight development regions, comprised into four main macro regions. The macro region one comprises North-West and Center Regions. The macro region two comprises the North East and South East Regions. The macro region three comprises South-Muntenia and Bucharest-Ilfov Regions. The macro region four comprises the South-West Oltenia and West Regions. They belong to NUTS II level and they are subject of the regional development policy, which is considered a key factor that facilitates the absorption of EU funds, through Rural Development National Program (Istudor, 2006).

The regions vary in size, assets and development. Considering the GDP as the main indicator showing the development of a region, in Table 1 and Figure 1, the GDP values per capita are presented, for the period 2012-2018. It can be noticed that the highest values registered in the region Bucharest, the GPD reached a pick of 22,803 euro/

person, in 2018. It is followed by the region West, which registered a value of 10,287 euro/person, in 2018. Still, the values of GDP in all regions are half of its value in the region Bucharest.

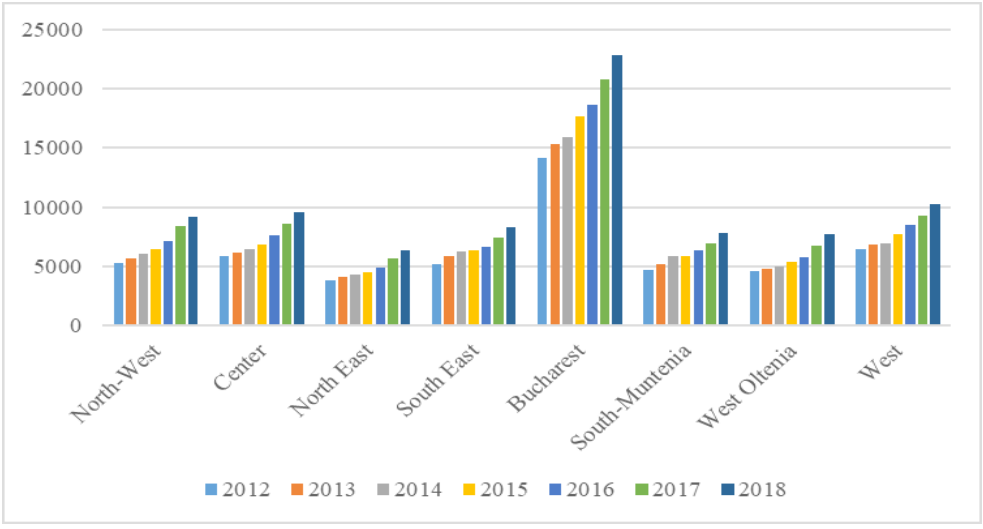
Table 1. GDP per capita by region of development, in Romania, 2000-2018 (euro/inhabitant)

Development region	2012	2013	2014	2015	2016	2017	2018
North-West	5302	5638	6083	6475	7153	8385	9201
Center	5849	6108	6415	6871	7571	8540	9572
North-East	3819	4085	4250	4497	4861	5640	6311
South-East	5213	5844	6211	6303	6659	7404	8322
Bucharest	14141	15296	15935	17673	18596	20817	22803
South-Muntenia	4644	5132	5832	5838	6362	6935	7806
South-West Oltenia	4607	4823	4942	5342	5719	6685	7755
West	6436	6791	6972	7659	8445	9277	10287

Source: National Institute of Statistic of Romania

A general increasing trend of the values of GDP can be observed in Figure 1, for all regions, over the period under analysis. The GDP grew up to 60-70% in 2018 as compared to 2012, depending on the region. The highest growth registered in the region North West, considered to be the most dynamic region in Romania.

Figure 1. GDP per capita by region of development, in Romania, in the period 2012-2018 (euro/inhabitant)



Source: National Institute of Statistic of Romania

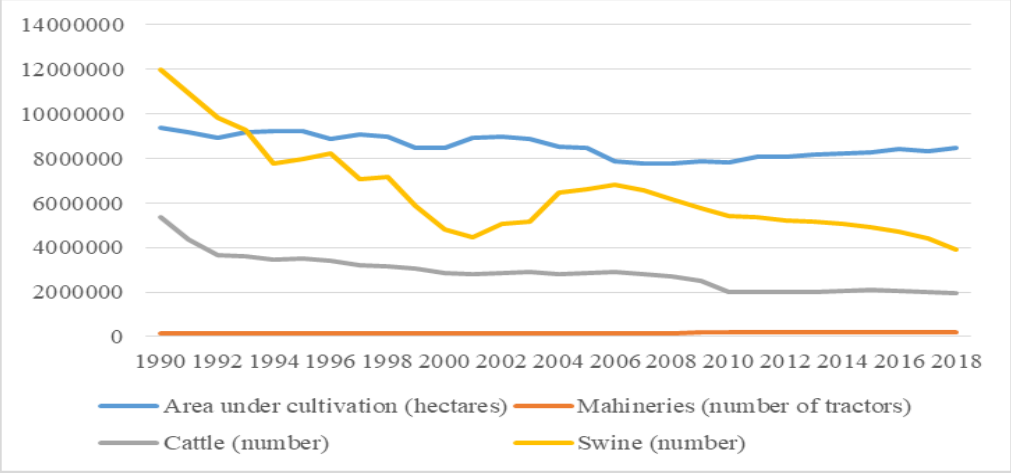
Materials and methods

It is assumed that the regions with high levels of GDP are able to ensure food security for its inhabitants. In this paper, the relationships between assets, particularly agricultural assets, and food security are analyzed.

The influence of agricultural assets on farmers' resilience can be explained by the relationship between the endogen variable, food security, and the exogenous variable, resilience capacity, with its shocks and stressors. Within this paper, the exogenous variable is agricultural assets, as pillar of resilience, and the endogen variable is food security, considered as an effect or outcome of individual's well-being.

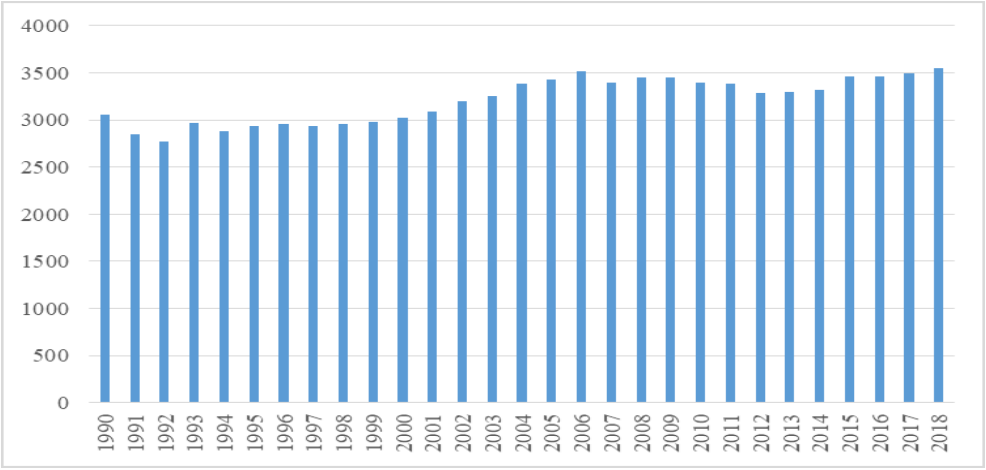
The indicators suitable to agricultural assets are land for cropping, technical endowments and livestock. They are presented in Figure 2. The indicator suitable to food security is food supply rendered in daily calories consumed per person. It is presented in Figure 3. This was used in FAO report of 2014 (RM-TWG), and other scientific paper: Bullock (et al. 2017) reported that food quantity, expressed as the amount of production or food calories, is the most common metric of food security and thus resilience.

Figure 2. Land under cultivation, technical endowments and livestock in Romania, 1990-2018



Source: National Institute of Statistic of Romania

Figure 3. Food supply in Romania, 1990-2018 (kcal/capita/day)



Source: National Institute of Statistic of Romania

As seen in Figure 2, the land under cultivation dropped by 1 million hectares within the period 1990-2018, from 9,402,113 hectares to 8,466,658 hectares. The number of agricultural tractors almost doubled within the period under analysis, from 127,065 to 215,980. The livestock dramatically decreased, almost three times, for both cattle and swine, from 5,380,780 to 1,977,232 in the case of cattle, and from 12,003,384 to 3,925,283, in the case of swine. This situation is explained by the structural changes registered in Romanian agriculture after 1989, when large agricultural exploitations belonging to the state or cooperative systems have been divided into smaller private farms. The same situation experienced the livestock, when larger state or cooperative exploitations have been closed or privatized.

Figure 3 reveals an oscillatory trend for food supply, with an overall increasing trend from 3053 kcal/capita/day to 3552 kcal/capita/day, in the period under analysis. It can be noticed that the values of food supply, expressed in calories per person per day, are higher than recommendations and closed to the average world consumption of almost 3000 kcal/capita/day. We can assert that food security is ensured, on average, in Romania, as statistical indicators show and the results of other scientific papers (Istudor et al.2014).

Results

For assessing the influence of agricultural assets on farmers' resilience, the relationship between food security, as dependent variable, and resilience capacity are analyzed.

The indicators are introduced into SPSS and analyzed using simple regression model, using 28 observations. The results of the model of regression are presented in Table 2, showing the influence of the agricultural assets, land, machinery, cattle and swine, on food supply.

Table 2. The influence of agricultural assets on food supply

Variable	Coefficients of correlation	Standard error	Sig.
Land	0.616	0.000	0.000
Machinery	0.588	0.001	0.000
Cattle	0.504	0.000	0.000
Swine	0.412	0.000	0.000

Source: Author's calculations

The agricultural assets have moderate influence on food supply, because the values of the coefficients of correlation are around 0.5. The land registered the highest influence of agricultural assets on food supply, since the value of the coefficient of correlation is 0.616, compared to machinery (0.588), cattle (0.504) and swine (0.412). The results of the regression model are retrieved with a standard error bellow 0.001 and a probability of 95%.

The analysis goes deep into the macro regions of Romania, assuming that the influence of agricultural assets varies from one region to another, due to their differences in those regarding economic activity, agricultural land, technical endowment, livestock, people income and, generally, people wellbeing. As mentioned before, there are four macro regions in Romania: macro region 1, including North-West and Center, macro region 2, including North-East, South-East, macro region 3, including South-Muntenia, Bucharest-Ilfov, and macro region 4, including South-West Oltenia and West. The influence of the agricultural assets on food supply is presented in Table 3.

It can be noticed that significant results are registered for macro region 4, West and South-West Oltenia, where land use and machinery influence food supply, since the values of the coefficients of correlation between variables are above 0.5. They show a medium correlation between variables. The relations are negative, as the values of the coefficients of the regression function show. The results are retrieved with standard errors bellow 0.005, and a probability of 95%.

Table 3. The influence of agricultural assets on food supply, by region

Variable	**Coefficients of correlation**	**Coefficients of the regression function**	**Standard error**	**Sig.**
Macro Region 1				
Land	*			
Machinery	*			
Cattle	0.645	0.803	0.000	0.003
Swine	*			
Macro Region 2				
Land	*			
Machinery	*			
Cattle	0.180	0.425	0.000	
Swine	*			

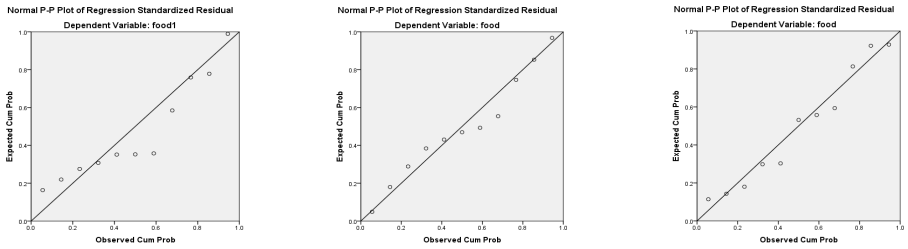
Variable	Coefficients of correlation	Coefficients of the regression function	Standard error	Sig.
Macro Region 3				
Land	*			
Machinery	*			
Cattle	0.487	0.698	0.000	0.170
Swine	*			
Macro Region 4				
Land	0.607	-0.779	0.000	0.005
Machinery	0.562	-0.750	0.005	0.008
Cattle	*			
Swine	0.357	0.597	0.000	0.052

*statistically insignificant
Source: Results of the regression model

In all the other regions, the results of the regression model are significant only for livestock, namely for cattle. In macro region 1, the cattle influence the food supply with a moderate intensity of 64%. The food supply modifies by 0.803 kcal as a result one-unit change in the number of cattle. In macro region 2, the cattle influence the food supply with a low intensity of 18%. The food supply modifies by 0.425 kcal as a result one-unit change in the number of cattle. In macro region 3, the cattle influence the food supply with a moderate intensity of 48%. The food supply modifies by 0.698 kcal as a result one-unit change in the number of cattle.

For land and machinery, although they are significant agricultural assets in farms activities, the results are not statistically significant. This could be considered a limit of the research, needing a detailed analysis, using different econometric methods and models.

Figure 4. The histograms showing the relationships between cattle and food supply in macro region 1 (a), macro region 2 (b) and macro region 3 (c)



(a) (b) (c)

Source: Results of the regression model

Conclusions

The results of the research validate the hypothesis, assumed at the beginning of the article, that the level of assets plays a role in assessing the risk level of farmer's exposure to shocks and stressors and causes the level of individuals' and farmers' food supply. The results of the regression models show medium influences of the agricultural assets on food supply and regional disparities concerning the relationships of the agricultural assets on farmers' resilience. Thus, significant influences have registered in macro region 4, West and South-West, for land, machineries and swine. Less significant influences have registered in all the other macro regions, where only cattle influence, with a lower intensity, the food supply.

Acknowledgements

This work was supported by a grant of the Ministry of Research and Innovation, CNCS - UEFISCDI, project number PN-III-P4-ID-PCCF-2016-0166, within the PNCDI III project "ReGrowEU - Advancing ground-breaking research in regional growth and development theories, through a resilience approach: towards a convergent, balanced and sustainable European Union".

Conflict of interests

The authors declare no conflict of interest.

References

1. Apostolache, M. (2014). Regional Development in Romania – From Regulations to Practice. *Procedia Economics and Finance, 8*, 35-41. https://doi.org/10.1016/S2212-5671(14)00059-8
2. Berkes, F., & Turner, N.J. (2006). Knowledge, learning and the evolution of conservation practice for social-ecological system resilience. *Human Ecology*, *34*(4), 479-494. https://doi.org/10.1007/s10745-006-9008-2
3. Bullock, J.M., Dhanjal-Adams, K.L., Milne, A., Oliver, T.H., Lindsay, T.C., Whitmore, A.P., & Richard, P.F. (2017). Resilience and food security: rethinking an ecological concept. *Journal of Ecology*, *105*(4), 880-884. https://doi.org/10.1111/1365-2745.12791
4. Burešova, P., Mrkvova, K., & Dudić, B. (2020). Changes in gastronomy. *Hotel and Tourism Management*, *8*(1), 79-88. https://doi.org/10.5937/menhottur2001079B
5. Ellis, F. (2000). Rural Livelihoods and Diversity in Developing Countries. *Oxford University Press*, Oxford, UK.
6. European Commission. (2020). Boosting EU regions' health and well-being. *Panorama. Focusing on European Regional and Urban Policy,* 73, 16-17.

7. Food and Agriculture Organization of the United Nations (FAO), (2016). Complete Analysing Resilience for better targeting and action. Resilience Index Measurement and Analysis – II, Rome: FAO. Retrieved from: http://www.fao.org/3/a-i5665e.pdf (13 November, 2020).
8. Gunderson, L.H., & Holling, C.S. (2002). Panarchy. Understanding Transformations in Human and Natural Systems, *Island Press,* Washington DC, USA.
9. Hoffmann, V., Probst K., & Christinck, A. (2007). Farmers and researchers: how can collaborative advantages be created in participatory research and technology development? *Agriculture and Human Values*, *24*(3), 355-368. https://doi.org/10.1007/s10460-007-9072-2
10. Holling, C.S. (1973). Resilience and stability of ecological systems. *Annual Review of Ecology and Systematics*, *4*, 2-23.
11. Istudor, N. (2006). *Regional and rural development of Romania in the perspective of EU integration*, Bucharest: ASE.
12. Istudor, N., Ion, R.A., Sponte, M., Petrescu, I.E. (2014). Food Security in Romania-A Modern Approach for Developing Sustainable Agriculture. *Sustainability, 6*(12), 8796-8807, doi: 10.3390/su6128796.
13. Jokić, M. (2020). The importance of considering internal audit as a decision-making by top-management of an agricultural company. *Oditor-časopis za menadžment, finansije i pravo, 6*(3), 123-136. https://doi.org/10.5937/Oditor2003123J
14. Law no.315/2004 on regional development. Romania's Official Gazette, no. 577 of June 29, 2004, amended by EGO. no.111/2004 (published in Romania's Official Gazette, no.1115 of November, 27, 2004, approved by Law no.58/2005, published in Romania's Official Gazette, no.257 of March 28, 2005).
15. Milestad, R., & Darnhofer, I. (2003). Building farm resilience: The prospects and challenges of organic farming. *Journal of Sustainable Agriculture*, *22*(3), 81-97. https://doi.org/10.1300/J064v22n0309
16. Milestad, R., Kummer, S., & Vogl, C. (2009). Building farm resilience through farmers´ experimentation, *WS 1.8* – Knowledge systems, innovations and social learning in organic farming*, 9th European IFSA Symposium*, 4-7 July 2009, Vienna (Austria).
17. Pretty, J. (1998). The living land: agriculture, food and community regeneration in rural Europe. *Earthscan*, London, UK.
18. Pretty, J. (2002). Agri-culture. Reconnecting People, Land and Nature, *Earthscan Publications*, London, UK.
19. RM-TWG (Resilience Measurement Technical Working Group), (2014). *Resilience Measurement Principles - Toward an Agenda for Measurement Design, 1*, 2014.

20. Röling, N., & Jiggins, J. (1998). The ecological knowledge system. In: Röling, N. and Wagemakers, W.A.E, Facilitating sustainable agriculture: participatory learning and adaptive management in times of environmental uncertainty. *Cambridge University Press*, Cambridge, 283-307.
21. Scoones, I., & Thompson, J. (1994). Beyond Farmer First. Rural people's knowledge, agricultural research and extension practice, *Intermediate Technology Publications*, London, UK.
22. Stanković, V., Mrdak, G., & Miljković, M. (2020). Economic-legal analysis of international investments. *Oditor-časopis za menadžment, finansije i pravo, 6*(3), 89-122. https://doi.org/10.5937/Oditor2003089S
23. Stankevičiūtė, Ž., & Wereda, W. (2020). Universalism values and organisational citizenship behaviour referring to employee perception of corporate social responsibility. *Management & Marketing. Challenges for the Knowledge Society*, 15(2), 302-325. https://doi: 10.2478/mmcks-2020-0018.
24. Sumberg, J., & Okali, C. (1997). Farmers' experiments-Creating local knowledge, *Lynne Rienner Publishers*, London, UK.

SOME ECONOMIC INDICATORS OF PRODUCTION OF COW'S MILK IN THE REPUBLIC OF SERBIA

Robert Radišić[1], Zorica Sredojević[2], Predrag Perišić[3]

**Corresponding author E-mail: zokas@agrif.bg.ac.rs*

ARTICLE INFO

Original Article

Received: 27 *September 2020*

Accepted: *20 November 2020*

doi:10.5937/ekoPolj2101113R

UDC
330.34.01:613.287.5(497.11)

Keywords:

cattle breeding, dairy cows, milk production trends, economic parameters

***JEL**: Q12,D24,Q19*

ABSTRACT

The subject of this research is cattle breeding with a focus on the production of cow's milk in the Republic of Serbia. The main goal is to analyze the state and trends of cow's milk production in Serbia during the last ten years in relation to production in Europe, the European Union and the world. Data from the SORS, FAO databases, etc. were used. In Serbia, 908,102 head of cattle are raised on 177,552 family farms, ie, an average of 5.11 head of cattle per farm. The number of cattle has dropped by more than 200,000 head over the last decade. In the total milk production in Serbia, cow's milk accounts for 96.84%. The average milk yield of cows in Serbia is far below the European average. The highest average amount of milk is recorded in the Belgrade region, where 5,335 liters per milking head are produced in one year. The quality of cow's milk in Serbia is far below EU standards, which is a key restriction on exports.

Introduction

Cattle breeding are the most important branch of livestock production and represents an indicator of the development of the entire agricultural and food sector, both in the world and in the Republic of Serbia. The harmonization of livestock with field production contributes to achieving greater stability of production on the farm, and in general, the overall agriculture of the country. In Serbia, 908,102 head of cattle are raised on 177,552 family farms, that is, an average of 5.11 head of cattle are raised per farm. On 89,753 farms, 190,914 heads are raised, and on average 2.17 heads per farm, while

1 Robert Radišić, Ph.D. student, University of Belgrade, Faculty of Agriculture; scientific researcher, Institute for Science Application in Agriculture, Bulevar despota Stefana 68, 11000 Belgrade, Serbia, Phone: +381 11 27 51 622, E-mail: rradisic@ipn.bg.ac.rs, ORCID ID (https://orcid.org/0000-0002-7161-1269)

2 Zorica Sredojević, Ph.D., Full Professor, University of Belgrade, Faculty of Agriculture, Nemanjina 6, 11080, Zemun, Serbia, Phone: +381 11 44 13 297, E-mail: zokas@agrif.bg.ac.rs, ORCID ID (https://orcid.org/0000-0001-7224-1573)

3 Predrag Perišić Ph.D., Associate Professor, University of Belgrade, Faculty of Agriculture, Nemanjina 6, 11080, Zemun, Serbia, Phone: +381 11 44 13 172, E-mail: perisicp@agrif.bg.ac.rs

717,188 head of cattle are raised on 87,799 farms, i.e. 8.16 heads per farm. Farms with an average of 7 head of cattle make up 40% of the total number of farms where cattle are raised.

In the structure of agricultural farms by regions of Serbia, farms where livestock is represented, in the region of Šumadija and Western Serbia they occupy 79.10%, while in the region of Vojvodina; this share is somewhat smaller, 72.90% (SORS, 2019). One of the most important livestock products of the Republic of Serbia is cow's milk, and the largest quantities are produced in the region of Šumadija and Western Serbia, exactly where the largest number of dairy cows is raised.

According to Kitsopanidis (2000), farms with less than 5,000 liters of milk per cow per year are not sustainable, while farms with 5,000-6,000 liters per cow are sustainable but not competitive, and farms with over 6,000 liters of milk per cow are both sustainable and competitive.

MacDonald et al. (2007) have determined a gross income of 4,051.50 euros per head of cow, and in the structure the value of milk is 87.80%, while the share of meat sales is much smaller (6.70%), and different types of support represent the smallest part of the total gross income, only 5.50%.

Of the represented breeds of cattle bred in Serbia, the largest share is the Simmental breed, the so-called "Serbian Simmental". A large number of high-quality cattle of this breed have been imported during the last decade from Germany and Austria, so that the Simetal breed makes up about 80% of the total number of cattle in the country. The share of crossbreeds, whose origin is from Simmental with other breeds of cattle, mainly with bush, is about 5%, while pure autochthonous breeds (bush and podolska) have a little more than 1,000 heads. Recently, there is a decreasing trend in Serbia in the number of producers who raise 1-3 head of dairy cows (Perišić et al., 2012).

Stankov (2015) states that farms, on which there are small farms (1-9 head of dairy cows), are relatively acceptable in terms of profitability, due to the engagement of family members. However, such farms have a low yield rate, about 36%. Due to insufficient animal productivity and small volume of final sales of products, the economic efficiency of small farms is not satisfactory. Animal nutrition has a great impact on the profitability of family farms. In the total cost of keeping dairy cows, the largest share is made up of food costs and ranges from 45 to 60% (Glavić et al., 2017).

Artificial insemination of cattle, import of breeding heads, application of selection, as well as crossing of domestic autochthonous breeds with noble breeds of cattle have significantly contributed to the change of the racial composition of cattle in Serbia. According to Popović (2014), the average capacity of cattle production of 5.1 head of cattle of all categories per farm indicates that cattle breeding in Serbia are dominant on small family farms. At the same time, milk production takes place on farms with an average capacity of 2.8 head of dairy cows. Perišić et al., (2002) found that there were statistically very significant effects of age at first fertilization on milk yield and 4% MCM in standard lactations, a significant

effect on milk fat yield and a negligible effect on milk fat content in standard lactations. Selection for maternal fertility is increasingly important for greater inclusion in the total breeding / breeding value. If there are major problems in reproduction, in addition to the immediate consequences on the production of milk and milk fat, there are also difficulties in the normal realization of the overhaul of the herd, which is reflected in the economy of production (Pantelić et al., 2009; *cit.* Pantelić et al., 2015; Miletić et al., 2020).

The highest average amount of milk per head of milk is recorded in the Belgrade region, where 5,335 liters of cow's milk, 200 liters of sheep's milk and 345 liters of goat's milk are produced in one year. In accordance with the structure of milk production, the production of dairy products on farms is mostly based on cow's milk products. Therefore, the subject of this research is cattle breeding with a focus on the production of cow's milk. The main goal of the research is to based on selected parameters, determine the state and trends of cow's milk production in Serbia during the last ten-year period in relation to the production in Europe, the European Union and the world.

Materials and Methods

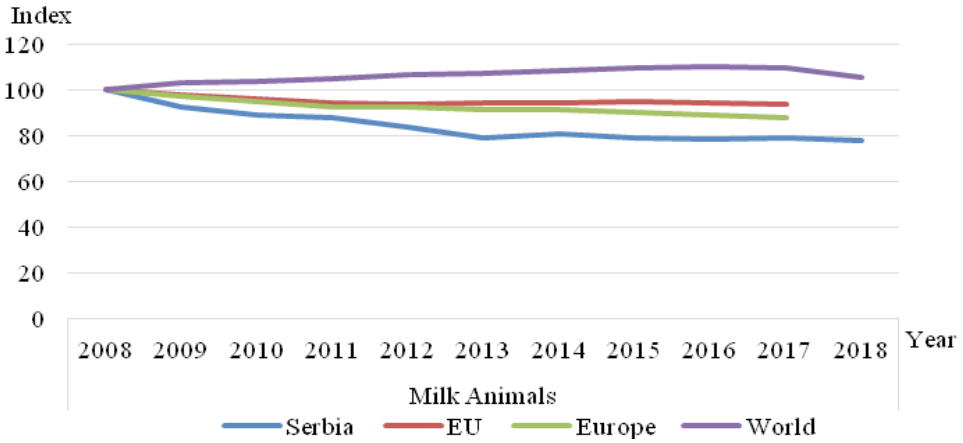
For this research, data and publications of official statistics published in statistical yearbooks, bulletins and other materials of the Republic Statistical Office of the Republic of Serbia, relevant publications of the FAO database, as well as other available domestic and foreign sources on the Internet were used. Data from the Expert Reports, Institute of Animal Husbandry of Belgrade were used as an additional source of data. When considering the situation and trends in cow's milk production in Serbia, the selected parameters were compared with the parameters of milk production in the European Union and the world. Agriculture and the food industry in the EU are protected by trade barriers and receive substantial financial support through a specific and dedicated policy (Andrei et al., 2020). It can influenced on production structures and their evolution (Popescu et al., 2018).

Results and Discussions

According to FAO data (2020), in the world cattle are mostly raised in the United States (35.50%), followed by Asia (33.40%), a slightly lower share in Africa (17.80%), and the lowest share in Europe (10.50%). The number of dairy cattle in the period 2008-2017 gradually increased in the world, so that in 2017 it was higher by 10% compared to 2008, with a slight decrease in 2018. In Europe and the European Union, it had a similar trend, with in 2018 the number decreased by 8% in the EU compared to 2008 and in Europe decreased by 10% (Figure 1).

Over the last decade, the number of cattle in Serbia has dropped by more than 200,000. Compared to the average during the period 2008-2017, in 2018 the total number of cattle was lower by 6.50%. Observing by regions, out of the total number of cattle in the Republic of Serbia, the largest number of cattle is bred in the Region of Šumadija and Western Serbia, i.e. 46.70% (SORS, 2019).

Figure 1. Dynamics of number of milking animals in the world, Europe, the EU and the Republic of Serbia, 2008-2018

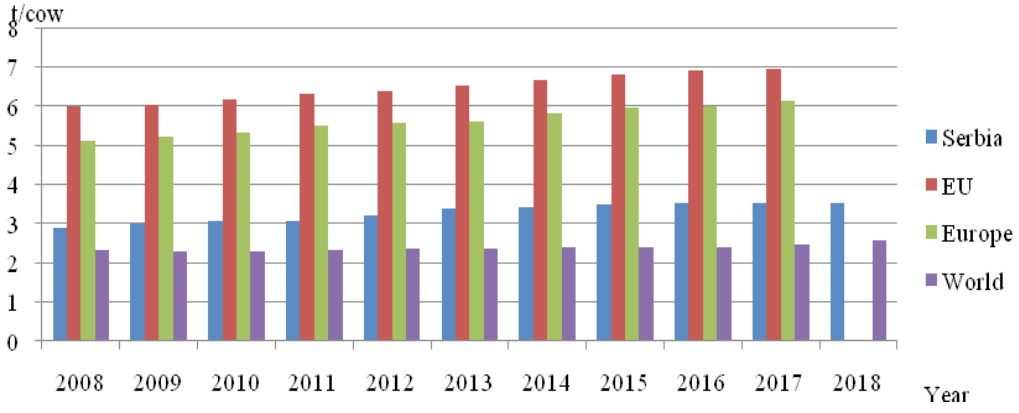


Source: FAO, 2020

Assessments of type and physical development are very important indicators of the productive abilities of cows, their ability to consume sufficient amounts of food, provide technologically quality milk, reduce energy consumption in production and stay in operation as long as possible (Pantelić et al., 2011; Pantić & Milojević, 2019).

The average annual milk production in the world during the period 2008-2018 ranged from 2.2 tons to 2.4 tons per head of dairy cow (Figure 2). Significantly more favorable results have been recorded in Europe and the European Union. In the European Union, from 6 tons per head in 2008, the average milk production improved to 6.9 tons of milk per head in 2017. A similar trend of production was recorded in Europe, with an average production of 5.1 tons per head in 2008 with an increase to up to 6 tons of milk per head in 2017

Figure 2. Average milk production per cow in the world, Europe, the EU and the Republic of Serbia, 2008-2018



Source: FAO, 2020

Compared to the average in Europe and the European Union, milk production per dairy cow in Serbia is significantly lower, and during the analyzed period ranged from 2.8 tons in 2008 to 3.3 tons in 2017. Observing the index of average milk production in the world during the analyzed period, a significant increase in 2018 (about 18%) compared to 2008 was observed, with slight oscillations by individual years. A similar trend is in Europe and the European Union with a growth of 8-10% in 2018 compared to 2008.

Farms that specialize in one of the branches of animal husbandry make up 14.30% of the total number of farms where livestock is raised (SORS, 2019). Territorially, the largest number of farms specialized in animal husbandry is located in the region of Šumadija and Western Serbia, and the smallest is in the Belgrade region, which is consistent with the total number of farms where livestock is raised.

The average milk yield of cows in the Republic of Serbia is far below the European average. According to the SORS (2019), the total number of musk deer in the Republic of Serbia is declining. On the other hand, the number of heads from which milk is delivered to dairies is constant.

In the structure of farms in Serbia where cattle are raised, farms with up to three heads make up about 50%, while the share of farms with 20 or more heads is only 3.20% (Table 1).

Table 1. Number and the structure of holding in Serbia according to the number of cattle in the Republic of Serbia

Interval of cattle number	Average number of cattle on the holding	Number of holdings	Share in the total number (%)
0	0	434,476	76.96
1-2	1.52	56,046	9.93
3-9	4.88	53,552	9.49
10-19	13.19	13,006	2.30
20-29	23.61	3,503	0.62
30-49	37.33	2,379	0.42
50-99	64.79	1,226	0.22
≥ 100	320.81	350	0.06
	Total:	564,538	100.00

Source: Statistical Office of the Republic of Serbia, 2019

The total standard output from farms where livestock production takes place is 3.8 billion euros (SORS, 2019).

Small economic power farms make up the majority in all regions of the Republic of Serbia and their share ranges from 61.80% in the region of Vojvodina, to 81.90% in the region of Southern and Eastern Serbia. In the total milk production in Serbia, cow's milk makes 96.84%, then goat's milk 2.20, and a smaller share makes sheep's milk, 0.96% (Table 2).

Table 2. Average annual milk production in the Republic of Serbia, 2008-2018

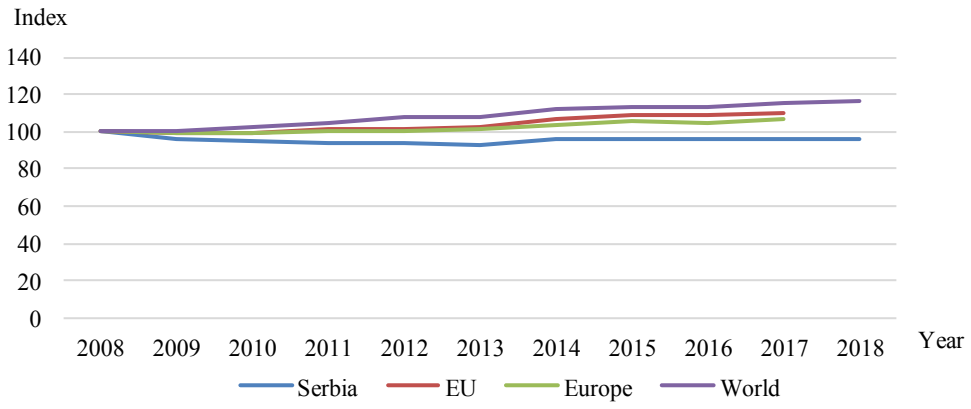
Animal origin of milk	Average annual milk production (mill. litres)	Share (%)
Cow's milk	1,493.18	96.84
Sheep's milk	14.82	0.96
Goat's milk	33.91	2.20
Total:	1,541.91	100.00

Source: Statistical Office of the Republic of Serbia, 2019

Milk production in developed countries is based on large family farms. This is a consequence of the fact that, in the development of cattle production, during the last decades, there has been a decrease in the number of producers, and an increase in the number of heads on existing farms on family farms. The biggest problem for small producers in the new member states was the harmonization with EU standards. The chance can be found in organic farming (Popescu & Andrei, 2011; Vasile et al., 2015).

The average production of cow's milk in Serbia decreased by 8% less in 2013 compared to 2008 and then stagnated over the next three years with a slight increase of 2% in 2018 compared to 2013. Indices of average milk production per year were calculated on the basis of data from the FAO database (Figure 3).

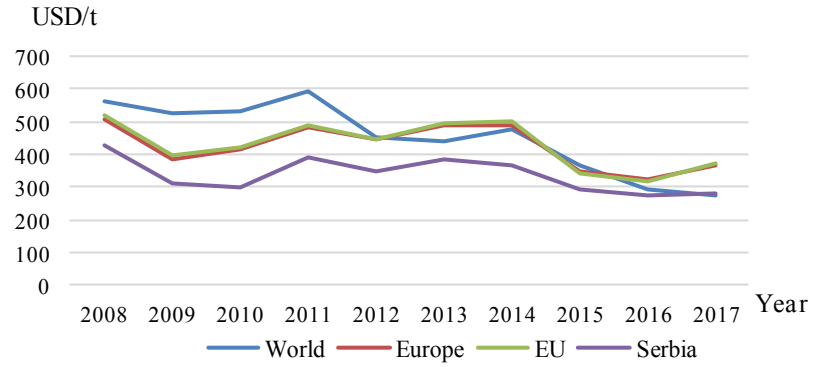
Figure 3. Indexes of average cow's milk production in the world and the Republic of Serbia, 2008-2018



Source: FAO, 2020

The average price of production of one ton of milk in Republika of Serbia decreased in 2018 compared to 2008, both in the world and in Europe and the European Union (Figure 4).

Figure 4. Average production prices per ton of milk in the world, Europe, the EU and the Republic of Serbia, 2008-2017



Source: FAO, 2019

Observing the production of cow's milk by regions of the Republic of Serbia, the dominant place is occupied by the region of Šumadija and Western Serbia during the entire period 2007-2018, with a share of 46.60% in the total production of cow's milk in 2018 (Table 3).

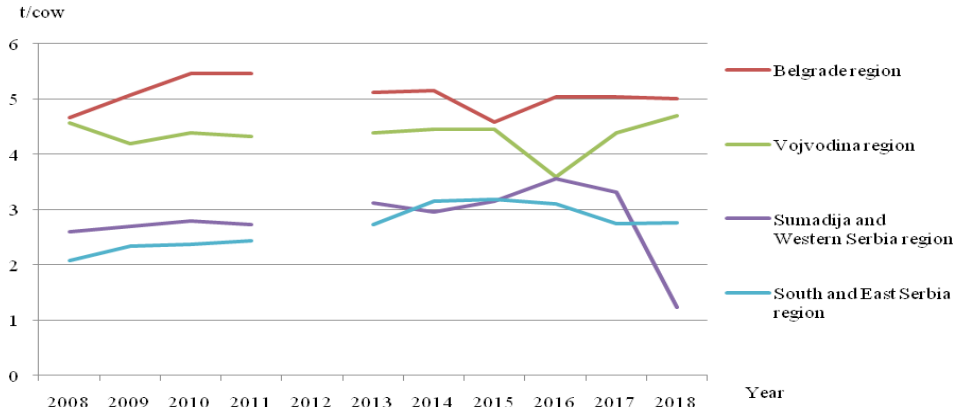
Table 3. Quantities of produced cow's milk by years in the Republic of Serbia, by regions and average per head, 2007-1018

Year	Cow's milk (total, mil. lit.)					Average milk yield of cows in Serbia (t)
	Republic of Serbia	Belgrade Region	Region of Vojvodina	Region of Šumadija and Western Serbia	Region of Southern and Eastern Serbia	
2007	1,571.00	128,00	388,00	747,00	308,00	2.69
2008	1,561.00	126,00	393,00	742,00	299,00	2.88
2009	1,505.00	137,00	356,00	728,00	284,00	3.00
2010	1,485.00	131,00	351,00	721,00	282,00	3.08
2011	1,462.00	131,00	337,00	714,00	280,00	3.06
2012	1,465.00	…	…	…	…	3.22
2013	1,451.00	123,00	360,00	670,00	298,00	3.38
2014	1,492.00	134,00	379,00	680,00	299,00	3.41
2015	1,501.00	119,00	357,00	723,00	302,00	3.49
2016	1,504.00	106,00	352,00	732,00	314,00	3.53
2017	1,506.00	106,00	434,00	695,00	270,00	3.51
2018	1,493.00	100,00	428,00	697,00	268,00	3.53
Index	100.00	6.70	28.67	46.68	17.95	-

Source: Statistical Office of the Republic of Serbia, 2019

The second place in terms of the amount of cow's milk production belongs to the region of Vojvodina (28.67%), then to the region of Southern and Western Serbia (17.95%), and finally to the Belgrade region (6.70%). During the period from 2007 to 2018, the average annual production of cow's milk ranged from 670 to 750 million liters with significant oscillations over the years. The largest quantities of milk were produced in 2007 and 2008, and the least in 2013 and 2014 during the analyzed period (Figure 5).

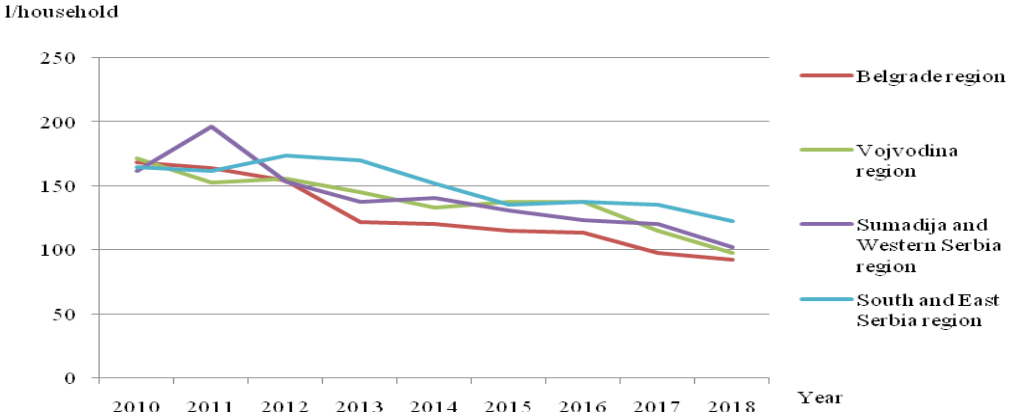
Figure 5. Average production of milk per cow by regions of the Republic of Serbia, 2008-2018



Source: Statistical Office of the Republic of Serbia, 2019

The average consumption of milk in households in Serbia during the analyzed period shows a declining trend. For example, in 2010, the average consumption was about 170 liters per household in all regions, and in 2018 it dropped to 90 liters in the Belgrade region, to 100 liters in the regions of Vojvodina, Sumadija and Western Serbia, and 130 liters in the Eastern and Southern Serbia (Figure 6).

Figure 6. Average cow milk consumption per household by regions of the Republic of Serbia, 2010-2018



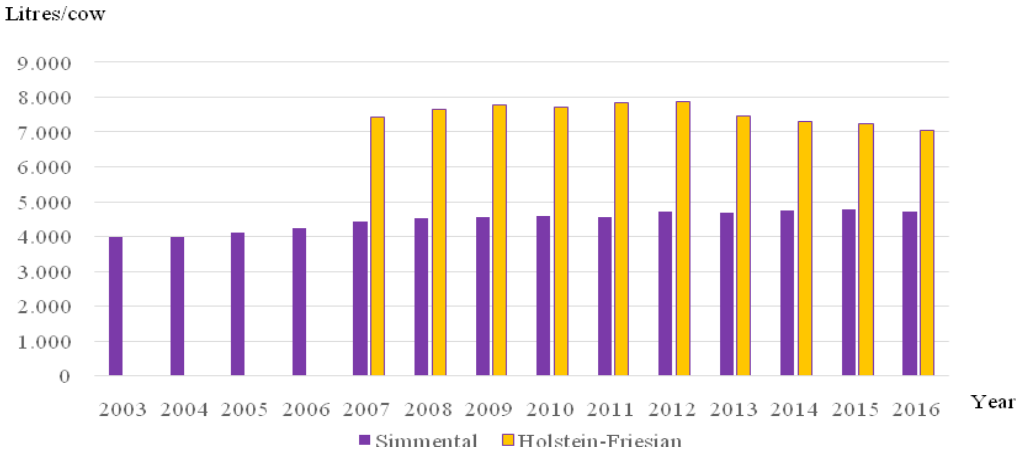
Source: Statistical Office of the Republic of Serbia, 2019

The average milk yield of Holstein-Friesian cows is lower than in Croatia (7,633 kg) and Slovenia (7,535 kg). In Austria, the average milk yield of Holstein cows is 8.809 kg with 4.07% milk fat and 3.30% milk protein (according to ICAR, Recording Guidelines-International Agreement of Recording Practices, 2016, *cit.* Mićić et al., 2019).

According to World Holstein Frisian Federation (Annual Statistics Report, 2016, *cit.* Mićić et al., 2019), HF populations in Israel and the USA with a yield of more than 11,000 kg have the highest milk production in the world, and the highest in Europe in Denmark, Germany and the Czech Republic (9-10,000 kg).

Based on the data from the Report of experts made on the basis of the survey and the results of control work conducted within the breeding program, by experts from the Institute of Animal Husbandry in Belgrade, during the period 2003-2016, the average milk yield of Bimetallic cows ranged from 4,000 to 4,800 liters, and Holstein-Friesian breeds from 7,200 to 7,900 liters per head of dairy cow (Figure 7).

Figure 7. Milk yield for Simmental (2003-2016) and Holstein-Friesian (2007-2016) cows in the Republic of Serbia



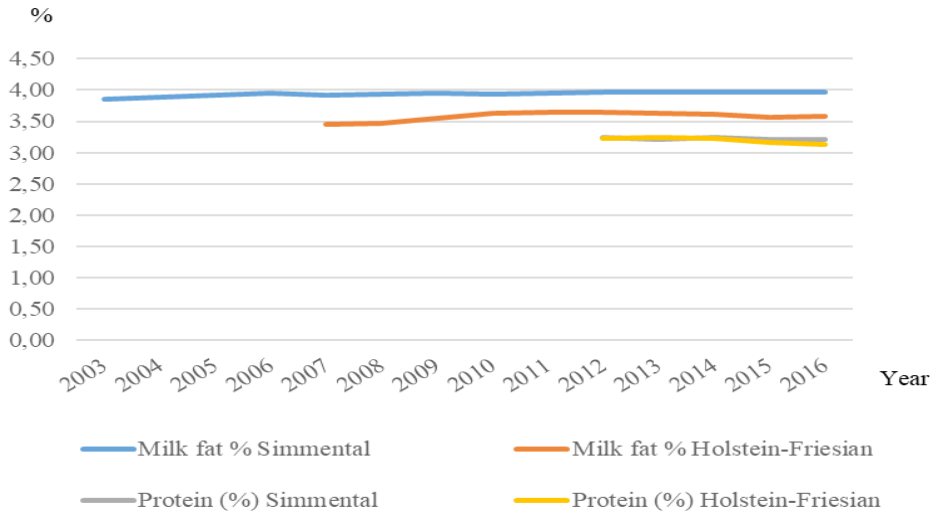
Source: Expert reports and results of control work carried out within the breeding program in 2016, Surveyed by Institute for Animal Husbandry

The composition of raw milk and hygienic correctness are factors on which its purchase price depends. In most industrialized countries, milk quality is defined by the level of somatic cells in the raw milk tank (Eduardo, 2014). High levels of somatic cells indicate poor milk quality, which further leads to adverse effects, such as lower selling (purchase) price of milk, and thus unfavorable business results, as well as other consequences for dairy products and health in general people.

In essence, the main parameters for determining the price of raw milk are the content of protein and fat in it. According to the same Report (above), of the Institute of Animal Husbandry in Belgrade, during 2003-2016, in the content of raw milk of Simetalac cows, the fat content was 4.50-5.00%, and protein 3.20-3.30%, while in the milk of

Holstein-Friesian cows, the protein content was the same as in the Simetalac breed and the fat content was slightly in the range of 3.50-3.60% (Figure 8).

Figure 8. Percentage of fat and protein in the milk of Simmental and Holstein-Friesian cow breeds in the Republic of Serbia, 2003-2016



Source: Expert reports and results of control work carried out within the breeding program in 2016, Surveyed by Institute for Animal Husbandry

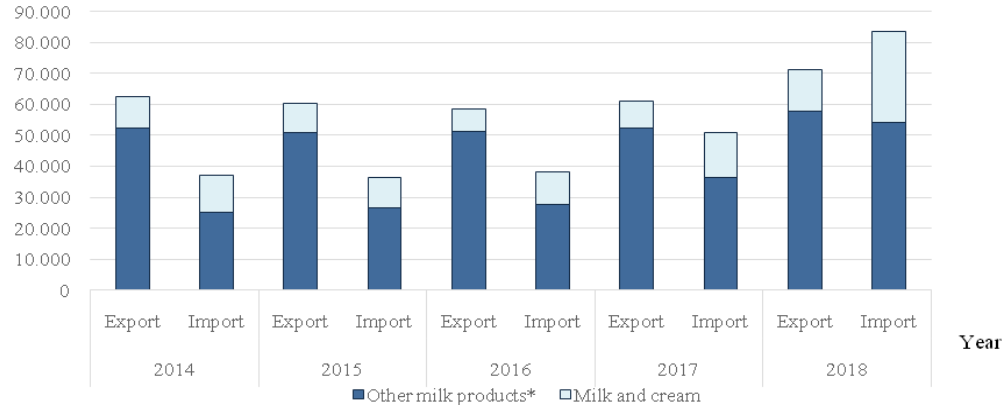
According to the standards in the European Union, the quality of milk is determined according to the following parameters: extra class contains less than 30,000 bacteria / ml and less than 300,000 somatic cells / ml; Class I contains 30-10,000 bacteria / ml and 300-400.00 somatic cells / ml; Class II has 100-300,000 bacteria / ml and 400-750.00 somatic cells / ml; and Class III contain more than 300,000 bacteria / ml and more than 750.00 somatic cells / ml (Mandić et al., 2006).

However, in Serbia, the limits of the stated parameters of milk are somewhat lower, as follows: for the extra class it is less than 100,000 bacteria / ml; for class I is 100-400,000 bacteria / ml; for class II it is 400-1,000,000 bacteria / ml; for class III it is more than 1,000,000 bacteria / ml, and for all classes up to 400,000 somatic cells / ml (Mandić et al., 2006). Therefore, milk that is considered an extra quality in Serbia, in the EU satisfies the quality of class III, which is a limiting factor for the export of milk from Serbia to the EU. According to expert estimates, a large number of Serbian producers do not meet the standard of extra milk class according to EU standards.

Of the total milk produced in Serbia, about 54% is placed on the market through dairies, which meet business requirements in terms of food safety, while the rest of the milk is consumed or processed on farms and thus placed through green markets. Given that the right to milk premiums is exercised only for quantities delivered to dairies (at least 3,000 liters of cow's milk per quarter), it can be expected that the share of placements through dairies will increase in the future.

According to the data from the Report of the Ministry of Agriculture, Forestry and Water Management, Figure 9 shows the value of exports and imports of cow's milk and dairy products in millions of euros per year in the period 2014-2018.

Figure 9. Foreign trade of milk and dairy products of the Republic of Serbia, 2014-2018 (000 euros)



*Other milk products: Powder milk, sour milk products, whey, buttery products, cheese and urda

Source: Report on the situation in Agriculture in the Republic of Serbia, Book II, Overview by Agricultural Markets (2018), Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia

The value of exported milk and milk products from Serbia in 2018 is almost three times higher than the value of exported the same type of products in 2014. The value of imports of milk and milk products in the mentioned period ranged from 9-27 million euro and the value of imported products in the range of 50-57 million euro which confirms the surplus in foreign trade of these livestock products.

Conclusions

In the world, cattle are mostly raised in America (35.50%), followed by Asia (33.40%), a slightly smaller share in Africa (17.80%), and the smallest share is in Europe (10.50%). The number of cattle for milk in the period 2008-2017 gradually increased in the world so that in 2017 it was higher by 10% compared to 2008, with a slight decrease in 2018. In Europe and the European Union it had a similar trend, while in 2018 the number decreased by 8% in the EU compared to 2008, and in Europe it fell by 10% (FAO, 2020).

In Serbia, 908,102 head of cattle are raised on 177,552 family farms, that is, there is an average of 5.11 head of cattle per farm. On 89,753 farms, 190,914 head are raised, and on average 2.17 heads per farm, while 717,188 head of cattle are raised on 87,799 farms, i.e. 8.16 heads per farm. Over the last decade, the number of cattle in Serbia has dropped by more than 200,000. Farms with an average of 7 head of cattle make up 40% of the total number of farms where cattle are raised (SORS, 2019).

In the structure of agricultural farms by regions of the Republic of Serbia, farms where livestock is represented, in the region of Šumadija and Western Serbia they occupy 79.10%, while in the region of Vojvodina this share is somewhat smaller, 72.90%. Of the represented breeds of cattle bred in Serbia, the largest share is the Simmental breed, the so-called "Serbian Simmental".

In the total milk production in Serbia, cow's milk makes 96.84%, then goat's milk 2.20%, and a smaller share is sheep's milk, 0.96%. Cow's milk production takes place on farms with an average number of head of 2.8 cows. The average milk yield of cows in the Republic of Serbia is far below the European average. Observing the production of cow's milk by regions of the Republic of Serbia, the dominant place is occupied by the region of Šumadija and Western Serbia during the entire period 2007-2018, with a share of 46.60% in the total production of cow's milk in 2018. The second place belongs to the region of Vojvodina (28.67%), then, on the third place is the region of Southern and Western Serbia (17.95%), and on the fourth place, the Belgrade region (6.70%). During the period from 2007 to 2018, the average annual production of cow's milk ranged from 670 to 750 million. liters with significant oscillations over the years. The largest quantities of milk were produced in 2007 and 2008, and the least in 2013 and 2014 during the analyzed period. The highest average amount of cow's milk is recorded in the Belgrade region, where 5,335 liters per dairy cow are produced in one year.

Due to the still small number of quality breeding heads and lower production characteristics compared to countries with developed countries and EU member states, the non-competitiveness of our cow's milk production is evident compared to the production in those countries. Also the quality of milk is a key problem that limits its export from Serbia to the EU. According to the allowed number of microorganisms, cow's milk in Serbia is classified into: class I milk, class II milk and class III milk (The Official Gazette of Republic of Serbia No. 106/2017). In addition to these three classes, there is an extra class. Milk quality criteria in Serbia are far below the standards in the European Union. For milk that is considered extra quality in Serbia, in the EU it meets the criterion of the third III class.

The average consumption of milk in households in Serbia during the analyzed period shows a declining trend. Thus, in 2010, the average consumption was about 170 liters per household in all regions, and in 2018 it dropped to 90 liters in the Belgrade region, to 100 liters in the regions of Vojvodina, Sumadija and Western Serbia, and 130 liters in Eastern and Southern Serbia. Of the total milk produced in Serbia, about 54% is placed on the market through dairies, which meet business requirements in terms of food safety, while the rest of the milk is consumed or processed on farms and thus placed through green markets. Positive tendencies in the development of cow's milk production in Serbia can be expected with the realization of favorable macroeconomic business conditions and more efficient fulfillment of requirements for quality standards. Achieving long-term stability of the market of milk and dairy products with better organization of sales channels is the basis of stability and sustainability of overall agricultural production in Serbia.

Acknowledgements

This paper work is result of the projects: 179028-Rural labor markets and rural economies Serbia-diversification of income and poverty reduction; 46009-Improvement and development of hygienic and technological procedures in the production of foodstuffs of animal origin in order to obtain high-quality and safe products competitive on the world market, financed by Ministry of Education, Science and Technological Development of the Republic of Serbia, 2011-2020.

Conflict of interests

The authors declare no conflict of interest.

References

1. Andrei, J. V., Popescu, G. H., Nica, E., & Chivu, L. (2020). The impact of agricultural performance on foreign trade concentration and competitiveness: empirical evidence from Romanian agriculture. *Journal of Business Economics and Management*, 21(2), 317-343. https://doi.org/10.3846/jbem.2020.11988
2. Eduardo, F.N. (2014). Exploring alternatives for milk quality improvement and more efficient dairy production in a smallholder farming context – Case study: Mantaro Valley (Peru). *Thesis to obtain the Joint International Doctoral Degree from Montpellier Supagro* (France) *and University College Cork* (Ireland).
3. Expert reports and results of control work carried out within the breeding program in 2016, *Surveyed by Institute for Animal Husbandry*, Belgrade.
4. Food and Agriculture Organization of the United Nations (2020). *Overview of global dairy market developments in 2019.* Retrieved from http://www.fao.org/faostat/en/#data/QL (June 10, 2020).
5. Glavić, M., Zenunović, A., Budiša, A. (2017). Production, purchase and processing of milk in Bosnia and Herzegovina. *Agro-knowledge Journal*, *18*(3), 187-198. https://doi.org/10.7251/AGREN1703187G
6. Kitsopanidis, I.G. (2000). Economics of dairy farming in Greece. *Medit, 11*(4), 49-55.
7. MacDonald, J.M., O'Donoghue, E.J., McBride, W.D, Nehring, R.F., Sandretto, C.L., & Mosheim, R (2007). *Profits, Costs, and the Changing Structure of Dairy Farming. A Report from the Economic Research Service*. Economic Research Report Number 47. United States Department of Agriculture.
8. Mandić, L., Gutić, M., Bogosavljević-Bošković, S., Kurćubić, V., Petrović, M., & Dosković, V. (2006). *Hygiene of milk - which a liter is worth more to us,* Faculty of Agriculture, Čačak, 5 -6.
9. Mićić, N., Marinković, M., Pantelić, V., Nikšić, D., Lazarević, M., Molerović, N., & Ćosić, I. (2019). Production Performances and Herd Book of Simmental and Holstein Friesian Cattle in Central Serbia, Proceedings of the 12th International-*Symposium Modern Trends in Livestock Producti*on, Oct. 9-11, Belgrade-Zemun, Serbia, 363-372.

10. Miletić, A., Belokapić, P., & Nešić, B. (2020). Specifics of innovation project portfolio management. *Oditor-časopis za menadžment, finansije i pravo, 6*(2), 91-107. https://doi.org/10.5937/Oditor2002091M

11. Pantelić, V., Kostić, S., Ostojić-Andrić, D. Petrović, M.M., Nikšić, D., Lazarević, M., Mićić, N., & Novaković, Ž. (2015). The impact of import of breeding Simmental cows on improvement of production performance in domestic population. Proceedings of the 4th international Congress-*New Perspectives and Challenges of Sustainable Livestock Production*, Oct. 7-9, 2015, Hotel Park, Belgrade, 20-29.

12. Pantić, N., & Milojević, I. (2019). Investments and employment in tourism in the Republic of Serbia. *Hotel and Tourism Management*, *7*(1), 95-104. https://doi.org/10.5937/menhottur1901095P

13. Perišić, P., Skalicki, Z., & Petrović, M.M. (2002). Influence of age at first insemination on some reproductive and production characteristics of Simmental cows in the first three lactations. *Biotechnology in Animal Husbandry*, *18*(1–2), 1–68.

14. Perišić, P., Skalicki, Z, Bogdanović, V. (2012). Changes in the cattle sector in EU Serbia. Invited paper. *Proceedings of the First International Symposium on Animal* (8-10th November, 2012), 1-14.

15. Popović, R. (2014). Livestock in the Republic of Serbia. Agriculture in the Republic of Serbia. *Census of Agriculture* (2012). Republic Statistical Office, Belgrade.

16. Popescu, G., & Andrei, J. (2011). From industrial holdings to subsistence farms in Romanian agriculture. Analyzing the subsistence components of CAP. *Agricultural Economics*, 57(11), 555-564.

17. Popescu, G. H., Mieila, M., Nica, E., & Andrei, J. V. (2018). The emergence of the effects and determinants of the energy paradigm changes on European Union economy. *Renewable and Sustainable Energy Reviews*, 81, 768-774. https://doi.org/10.1016/j.rser.2017.08.055

18. Report on the situation in Agriculture in the Republic of Serbia, Book II, *Overview by Agricultural Markets* (2018), Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia.

19. Republički zavod za statistiku Srbije (2019). Retrieved from http://www.stat.gov.rs/sr-Latn/oblasti/poljoprivreda-sumarstvo-i-ribarstvo/stocarstvo-dodatne-tabele (July 13, 2020).

20. Stankov, K. I., 2015. Economic efficiency analysis of dairy cattle farms in Bulgaria. *Trakia Journal of Sciences*, *13*(1), 226-232.

21. Sl. glasnik RS br. 106/2017, *Pravilnik o kvalitetu sirovog mleka,* Retrieved from https://www.paragraf.rs/propisi_download/pravilnik-o-kvalitetu-sirovog-mleka.pdf (September 11, 2020).

22. Vasile, A. J., Popescu, C., Ion, R. A., & Dobre, I. (2015). From conventional to organic in Romanian agriculture–Impact assessment of a land use changing paradigm. *Land Use Policy*, 46, 258-266. http://dx.doi.org/10.1016/j.landusepol.2015.02.012

FOOD CHOICE MOTIVES OF GENERATION Z IN SERBIA

Sanja Mitic[1], *Semir Vehapi*[2]

**Corresponding author E-mail: sanja@ekof.bg.ac.rs*

ARTICLE INFO

Original Article

Received: *06 April 2020*

Accepted: *28 September 2020*

doi:10.5937/ekoPolj2101127M

UDC 641.3:581.166(497.11)

Keywords:

food choice motives, generation Z, food choice questionnaire, food marketing

JEL: *M31, I10, Q18*

ABSTRACT

The topic of this paper is food choice motives of generation Z in Serbia. Generational cohort is used as a theoretical perspective, as the research is focusing on specific generational cohort. The aim of this research is to understand the characteristics of generation Z and their food choice motives. A Food Choice Questionnaire (FCQ) was used for analyzing generation Z's motives. A survey was used for data gathering. The sample consists of 287 students, from three universities from Serbia. The results are presented based on descriptive statistics, statistical testing and principal component analysis. The most important food choice motives identified are: sensory appeals, health and nutritional food attributes and convenience of preparation. The study revealed that generation Z in Serbia has some common features, as recognized in developed countries, but shows one interesting divergence, regarding the undervaluation of ethical factors. Managerial implications from the perspective of a marketing strategy are discussed.

Introduction

Food consumption patterns are rapidly changing due to various external - cultural, social and economic influences. Understanding consumers' food choice is essential not just for developing an effective marketing strategy of food producers, but also for creating successful public policies aimed at influencing health and dietary habits of population. As the research of food choice is dominant in developed countries, those results should be reconsidered not just in different cultural, but also in different economical contexts. Additional differences that should be considered are regarding generation marketing. As a generational cohort perspective has been widely used in contemporary marketing research, the aim of this study is to understand the main characteristics of

1 Sanja Mitic, Ph.D., Associate Professor, University of Belgrade, Faculty of Economics, Belgrade, Kamenicka 6, Republic of Serbia, Phone: +381 69 80 66 350, E-mail: sanja.mitic@ekof.bg.ac.rs, ORCID ID (http://orcid.org/0000-0003-1365-273X)

2 Semir Vehapi, Ph.D., Teaching Assistant, State University of Novi Pazar, Vuka Karadzica 9, Novi Pazar, Republic of Serbia, Phone: +381 63 86 18 381, E-mail: svehapi@np.ac.rs, ORCID ID (http://orcid.org/0000-0002-7503-6716)

new generational cohort, generation Z. This study offers a new insight into the attitudes of the young population, generation Z, from Serbia, regarding food choice.

The main goals of the study are: 1) to identify the main characteristics of generation Z, in regard to their general features, their consumption behavior and purchasing power potentials; and 2) to recognize the main food choice motives of generation Z in Serbia, 3) to identify main differences between respondents' attitudes in regard to their gender, family income and family size.

The analysis of consumption behavior of generational cohorts has become a rising topic in the marketing literature. The generational cohort stands for a group of people born during a particular period. Generational cohort perspective describes "a complex of social, historical, and environmental factors that simultaneously affect individuals and populations of individuals" (Yang & Land, 2013), which can influence the way one cohort perceives and experiences events. Those differences between cohorts can cause diverse buying behaviors of consumers from different cohorts (Noble & Schewe, 2003; Chaney et al., 2017).

The analysis of generational cohort behavior in the food marketing literature has increased in the last decade. The majority of studies examined the food preferences of millennials (people born between 1980 and 1996), or generation Y (Yepes, 2014; Marinelli et al., 2014; Thambiah et al., 2015; Faber et al., 2020; Küster et al., 2019; Molinillo et al., 2020; Kamenidou et al., 2020). As generation Y is of a significant size and purchasing power, it is not surprising that it represents the main focus of researchers. On the other hand, generation Z will become increasingly important in the future, as their members will start their professional careers and significantly increase their incomes. Aiming to shed light on the food choice of generation Z, firstly, it is necessary to understand the characteristics of generation Z and already identified buying behavior patterns.

The terms post-millennial generation or generation Z refer to people born between 1995 and 2012 (but still without consensus in the literature regarding the exact period). This generation is oriented toward digital technology and the Internet, they are technologically savvy, well-informed, socially responsible, tolerant and well connected (Chaney et al., 2017; Kitchen & Proctor, 2015). They are also called Digital natives, being perceived as "native speakers of the digital language of computers, video games and the Internet" (Prensky, 2001). Most of generation Z is continuously connected through smartphones and tablets, and given that the Internet has been available to them for all their lives, they tend to be better-informed than any other generational cohort (Smith, 2019). Four general characteristics are linked to generation Z as consumers (Wood, 2013): 1) a focus on innovation, especially in the area of technology, expecting continuous improvements of products offered on the market; 2) a focus on convenience of product attributes and experience, product delivery, and marketing communications; 3) a focus on security, while growing up in economically difficult times, they feel more cautious about spending their money, thus expressing low level of brand loyalty

and 4) a tendency toward escapism, as they temporally express desire to escape the reality facilitated by the emergence of video-games, social media and smart mobile devices. Smart technologies have a significant influence on generation Z consumers' experiences, as they see them as an instrument for being well-informed, for making autonomous decisions, increasing convenience and efficiency of market transactions (Priporas et al., 2017). In regard to their characteristics and lifestyle this generation is described as "new conservatives" that highly appreciate traditional values such as respect, trust, family, savings, responsibility and independency (Williams & Page, 2011; Williams et al., 2010).

According to Forbes data, generation Z accounts for up to $143 billion in direct spending in the USA, with additional high indirect impact on the consumption of households, while in 93% of cases children influence the household purchases (Fromm, 2018). In the study from 2011, Williams and Page highlighted high spending of teenagers, in that time the first representatives of generation Z, which was $43 billion with additional influence on family spending of approximately $600 billion. They stated that kids influenced more than 70% of family food choices and 80-90% of choices of products for kids (Williams & Page, 2011).

As they regularly use the Internet and smart gadgets, their behavior is often examined in the context of their retail habits (Priporas et al., 2017; Dabija & Lung, 2019; Marjanen et al., 2019; Lissitsa & Kol, 2019) and marketing communication (Kitchen & Proctor, 2015; Smith, 2019), especially regarding the usage and influence of social media. The issue of food choice of generation Z has not been widely examined. There are some findings that this generation expresses more interest in environmental issues and sustainable consumption (Chaney et al., 2017; Kitchen & Proctor, 2015; Kamenidou et al., 2019). The young generation is concerned with environmental issues, expressing strong positive attitudes and purchasing intentions toward green environmental products (Kanchanapibul et al., 2014) or green-oriented retail stores (Dabija, 2018). In order to fulfill the identified gap, this study investigates food choice motives of generation Z in Serbia.

The paper is structured in four parts. After the introduction, where the main characteristics of generation Z are discussed, the methodological issues of the research will be presented, with a focus on Food choice questionnaire, widely used for analyzing main consumers' food buying motives. In part three, the main results of the research are presented and discussed, after which the most important outcomes are summarized, with managerial implications and proposals for further research.

Materials and methods

The Food choice questionnaire (FCQ) was used as a tool for gathering data about the food preferences of generation Z. FCQ, consisting of 36 variables, was proposed by Steptoe, Pollard and Wardle (1995). All variables describing food buying motives can be grouped in nine dimensions: health, mood, convenience, sensory appeal, natural

content, price, weight control, familiarity and ethical concern. This questionnaire is a widely used tool for analyzing main consumers' motives for buying food products. One recent study explored its validity and reliability in 9 European countries (Markovina et al., 2015), concluding that FCQ is an appropriate tool for exploring food choice motives among European population, although except from Poland, all the analyzed countries were developed ones. FCQ was used and tested in Serbia and other developing countries from the South-East Europe region (Milošević et al., 2012; Gagić et al., 2014). In neither study were the original nine factors identified. Gagić et al. (2014), recognized eleven dimensions of food choice motives of Serbian consumers. Along with the original nine dimensions, the two additional were: the availability of food and food image. The analysis of Milošević et al. (2012), conducted in six Western Balkan countries, revealed eight dimensions, with some significant differences compared to the original model, indicating "that Steptoe et al.'s (1995) nine-factorial design displays suboptimal fit for the West Balkan Countries." Both studies identified sensory appeal, health and availability/purchase convenience as main food choice motives of consumers from Serbia/Western Balkan countries (Milošević et al., 2012; Gagić et al., 2014).

A survey conducted during 2019, within a sample of 287 students from three universities from Serbia, was used for collecting the data. Students who participated in the research were enrolled in the third or fourth year of studies, which means that they were born in 1997 or 1998. The structure of the sample is presented in Table 1. The results are presented based on descriptive statistics, statistical testing and principal component analysis.

Table 1. The structure of the sample

Characteristics of respondents		*Number of respondents*	*% of respondents*
	Total	287	100%
Gender	Female	198	70
	Male	85	30
Location	Large city	108	38.2
	Suburb of a large city	43	15.2
	Medium or small city	97	34.3
	Rural area	35	12.4
Household income	No income	4	1.5
	Less than 50.000 rsd	40	14.9
	Between 50.000 and 100.000 rsd	95	35.3
	Between 100.000 and 150.000 rsd	70	26
	Between 150.000 and 200.000 rsd	34	12.6
	More than 200.000 rsd	26	9.7
Size of a household	Two members	16	5.7
	Three members	47	16.8
	Four members	117	41.8
	Five members	57	20.4
	Six members	27	9.6
	Other	16	5.7

Results and discussions

Based on the Food Choice Questionnaire (Steptoe et al. 1995), the main determinants of food choice were recognized. The 36 items from the original FCQ were evaluated on 5-item Likert scale. In Table 2, the individual items with above average score (more than 3.596) are listed. Apart from the sensory criteria, such as taste, texture and smell of the food, health and natural characteristics and motives connected with convenience are the most important. Sensory appeals are expected to be important, in majority of the research of food choice in foreign countries and in Serbia (Steptoe et al. 1995; Eertmans et al., 2006; Januszewska et al., 2011; Markovina et al., 2015; Milošević et al., 2012; Gagić et al., 2014).

Table 2. Main food choice motives

	Food choice motives	***Mean***	***Std. deviation***
1	Tastes well	4.7003	0.62082
2	Is good value for money	4.3275	0.83877
3	Is nutritious	4.2753	0.80916
4	Has a pleasant texture	4.2622	0.82363
5	Keeps me healthy	4.2334	0.85558
6	Is easily available in shops and supermarkets	4.1568	0.89275
7	Smells nice	4.0801	0.99502
8	Is good for my skin/teeth/hair/nails etc.	4.0594	0.95143
9	Makes me feel good	4.0105	0.91185
10	Contains natural ingredients	3.9895	0.88208
11	Contains a lot of vitamins and minerals	3.9443	0.85097
12	Cheers me up	3.9408	1.02758
13	Can be cooked very easily	3.8451	0.99323
14	Keeps me awake/alert	3.8287	0.95624
15	Can be bought in shops close to where I live or work	3.8049	1.08240
16	Is easy to prepare	3.7770	1.04401
17	Is high in protein	3.7657	0.98284
18	Contains no artificial ingredients	3.6794	1.00438
19	Takes no time to prepare	3.6794	1.02846

On the second place is whether an item *Is good value for money*, which can be explained by the already recognized buying preferences of generation Z, as they value security and feel more cautious about spending their money (Wood, 2013). This generation is seen as "new conservatives" (Williams & Page, 2011) not just as they embody the traditional beliefs and values, but responsible consumption, too. Among 19 items with above average scores, the majority reflect health and natural characteristics of food: *Is nutritious*, *Keeps me healthy*, *Is good for my skin/teeth/hair/nails etc.*, *Contains natural ingredients*, *Contains a lot of vitamins and minerals*, *Is high in protein*, *Contains no artificial ingredients*. This result can indicate high concerns of young consumers for health effects of food and their health in general. The third important group of motives consists of the following: *Is easily available in shops and supermarkets*, *Can be cooked very easily*, *Can be bought in shops close to where I live or work*, *Is easy to*

prepare, *Takes no time to prepare*. All the listed criteria are connected to convenience, in food preparation and food purchasing. As already discussed, generation Z is seen as a generation oriented toward convenience regarding product experience and product delivery (Wood, 2013).

Motives with the lowest score (less than 3) were: *Is packaged in an environmentally friendly way* (2.9373), *Is low in calories* (2.8676), *Is like the food I ate when I was a child* (2.8007), *Has the country of origin clearly marked* (2.7143), and *Comes from countries I approve of politically* (1.8223). Having such low marks for environmental aspects of the product is somewhat unexpected, since the ecological responsibility was recognized as one of the important characteristic of generation Z. On the other hand, there is a recent study conducted in Croatia, with similar findings concerning the attitudes of young consumers toward sustainability and ecological issues (Razum et al., 2017).

In the next part, the differences in food buying motives in regard to gender, income and family size of respondents were analyzed. Food buying motives of male and female respondents were found to be significantly different in several items. In general, female respondents gave higher average marks to majority of items, as already recognized in the literature (Januszewska et al., 2011; Steptoe et al., 1995), even to those connected to sensory appeals and convenience of preparation. For example, male respondents gave higher average marks to following items: *Comes from countries I approve of politically*, *Is high in protein*, *Helps me relax* and *Is cheap*. But, only in case of protein content there is statistically significant difference ($t = 2.034$, $p = 0.043$). Higher average mark for protein content of male respondents ($M = 3.9647$) can be explained by their higher interest in fitness performances, especially regarding strength training, compared to women ($M = 3.7107$). On the other hand, women are more concerned with the items listed in Table 3, with statistically significant differences.

Table 3. Food choice - gender differences

	Mean		t	Sig. (2-tailed)
	Female	Male		
Tastes well	4.7475	4.5765	-2.126	.034
Is low in calories	3.0000	2.5529	-2.923	.004
Is low in fat	3.3081	2.9647	-2.329	.021
Cheers me up	4.0556	3.6824	-2.819	.005
Smells nice	4.2273	3.7176	-4.055	.000
Can be cooked very easily	3.9242	3.6506	-2.132	.034
Has a pleasant texture	4.3299	4.1059	-2.098	.037
Keeps me awake/alert	3.9040	3.6548	-2.025	.044
Looks nice	3.6212	3.2941	-2.341	.020
Is good for my skin/teeth/hair/nails etc.	4.1616	3.8333	-2.676	.008
Makes me feel good	4.0914	3.8471	-2.080	.038

In case of income of the household, major differences in the attitudes of respondents were not found (there is an indication of differences regarding price: *It is not expensive* (F=1.955, p=0.086)). As for household size, there are differences regarding convenience of preparation: *Can be cooked very easily* (F=3.441, p=0.005) and *Is easy to prepare* (F = 2.283, p = 0.047). Respondents from smaller households were more concerned for these two items. Statistically significant differences were found regarding concerns with political aspects and the country of origin, but as those criteria were valued with the lowest average marks, those differences will not be commented additionally.

The following step was the principal component analysis, performed with varimax rotation. Kaiser-Meyer-Olkin Measure verified the sampling adequacy, with KMO = 0.825, which is above the acceptable limit. Bartlett's Test of Sphericity Approx. Chi-Square = 3638.894, p = 0.000, indicated that correlations between the items were sufficiently large. Nine factors were considered significant. They account for 61,104% of the variance. Table 4 shows the factor loadings after rotation. Factor loadings over .40 appear in bold. Majority of the items have value higher than .60. The items that cluster on the same components suggest following nine components: Health, Mood, Convenience of preparation, Sensory appeal, Weight control, Availability, Familiarity, Ethical concern and Natural content. As two factors (Natural content and Familiarity) are composed of only two items, it was not surprising that those two items have low reliability (less than .60).

Table 4. Exploratory factor analysis results

	Factor loadings
	Health Chronbach's alpha 0.85
Contains a lot of vitamins and minerals	**.769**
Keeps me healthy	**.767**
Is good for my skin/teeth/hair/nails etc.	**.727**
Is high in protein	**.716**
Keeps me awake/alert	**.619**
Is high in fibers	**.546**
Contains no artificial ingredients	**.545**
Is nutritious	**.500**
	Mood Chronbach's alpha 0.80
Helps me cope with stress	**.802**
Helps me relax	**.789**
Helps me cope with life	**.700**
Cheers me up	**.642**
Makes me feel good	**.581**
	Convenience of preparation Chronbach's alpha 0.83
Can be cooked very easily	**.852**
Takes no time to prepare	**.831**
Is easy to prepare	**.805**

	Factor loadings
	Sensory appeal Chronbach's alpha 0.71
Tastes well	**.770**
Smells nice	**.727**
Has a pleasant texture	**.669**
Looks nice	**.488**
Is good value for money	.399
	Weight control Chronbach's alpha 0.76
Is low in calories	**.808**
Is low in fat	**.740**
Helps me control my weight	**.686**
	Availability - price and distribution Chronbach's alpha 0.66
Is cheap	**.711**
Is not expensive	**.704**
Can be bought in shops close to where I live or work	**.679**
Is easily available in shops and supermarkets	.395
	Familiarity Chronbach's alpha 0.56
Is what I usually eat	**.712**
Is familiar	**.649**
	Ethical concern Chronbach's alpha 0.63
Comes from countries I approve of politically	**.677**
Is like the food I ate when I was a child	**.592**
Has the country of origin clearly marked	**.554**
Is packaged in an environmentally friendly way	**.512**
	Natural content Chronbach's alpha 0.50
Contains no additives	**.641**
Contains natural ingredients	**.521**

The results do not correspond to Steptoe's et al. (1995) nine-factor model, as some variation was recognized, compared to the original model. The original model was found to be only partially applicable to Serbian generation Z. The main difference is regarding three motives: *Availability*, *Price* and *Convenience*. In this research, the convenience of preparation emerged as an individual factor (as in Milošević et al., 2012), while distribution availability was in the group with the price criteria. Compared to other researches conducted in Serbia, there are differences, given that those studies reported eight-factor (Milošević et al., 2012) or eleven-factor (Gagić et al., 2014) model.

In Table 5, average marks for identified nine factors (but not in line with original nine-factor model) are summarized. The results confirm that the most important food buying motives are *Sensory appeals (M*=4.1425*)*, *Health (M*=3.8895*)* and *Convenience of preparation (M*=3.7676*)*. The first two motives are in accordance with the previous

studies conducted in Serbia (Milošević et al., 2012; Gagić et al., 2014). *Convenience of preparation* emerged as an important motive to generation Z, which has already been discussed in terms of their orientation toward efficiency and convenience of brand or product experience. As their parents, generation X cohort, were heavy users of convenience goods, this consumption pattern is widely present in their children, generation Z (Wood, 2013). In case of food consumption, for generation Z in Serbia, the main issue is regarding convenience in product time-saving attribute and in brand experience, such as being easy to cook. The next two factors, with above average marks, are *Natural content* (M=3.6825) and *Availability* (in terms of price and distribution, M=3.6285). As *Availability* contains items related to price and distribution, these results need additional clarification, based on an individual items score. Two availability items, *Can be bought in shops close to where I live or work* and *Is easily available in shops and supermarkets*, have larger score than two price items: *Is cheap* and *Is not expensive*. As generation Z expresses positive attitudes toward convenience in terms of delivery, such result is expected. The least important factor is *Ethical concerns*, which is in line with some studies from the region (Cerjak et al. 2014; Razum et al., 2017), but not expected in case of generation Z, which is often described as an environmentally responsible cohort, highly interested in political issues.

Table 5. Mean values for each factor

Factors	***Mean***	***Std. Deviation***
Sensory appeal*	4.1425	0.64992
Health	3.8895	0.64209
Convenience of preparation	3.7676	0.88435
Natural content	3.6825	0.80056
Availability - price and distribution	3.6285	0.69765
Mood	3.5121	0.81284
Familiarity	3.4826	0.90049
Weight control	3.1661	0.97037
Ethical concern	2.5726	0.78847
*Item *Is good value for money* was not calculated within this factor		

Examining the differences between groups of respondents based on calculated scores of nine factors, two variables were found to be relevant: gender and household size. In case of gender, two statistically significant differences appeared, with regard to *Sensory appeals* (t=-3.739, p=0.000) and *Weight control* (t=-2.784, p=0.006). Female respondents valued both factors with higher average marks than male respondents. Apart from motives connected to weight control which has already been recognized in the literature (Januszewska et al., 2011), it is interesting that *Sensory appeal* is more important to female than male respondents. These results are not in line with the previous research of food buying motives that considered the role of gender (Goktolga et al., 2006; Fotopoulos et al., 2009; Ares & Gámbaro, 2007; Szakály et al., 2018, Gagić et al., 2014). On the other hand, the previous studies found significant differences regarding health motives, which did not appear in this case (Steptoe et al., 1995; Szakály et al., 2018).

In case of the size of households, there are statistically significant differences regarding *Sensory appeals* (t=2.929, p=0.014) and *Convenience of preparation* (t=3.013, p=0.012). *Sensory appeals* are more important to respondents who come from larger households (five and six members), while *Convenience of preparation* is more important to respondents who came from smaller households (two and three members), which is surprising at first glance. But, in smaller households (two or three members), younger family members (as our respondents are) can be more engaged in food preparation.

The main managerial implication for food producers that target generation Z is related to the redesigning of a marketing mix, in terms of: 1) developing products with clear health and nutritional benefits, avoiding artificial ingredients and increasing the convenience of preparation and consummation; 2) marketing communication focusing on main consumer motives, 3) increasing delivery efficiency and 4) a value based price strategy. The functional food producers and organic food producers can expect that their products fit generation Z's preferences, but they have to develop convenience food formats and adjust other marketing mix instruments. The discussion on generation Z's preferences of functional and organic food may be an interesting topic for further research.

Main proposals for future research could be regarding preferred delivery channels and attitudes toward online channels for food products, which can significantly increase their availability. The finding of the research not in line with the consumption patterns of generation Z is that the respondents from Serbia undervalue the importance of ethical factors, such as political and environmental concerns. These results need further, more detailed examination, which could be additional proposal for further studies on this topic. A key methodological issue to address in further research of this topic should be the size of the sample, which is the main limitation of this research. For testing the validity and reliability of the Food choice questionnaire, it is essential to significantly increase sample size.

Conclusions

This paper deals with food choice motives of generation Z in Serbia. This generation cohort of young consumers has become increasingly interesting for researchers and companies as their purchasing power rises. Generation Z has been recognized as a generation of digital natives, technologically superior, well-informed and well-connected. They are seen as responsible customers, oriented toward convenience and security, environmentally concerned, choosing high value-for-money offers over brand loyalty. Recognizing different behavioral patterns, in terms of their purchasing and consuming habits, the aim of this paper was to analyze main food choice motives of generation Z, which has not been investigated much in the literature. For that purpose, Steptoe's et al. (1995) Food choice questionnaire was used. Although the original nine-factor model was not found to be applicable in this case, this study revealed major food motives of generation Z in Serbia. Apart from sensory appeals, this generation is highly interested in health benefits of food products and convenience of preparation. Additional two important factors are natural content and the availability of food products, in terms

of price and distribution. An individual motives' scores highlight the importance of value based perspective for generation Z. They undervalue items regarding low prices of food products, but highly appreciate food products that offer good value for money. Such results are in accordance with the previous findings about generation Z consumption behaviors. The differences in the attitudes of the respondents were also identified, in regard to their gender and household size, which can be addressed in the market segmentation process. This study offered valuable managerial implications for creating effective marketing strategy of the food producers that target generation Z.

Acknowledgements

The paper is a part of the research done within the project number 179062 and project number 41030, financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

Conflict of interests

The authors declare no conflict of interest.

References

1. Ares, G., & Gámbaro, A. (2007). Influence of gender, age and motives underlying food choice on perceived healthiness and willingness to try functional foods. *Appetite*, *49*(1), 148–158. https://doi.org/10.1016/j.appet.2007.01.006
2. Cerjak, M., Haas, R., Brunner, F., & Tomić, M. (2014). What motivates consumers to buy traditional food products? Evidence from Croatia and Austria using word association and laddering interviews. *British Food Journal*, *116*(11), 1726–1747. https://doi.org/10.1108/bfj-02-2014-0090
3. Chaney, D., Touzani, M., & Ben Slimane, K. (2017). Marketing to the (new) generations: summary and perspectives. *Journal of Strategic Marketing*, *25*(3), 179–189. https://doi.org/10.1080/0965254x.2017.1291173
4. Dabija, D.C. (2018). Enhancing green loyalty towards apparel retail stores: A cross-generational analysis on an emerging market. *Journal of Open Innovation: Technology, Market, and Complexity*, *4*(8), https://doi.org/10.1186/s40852-018-0090-7
5. Dabija, D.C., & Lung, L. (2019). Millennials Versus Gen Z: Online Shopping Behaviour in an Emerging Market. *Springer Proceedings in Business and Economics*, 1–18. https://doi.org/10.1007/978-3-030-17215-2_1
6. Eertmans, A., Victoir, A., Notelaers, G., Vansant, G., & Van den Bergh, O. (2006). The Food Choice Questionnaire: Factorial invariant over western urban populations? *Food Quality and Preference*, *17*(5), 344–352. https://doi.org/10.1016/j.foodqual.2005.03.016

7. Faber, I., Castellanos Feijoó, N.A., Van de Sompel, L., Davydova, A., & Perez-Cueto, F.J.A. (2020). Attitudes and knowledge towards plant-based diets of young adults across four European countries. Exploratory survey. *Appetite*, 145, 104498. https://doi.org/10.1016/j.appet.2019.104498

8. Fotopoulos, C., Krystallis, A., Vassallo, M., & Pagiaslis, A. (2009). Food Choice Questionnaire (FCQ) revisited. Suggestions for the development of an enhanced general food motivation model. *Appetite*, *52*(1), 199–208. https://doi.org/10.1016/j.appet.2008.09.01

9. Fromm, J. (2018). How much financial influence does Gen Z have? Retrieved from www.forbes.com/sites/jefffromm/2018/01/10/what-you-need-to-know-about-the-financial-impact-of-gen-z-influence/#2e2f76c656fc (February 29, 2020).

10. Gagić, S., Jovičić, A., Tešanović, D. ,& Kalenjuk, B. (2014). Motives for food choice among Serbian consumers. *Economics of agriculture*, *61*(1), 41-51. https://doi.org/10.5937/ekoPolj1401041G

11. Goktolga, Z.G., Bal, S.G., & Karkacier, O. (2006). Factors effecting primary choice of consumers in food purchasing: The Turkey case. *Food Control*, *17*(11), 884–889. https://doi.org/10.1016/j.foodcont.2005.06.006

12. Januszewska, R., Pieniak, Z., & Verbeke, W. (2011). Food Choice Questionnaire revisited in four countries. Does it still measure the same? *Appetite*, 57(1), 94–98. https://doi.org/10.1016/j.appet.2011.03.014

13. Kamenidou, I., Mamalis, A.S., Pavlidis, S., & Bara, E.Z. (2019). Segmenting the Generation Z Cohort University Students Based on Sustainable Food Consumption Behavior: A Preliminary Study. *Sustainability*, *11*(3). https://doi.org/10.3390/su11030837

14. Kamenidou, I., Stavrianea, A. & Bara, E.Z. (2020). Generational Differences toward Organic Food Behavior: Insights from Five Generational Cohorts. *Sustainability, 12*(6). https://doi.org/10.3390/su12062299

15. Kanchanapibul, M., Lacka, E., Wang, X., & Chan, H. K. (2014). An empirical investigation of green purchase behaviour among the young generation. *Journal of Cleaner Production*, *66*, 528–536. https://doi.org/10.1016/j.jclepro.2013.10.062

16. Kitchen, P. & Proctor, T. (2015). Marketing communications in a post-modern world. *Journal of Business Strategy*, *36*(5), 34-42. https://doi.org/10.1108/JBS-06-2014-0070

17. Küster, I., Vila, N., & Sarabia, F. (2019). Food packaging cues as vehicles of healthy information: Visions of millennials (early adults and adolescents). *Food Research International*, *119,* 170–176. https://doi.org/10.1016/j.foodres.2019.01.051

18. Lissitsa, S., & Kol, O. (2019). Four generational cohorts and hedonic m-shopping: association between personality traits and purchase intention. *Electronic Commerce Research*. https://doi.org/10.1007/s10660-019-09381-4

19. Marinelli, N., Fabbrizzi, S., Alampi Sottini, V., Sacchelli, S., Bernetti, I., & Menghini, S. (2014). Generation Y, wine and alcohol. A semantic differential approach to consumption analysis in Tuscany. *Appetite*, 75, 117–127. https://doi.org/10.1016/j.appet.2013.12.013

20. Marjanen, H., Kohijoki, A.M., Saastamoinen, K., & Engblom, J. (2019). Old dogs learning new tricks? The effect of age and generation on shopping behaviour. The *International Review of Retail, Distribution and Consumer Research*, *29*(5), 549–567. https://doi.org/10.1080/09593969.2019.1664613

21. Markovina, J., Stewart-Knox, B.J., Rankin, A., Gibney, M., de Almeida, M.D.V., Fischer, A Kuznesof, A.S., Poínhos, R., Panzone, L. & Frewer, L. J. (2015). Food4Me study: Validity and reliability of Food Choice Questionnaire in 9 European countries. *Food Quality and Preference*, *45*, 26–32. https://doi.org/10.1016/j.foodqual.2015.05.002

22. Milošević, J., Žeželj, I., Gorton, M., & Barjolle, D. (2012). Understanding the motives for food choice in Western Balkan Countries. *Appetite*, *58*(1), 205–214. https://doi.org/10.1016/j.appet.2011.09.012

23. Molinillo, S., Vidal-Branco, M., & Japutra, A. (2020). Understanding the drivers of organic foods purchasing of millennials: Evidence from Brazil and Spain. *Journal of Retailing and Consumer Services, 52*, 1-9. https://doi.org/10.1016/j.jretconser.2019.101926

24. Noble, S.M., & Schewe, C.D. (2003). Cohort segmentation. An exploration of its validity. *Journal of Business Research*, *56*, 979–987.

25. Prensky, M. (2001). Digital Natives, digital immigrants part 1. *On the Horizon*, *9*(5), 1–6. https://doi.org/10.1108/10748120110424816

26. Priporas, C.V., Stylos, N., & Fotiadis, A.K. (2017). Generation Z consumers' expectations of interactions in smart retailing: A future agenda. *Computers in Human Behavior*, *77*, 374–381. https://doi.org/10.1016/j.chb.2017.01.058

27. Razum, A., Pandža, B.I., & Zekić, Z., (2017). The analysis of the sustainable consumption patterns of generation Z in fashion industry. *Ekonomski pregled*, *68*(3), 297-318.

28. Smith, K.T. (2019). Mobile advertising to Digital Natives: preferences on content, style, personalization, and functionality. *Journal of Strategic Marketing*, *27*(1), 67-80. https://doi.org/10.1080/0965254X.2017.1384043

29. Steptoe, A., Pollard, T.M., & Wardle, J. (1995). The development of a measure of the motives underlying the selection of food: the Food Choice Questionnaire. *Appetite*, *25*(3), 267–284. https://doi.org/10.1006/appe.1995.0061

30. Szakály, Z., Kontor, E., Kovács, S., Popp, J., Pető, K., & Polereczki, Z. (2018). Adaptation of the Food Choice Questionnaire: the case of Hungary. *British Food Journal*, *120*(7), 1474-1488, https://doi.org/10.1108/BFJ-07-2017-0404

31. Thambiah, S., Khin, A.A., Muthaiyah, S., & Yen, Y.Y. (2015). Organic food consumption among generation Y in Malaysia: a conceptual framework. *Journal of Applied Sciences*, *15*(3), 570-575. https://doi.org/10.3923/jas.2015.570.575

32. Williams, K.C., & Page, R.A. (2011). Marketing to the generations. *Journal of Behavioral Studies in Business, 5*(1), 1-17.

33. Williams, K.C., Page, R.A., Petrosky, A.R., & Hernandez, E.H. (2010). Multi-generational marketing: descriptions, characteristics, lifestyles and attitudes. *Journal of Applied Business and Economics*, *11*(2), 21-37.

34. Wood, S. (2013). *Generation Z as consumers: Trends and innovation*. Institute for Emerging Issues, NC State University. Retrieved from https://iei.ncsu.edu/wp-content/uploads/2013/01/GenZConsumers.pdf (February 27, 2020).

35. Yang, Y., & Land, C.K. (2013). *Age-Period-Cohort Analysis: New Models, Methods, and Empirical Applications*. Taylor & Francis Group, Boca Raton.

36. Yepes, M.F. (2014). Mobile Tablet Menus: Attractiveness and Impact of Nutrition Labeling Formats on Millennials' Food Choices. *Cornell Hospitality Quarterly*, *56*(1), 58–67. https://doi.org/10.1177/1938965514546371

EARNINGS AND CASH FLOW PERSISTENCE – CASE OF MEDIUM AGRICULTURE ENTERPRISES IN SERBIA

Slavica Stevanović[1], Jelena Minović[2], Grozdana Marinković[3]

**Corresponding author E-mail: slavica.stevanovic@ien.bg.ac.rs*

ARTICLE INFO

Original Article

Received: *10 December 2020*

Accepted: *29 December 2020*

doi:10.5937/ekoPolj2101141S

UDC 331.28:631.164.6(497.11)

Keywords:

persistence, earnings quality, agriculture. medium-sized enterprises, Serbia

***JEL**: M20, L25, Q19*

ABSTRACT

This paper examines the earnings and cash flow persistence of selected agriculture Serbian enterprises as a measure of their earnings quality. We study the persistence of income statements and cash flow statement items of medium-sized agriculture enterprises in Serbia. Agriculture is a relevant sector for the national economy and medium-sized enterprises are the main drivers of her economic growth. We use panel regression analysis with annual data over the period from 2010 to 2018. The results of our research indicate that earnings and cash flow-based indicators have different persistence. Analysing accruals and net cash flows of operating activities as determinants of operating profit of analysed enterprises, we conclude that operating profit that represents accruals are more persistent than operating profit backed by net operating cash flows.

Introduction

Earning generated over some period as a measure of an enterprises' success is often the most crucial goal in doing its business. The company's stakeholders see fulfilling their interests in a positive and satisfactory net financial result. Earnings information as a part of accrual-based accounting is base for making business decisions. Earning has become the most common subject of manipulation in numerous frauds and creative financial reporting. Mulford and Comiskey (2005) point out that "analysts, investors, and creditors, burned by the trust they have placed in reported earnings in an era of fraud and deceit in financial reporting, have turned their attention to cash flow as a

1 Slavica Stevanović, Research Associate, Institute of Economic Sciences, Zmaj Jovina 12, Belgrade, Serbia, Phone: +381 63 87 29 970, E-mail: slavica.stevanovic@ien.bg.ac.rs, ORCID ID (https://orcid.org/0000-0002-8545-4540)

2 Jelena Minović, Senior Research Associate, Institute of Economic Sciences, Zmaj Jovina 12, Belgrade, Serbia, Phone: +381 69 88 93 301, E-mail: jelena.minovic@ien.bg.ac.rs, ORCID ID (https://orcid.org/0000-0001-6254-4888)

3 Grozdana Marinković, Associate Professor, Belgrade Banking Academy, Zmaj Jovina 12, Belgrade, Serbia, Phone: +381 64 26 68 546, E-mail: grozdana.marinkovic@bba.edu.rs, ORCID ID (https://orcid.org/0000-0002-9425-4479)

directional beacon guiding them through the uncharted and risky waters of modern financial analysis". Some managers use aggressive accounting or fraud to avoid reporting a decline in earnings (Dechow and Schrand, 2004). Intentionally trying to hide current good performance and presenting earnings lower than realized, the company's management wants to defer payment of income tax or defer part of the profit to future accounting periods.

Earnings persistence is earnings quality measures commonly used in the empirical literature. The aim of our paper is to assess the earnings persistence and cash flow persistence of selected Serbian enterprises using the panel autoregression and regression model with annual data that cover the period from 2010 to 2018. The research results indicate that operating profit is more persistent than net profit and cash flow-based indicators of analysed agriculture enterprises. This paper contributes significantly to the existing literature of earnings quality and can be of interest to readers in academic areas and practitioners.

The sample includes the medium-sized agriculture enterprises in Serbia because the agriculture sector is much essential for the Serbian economy measured by the share of this sector in GDP and total employment. Medium-sized enterprises also have a significant impact on the economic performance of the national economy. According to key developing indicators, medium enterprises represent the backbone of national economies although a modest share in the overall structure of enterprises (Đuričin et al., 2018). According to the data of the Serbian Business Registers Agency – SBRA (2019), Serbian enterprises that operate in sector A - Agriculture, Forestry and Fishery are about 3.8% of the total number of enterprises. This sector employs about 2.8% of the total number of employees and generates 3% of the total revenues of all enterprises in Serbia. After several consecutive years with a positive financial performance, aggregated profit and loss statements of this sector reported a negative net result in 2018 in the amount of 1,750.2 million dinars. In 2019 agriculture sector realized a positive net result in the amount of 6,184.7 million dinars. Observing the results structure, the agriculture sector noticed positive and significant operating profit, even in 2018, when the final negative net financial result influenced by high negative results from temporary activities.

This paper consists of five sections. After the introduction as a first section, the literature review is presented in the second section. The third section explains the used data and methodology. The results and discussions are explained in the fourth section. Finally, the fifth section contains the main conclusions.

Materials and methods

Theoretical Background

Reported earnings as a measure of the company's success can be the effect of actual business transactions, but to a greater or lesser extent may be the result of the application of specific balance sheet policy measures by the company's management.

How management uses the flexibility of the methods and policies provided by accounting regulations, as well as whether there is a violation of applicable accounting frameworks, it is crucial to determine to assess the quality of profit shown in the income statement (Stevanović and Marinković, 2017). Numerous studies that examine the earnings quality are based on the use of one or a set of quality measures. Dechow et al. (2010) in their research concluded that there is no superior measure of profit quality and point out that alternative quality measures should not be used as substitutes, but as complementary measures.

Earnings quality measurement cannot be focused on accrual-based indicators alone. The analysts have to use the cash flow statement of enterprises in earnings quality assessing process, in combination with the other financial statements, especially income statement and balance sheet. "Financial officer of Tyco International Ltd. company told investors to forget reported earnings and instead focus on cash-flow generation as a percentage of net income" to verify if earnings quality of their company is good (Mulford and Comiskey, 2005, 95). Dechow and Schrand (2004) conclude that earnings data backed by cash flows data perform better in predicting future earnings than earnings data alone. Strong and stable net operating cash flow is a sign of high-quality earnings (Stevanović et al., 2013).

The earnings quality depends on its stability, but also on the sources from which it originates. Certainly, stability, sustainable and real sources of income have a positive effect on the reality of the reported earnings. Suppose the high profitability is the result of the payment of a temporary nature, which will not appear regularly. In that case, the reported profit is not entirely of a sustainable nature. Meeampol et al. (2013) point out that "in accounting if the net income is stable and not fluctuating, it has a significantly lesser risk because the risk is positively correlated with income".

Managers often want to improve the reputation of the company that they manage with investors and the other stakeholders, and persistent earnings can help them in this. Persistence can be used as time series and accounting-based measures of earnings quality. Persistence determines the extent that current earnings persist in the future period (Perotti and Wagenhofer, 2014). Demerjian et al. (2013) select earnings persistence and the other three earnings quality measures to examine the impact of managers on accrual estimation. Pagalung and Sudibdyo (2018) include persistence as one of accounting-based earnings quality attributes in their research of earnings quality factors and the economic consequences in the Indonesian capital market. Earnings persistence as earning quality measure in their research use Dasmaran and Mulyani (2019), Nuris and Juliardi (2017), and Huq (2016).

Boulton et al. (2011) use earnings management measures as earnings quality measures defined by Leuz, Nanda and Wysocki. Their criteria include earnings smoothing measurements. Perotti and Wagenhofer (2014) also use earnings measures that reflect smoothness of earnings where smoothness measures are based on the earnings volatility, or accruals relative to the operating cash flows volatility.

Based on the earnings quality literature over the past four decades, Srivastava (2014) point out that there has been an increase in the volatility of earnings. She also notices a decrease in the earnings relevance and a reduction in the degree of matching between concurrent revenues and expenses, that can be interpreted as an earnings quality decline. Dechow and Schrand (2004) in their research, also conclude that earnings quality has deteriorated over the past 40 years because of the increasing number of companies reporting losses and to "nonrecurring" special items.

Perotti and Wagenhofer (2014) in their research include accounting-based and market-based earnings quality measures that are commonly used in the empirical literature. Aboody et al. (2005) use the accrual value (the discretionary component of accrual) for earnings quality defining. If the absolute value of accrual is larger, the earnings quality is lower. Milić et al. (2018) used residuals from accruals models approach to capture earnings management in Serbian agricultural companies. In the research of Pagalung and Sudibdyo (2018), the earnings quality, among other things, was measured by accrual quality. Francis et al. (2008) use absolute abnormal accruals for constructing earnings quality measure too, but also three other measures such as accruals quality, earnings variability, and a combined measure.

Methodology

We tested the persistence of selected earnings and cash flow-based indicators on the sample that includes the medium-sized agriculture enterprises. The share of agriculture sector in the GDP of Serbia is significant compared to EU countries, which is in line with the richness of natural resources, climatic conditions, but also the low level of productivity of agricultural production and the development of other activities in Serbia. We used the panel autoregression and panel regression model over the period from 2010 through 2018. It is a sample of 70 medium-sized agriculture enterprises operating in Serbia with the total number of observations being 630.

The analysed Serbian agriculture enterprises predominant do business in eight different group of economic activities. The most significant share in the sample structure (77%) is that of enterprises from group of activities named Growing of cereals (except rice), leguminous crops and oil seeds. Four percent enterprises operate in each of the following group of activities: Growing of other non-perennial crops; Raising of swine/pigs and Raising of poultry. Three percent enterprises of total observed agriculture enterprises do business in group of economic activities named Growing of pome fruits and stone fruits, Freshwater aquaculture and Raising of dairy cattle. One agriculture enterprise predominant operates in group activities Support activities for crop production.

The analysed variables are determined based on annual financial statements data that include balance sheet, income statement and cash flow statement data. The Register of Financial Statements of the Serbian Business Registers Agency is the source of mentioned data for each agriculture medium enterprise individually (SBRA). The annual analyses cover the period 2010-2018. The analysed enterprises are classified

as medium-sized enterprises in 2015 based on the average number of employees, operating income, and an average value of operating assets at 31 December 2014. In 2015, 74 medium-sized enterprises did business in sector Agriculture, forestry, and fishery. There are no publicly available financial statements for four enterprises that are excluded from analyses. Two enterprises are excluded from register of Business Registers Agency, one enterprise is inactive, and one is in the bankruptcy process.

Analyse of medium enterprises in this sector by size, shows that 70% of enterprises are classified as medium enterprises in the period 2016-2018 too. In the same period, 10% of enterprises are classified as small, one percent as micro and one percent of enterprises became large-sized enterprises. Remaining enterprises (18%) has changed size during period 2016-2018, and their size mostly was decreased.

Earnings quality measures that we used refers to earnings persistence. Persistence is one of accounting-based earnings quality attributes, and it was measured by the regression coefficient of current earnings towards future earnings (Pagalung and Sudibdyo, 2018). "Greater earnings persistence is a meaningful definition for earnings quality only if earnings truly reflect performance during the period and if current-period performance persists in future periods" (Dechow and Schrand, 2004). Earnings persistence as a time-series measure is equal to the coefficient beta value of the regression between current period earnings and past period earnings (from the autoregressive equation of annual earnings). High persistence is positively associated with high earnings quality since it indicates a stable, sustainable, and less volatile earnings generation process (Perotti and Wagenhofer, 2014).

Autoregression that we use to assess persistence of selected earnings and cash flow-based indicators is given with the following equation:

$$R_{i,t+1} = c + \beta R_{i,t} + \varepsilon_{t+1} R_{i,t+1} = c + \beta R_{i,t} + \varepsilon_{t+1} \quad (1)$$

where R are selected earnings and cash flow-based indicators, c is the constant term, β is coefficient of persistence, and ε is disturbance term, i is enterprise (i=1,…,70), and t is the period.

Panel regression that we use to estimate persistence accruals and net operating cash flows as determinants of the operating profit is given with the following equation:

$$OPM_{i,t+1} = c + \alpha ACC_{i,t} + \gamma CFOM_{i,t} + \varepsilon_{t+1} \quad (2)$$

where OPM is operating profit margin, ACC is accounting accruals, CFOM is cash flow operating margin, c is a constant term, α and γ are coefficients, ε is disturbance term, i is enterprise (i=1,…,70), and t is the period.

We used seven indicators for our autoregressions and three for the panel regression model. We define earnings as operating profit and net profit, so that earnings-based indicators are operating profit margin and profit margin. Cash flow-based indicators include net cash flow operating margin, net cash flow investing margin, net cash flow financing margin,

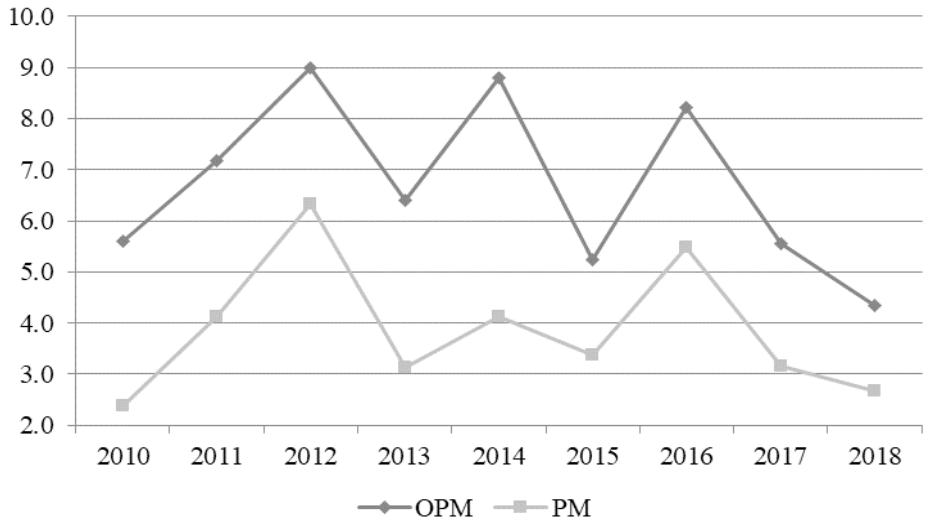
and free cash flow margin. Operating Profit Margin (OPM) represents the operating result (difference between operating revenues and operating costs) divided by operating revenues. Profit Margin (PM) represents the net financial results (difference between total revenues and total costs) divided by operating revenues. Accounting Accruals (ACC) represents the difference between operating results and net operating cash flow that is divided by operating revenues. Net Cash Flow Operating Margin (NCFOM) represents the net operating cash flow (difference between cash inflows from operating activities and cash outflows used by operating activities) divided by operating revenues. Net Cash Flow Investing Margin (NCFIM) represents the net investing cash flow (difference between cash outflows used in investing activities and cash inflows provided by investing activities) divided by operating revenues. Net Cash Flow Financing Margin (NCFFM) represents the difference between cash inflows provided by financing activities and cash outflows used by financing activities that is divided by operating revenues. Free Cash Flow Margin (FCFM) represents free cash flow as a difference between net operating cash flow and net capital expenditures divided by operating revenues.

Results and discussions

Earnings and cash flow-based indicators analysis are realized to assess the profitability flow and cash flow persistence of medium-sized enterprises and monitor the relationship between operating profit margin and net cash flow operating margin in 2010-2018.

Trend analysis of the operating profit margin and profit margin of selected medium-sized agriculture enterprises is realized based on the median values of the mentioned indicators. Their trend in the period 2010-2018 is shown in Figure 1.

Figure 1. Earnings-based indicators in the period 2010-2018

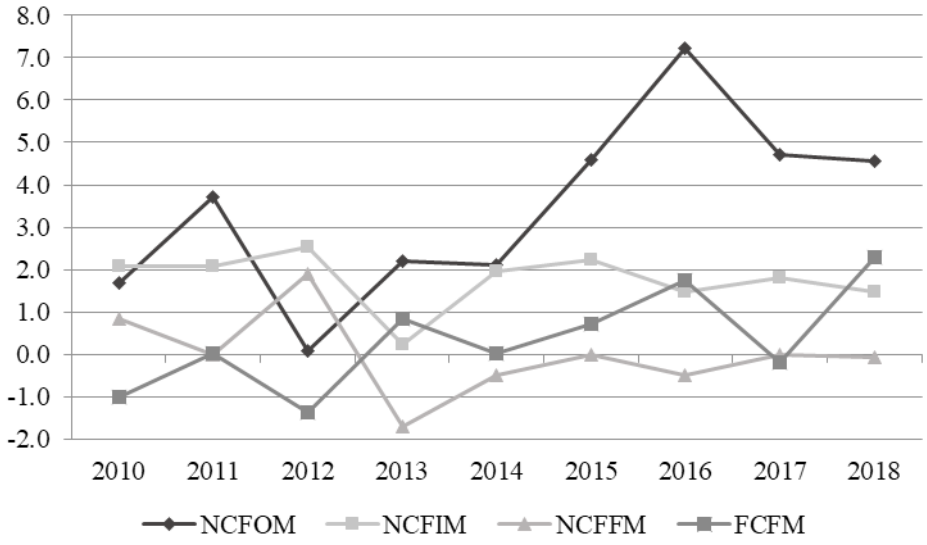


Source: Authors' calculation based on SBRA data
Note: OPM- Operating Profit Margin; PM- Profit Margin

The trend of observed earnings-based indicators in the period 2010-2018 is equal. Medium-sized agriculture enterprises notice a continuous improvement in profitability flows in 2011, 2012, 2014, and 2016, observing operating profit margin and profit margin. The highest median operating profit and median net profit were achieved in 2012, while the lowest median operating profit margin was in 2018 and the lowest median profit margins were in 2018 and 2010. The decrease of earnings-based indicators is noticed in 2013, 2015, 2017, and 2018.

Trend analysis of cash flow-based indicators (net cash flow operating margin, net cash flow investing margin, net cash flow financing margin, and free cash flow margin) of selected medium-sized agriculture enterprises is realized based on median values of the mentioned indicators. Their trend in the period 2010-2018 is shown in Figure 2.

Figure 2. Cash flow-based indicators in the period 2010-2018



Source: Authors' calculation based on SBRA data
Note: NCFOM- Net Cash Flow Operating Margin; NCFIM- Net Cash Flow Investing Margin; NCFFM- Net Cash Flow Financing Margin; FCFM-Free Cash Flow Margin.

The trend of observed cash flow-based indicators in the period 2010-2018 is unequal. Medium-sized agriculture enterprises noticed an increase of median net cash flow operating margin in 2011, 2013, and 2015-2016. The median free cash flow margin marks the same trend, whereby it also increased in 2018. The highest median net cash flow operating margin was noticed in 2016. but the lowest in 2012. The median net cash flow investing margin and median net cash flow financing margin have the equable trends. They increase in 2012, 2014, 2015 and in 2017. In other periods, medians of these indicators decline.

Table 1 shows the persistence of selected earnings and cash flow-based indicators, on average, for the period 2010-2018. The operating profit and net profit data are used

from income statements. Net cash flow from operating activities, net cash flow from investing activities, net cash flow from financing activities and free cash flow are used from cash flow statements. Accounting accruals values are included in the persistence analyse. Selected statements items are scaled by operating revenue. The total accruals can be defined as differences between net income before extraordinary items and cash flow from operations (Aboody et al., 2005) or between earnings and cash flow from operations (Demerjian et al., 2013).

Table 1. Persistence of earnings and cash flow-based indicators

Variable	Persistence	
	Beta	p-value
Operating Profit Margin - OPM	0.455	0.000
Profit Margin – PM	0.374	0.000
Accounting Accruals - ACC	0.338	0.000
Net Cash Flow Operating Margin - NCFOM	0.055	0.227
Net Cash Flow Financing Margin - NCFIM	0.412	0.000
Net Cash Flow Investing Margin - NCFFM	0.026	0.235
Free Cash Flow Margin - FCFM	0.264	0.000

Source: Authors' calculation

Folowing autoregressions show estimated persistence parameters:

$$OPM_{t+1} = 0.455OPM_t + \varepsilon_{t+1} \quad (3)$$

$$PM_{t+1} = 0.374PM_t + \varepsilon_{t+1} \quad (4)$$

$$ACC_{t+1} = 0.338ACC_t + \varepsilon_{t+1} \quad (5)$$

$$NCFOM_{t+1} = 3.383 + \varepsilon_{t+1} \quad (6)$$

$$NCFIM_{t+1} = 2.629 + 0.412NCFIM_t + \varepsilon_{t+1} \quad (7)$$

$$NCFFM_{t+1} = \varepsilon_{t+1} \quad (8)$$

$$FCFM_{t+1} = 0.264FCFM_t + \varepsilon_{t+1} \quad (9)$$

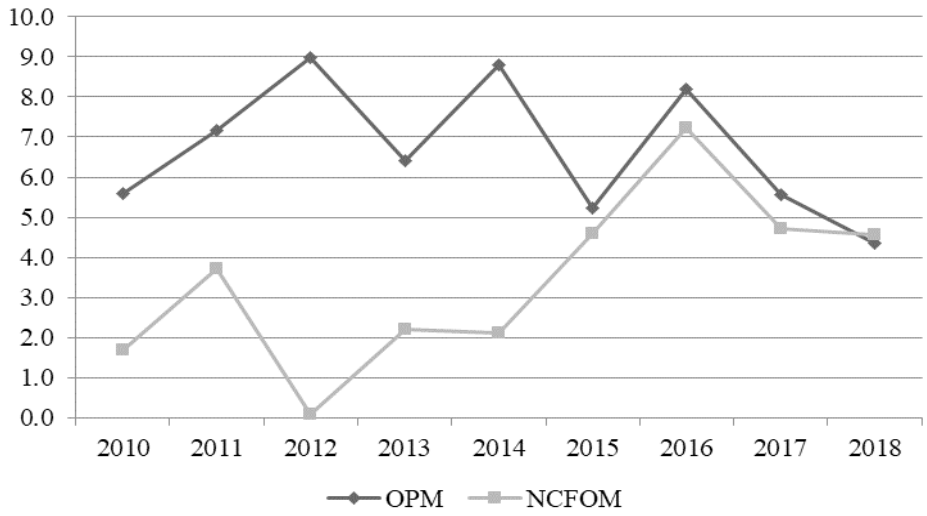
The higher the regression beta coefficient of current earnings towards the future earnings shows the earnings persistence and the smaller the beta coefficient can mean the lower the earnings quality or, the higher the transitory earnings. The higher beta coefficient is closer to one, the smaller beta is closer to zero (Pagalung and Sudibdyo, 2018).

Results of persistence analysis show that if an enterprise generates an operating profit of 1.00 RSD, then, on average, 0.455 RSD will persist into next year's operating profit. The results indicate that operating profit (0.455) is more persistent than net profit (0.374), and this can result from the fact that net profit contains financial and other revenues and less persistent costs. Cash flow-based indicators have different persistence rates

and less in comparison to operating profit persistence. Accruals values (0.338) are less persistent than operating profit and net profit but more persistent than free cash flow (0.264). Net cash flow operating margin and net cash flow financing margin are white noise processes. Betas are not statistically significant in these processes.

A stable relationship between operating profit margin and cash flow operating margin is a good assumption for the satisfactory the reported operating profit quality, the sustainability of a positive operating result and the sustainability of the net cash flow from operating activities. A different trend of operating profit margin and cash flow margin can be explained in the short run, while such a movement is unsustainable in the long run (Đuričin et al., 2019). The trend analysis of the difference between operating profit margin and cash flow operating margin for selected enterprises was conducted based on the median values of the mentioned determinants and their trend in the period 2010-2018 is shown in Figure 3.

Figure 3. The trend of Operating profit margin and Net cash flow operating margin



Source: Authors' calculation based on SBRA data
Note: OPM- Operating Profit Margin; NCFOM- Net Cash Flow Operating Margin

The trend of operating profit margin and cash flow operating margin is uniform in the period 2010-2011 and 2015-2018. After 2011, when the growth trend of operating profit margin and cash flow operating margin was recorded, a different trend was in 2012, when the operating profit margin continued to grow, and the cash flow margin decreased. The trend of operating profit margin and cash flow operating margin was again equal in 2015. In 2016 they increased compared to the previous year and then reduced in 2017 and 2018. The difference between operating profit margin and cash flow operating margin is the largest in 2012, while in period 2015-2018 median values of operating profit margin and cash flow operating margin are at the closest level, showing that the accruals is relatively stable in the last four years of the observed period.

Accruals and net operating cash flows can be observed as determinants of operating profit. In that case, we can estimate the persistence of the operating profit separately estimating accruals and net operating cash flows. The following regression shows that accruals and net operating cash flows in the past period have different implications for the persistence of operating profit in the current period.

$$OPM_{t+1} = 0.929^{***} ACC_t + 0.845^{***} CFOM_t + \varepsilon_{t+1} \quad (10)$$

We evaluated panel regression with fixed and random effects. However, the Hausman test showed that the value of Chi-Sq. Statistic = 15.042 with a p-value of 0.001 and regression with fixed effects is more adequate. Therefore, we will only describe its results.

Table 2. Panel Regression Analysis

Variable	Fixed Effects		Random Effects	
	Coefficient	**Prob.**	**Coefficient**	**Prob.**
C	-1.673	0.178	-2.204	0.103
ACC(-1)	0.929	0.000	1.020	0.000
NCFOM(-1)	0.845	0.000	0.946	0.000
Hausman test	15.042	0.001		
R-squared	0.542		0.435	
F-statistic	7.81	0.000	207.514	0.000

Source: Authors' calculation
Note: ACC- Accounting Accruals; NCFOM- Net Cash Flow Operating Margin

The value of determination coefficient (R^2) is 54.2% which means that this model explains so many variations. The remaining 45.8% of the variations remain unexplained by this model. The value of F-statistics and its p-value indicates that regression is statistically significant. The constant term is not statistically significant. Regression results show that operating profit that represents accrual is more persistent than operating profit backed by net operating cash flows, but with slight differences. These results can be explained by higher cash flows volatility in comparation to accruals volatility of selected Serbian agriculture enterprises. Our results indicate that for 1.00 RSD of operating profit that represents accruals, 0.929 RSD will persist into next year's operating profit. For 1.00 RSD of operating profit that represents operating cash flows, 0.845 RSD will persist into next year's operating profit. Dechow and Schrand (2004) founded that earnings backed by cash flows are more persistent than earnings that represent accruals.

Conclusions

Earnings quality can be based on the one or a set of quality measures, but earnings persistence is earnings quality measures commonly used in the literature. In this paper, we assessed the earnings and cash flow persistence of selected Serbian agriculture enterprises' using panel autoregression and regression model for the period 2010-2018.

For that purpose, we used operating profit margin and profit margin as accrual-based indicators and net cash flow operating margin, net cash flow investing margin, net cash flow financing margin and free cash flow margin as cash flow-based indicators. The contribution of this paper is the focus on the medium-sized enterprises that operate in the agriculture sector in Serbia and use of earnings and cash flow persistence indicators as earnings quality measures.

Serbian medium-sized agriculture enterprises notice an improvement in profitability flows in 2011, 2012, 2014, and 2016, measuring by medians of operating profit margin and profit margin. Unlike the earnings-based indicators' trend, the trend of observed cash flow-based indicators in the analysed period is unequal. The autoregression panel results indicate that operating profit is more persistent than net profit of analysed agriculture enterprises, but cash flow-based indicators have less persistence than operating profit. Accruals values are less persistent than operating profit and net profit but more persistent than free cash flow. A relationship between operating profit and net operating cash flow is relatively stable in the period 2015-2018 that is a good assumption for the operating profit quality and operating cash flow sustainability. Our regression results show more persistence of operating profit that represents accrual than the persistence of operating profit backed by net operating cash flows. It can be explained by higher cash flows volatility of Serbian agriculture enterprises than their accruals volatility. Future research can be done by estimating the earnings quality of Serbian enterprises using other quality measures or analysing enterprises that operate in some other economic sectors.

Acknowledgements

The authors acknowledge funding from the Ministry of Education, Science and Technological Development of the Republic of Serbia.

Conflict of interests

The authors declare no conflict of interest.

References

1. Aboody, D., Hughes, J., & Liu, J. (2005). Earnings quality, insider trading, and cost of capital. *Journal of Accounting Research*, *43*(5), 651-673. https://doi.org/10.1111/j.1475-679X.2005.00185.x
2. Boulton, T.J., Smart, S.B., & Zutter, C.J. (2011). Earnings quality and international IPO underpricing. *The Accounting Review, 86*(2), 483-505. https://doi.org/10.2308/accr.00000018
3. Dasmaran, V., & Mulyani, S.D. (2019). The Effect of Environmental Accounting Implementation, Research and Development to Earnings Quality and Ethics as to Moderating Variables. *Research Journal of Finance and Accounting, 10*(24), 159-167. https://doi.org/10.7176/RJFA/10-24-17

4. Dechow, P.M., & Schrand, C.M. (2004). *Earnings quality*, Monograph, Research Foundation of CFA Institute, 1-3927.

5. Dechow, P., Ge, W., & Schrand, C. (2010). Understanding earnings quality: A review of the proxies, their determinants, and their consequences. *Journal of accounting and economics*, *50*(2-3), 344-401. https://doi.org/10.1016/j.jacceco.2010.09.001

6. Demerjian, P.R., Lev, B., Lewis, M.F., & McVay, S.E. (2013). Managerial ability and earnings quality. *The Accounting Review, 88*(2), 463-498. https://doi.org/10.2308/accr-50318

7. Đuričin, S., Beraha, I., & Bodroža, D. (2018). Alternatives for existing the loss zone for medium-sized agricultural enterprises in the Republic of Serbia. *Economics of Agriculture*, *65*(1), 391-411. https://doi.org/10.5937/ekoPolj1801391D

8. Đuričin, S., Stevanović, S., Ljumović, I., & Simović, V. (2019). National network of medium enterprises in the Republic of Serbia. Belgrade: Institute of Economic Sciences, Retrieved from https://www.library.ien.bg.ac.rs/index.php/nmsp/article/view/532/1059. (September 9, 2020).

9. Francis, J., Nanda, D., & Olsson, P. (2008). Voluntary disclosure, earnings quality, and cost of capital. *Journal of accounting research*, *46*(1), 53-99. https://doi.org/10.1111/j.1475-679X.2008.00267.x

10. Huq, A. M. (2016). Effect of earnings volatility on cost of debt: the case of Swedish limited companies. Dalarna University, Master's in Business Studies, Retrieved from https://www.diva-portal.org/smash/get/diva2:937817/FULLTEXT01.pdf (September 12, 2020).

11. Meeampol, S., Rodpetch, V., Srinammuang, P., & Wongsorntham, A. (2013). Relationship between corporate governance and earnings quality: case study of listed companies in the Thailand Stock Exchange. In *Active Citizenship by Knowledge Management & Innovation: Proceedings of the Management, Knowledge and Learning International Conference 2013*, 1345-1353.

12. Milić, D., Mijić, K., Jakšić, D. (2018). Opportunistic management behavior in reporting earnings of agricultural companies. *Custos e agronegocio on line*, *14*(1), 125-142.

13. Mulford, C., & Comiskey, E. (2005). *Creative Cash Flow Reporting: Uncovering Sustainable Financial Performance*, New Jersey: John Wiley & Sons, Inc. Hoboken.

14. Nuris, D.M.R., & Juliardi, D. (2017). The Effect of Auditor Switch Toward the Firm Value And Earning Persistance, Retrieved from https://osf.io/preprints/inarxiv/5mhu7/ (August 3, 2020).

15. Pagalung, G., & Sudibdyo, B. (2018). The determinant factors of earnings quality and economic consequences. *EKUITAS (Jurnal Ekonomi dan Keuangan), 16*(1), 105-122. https://doi.org/10.24034/j25485024.y2012.v16.i1.150

16. Perotti, P., & Wagenhofer, A. (2014). Earnings quality measures and excess returns. *Journal of Business Finance & Accounting*, *41*(5-6), 545-571. https://doi.org/10.1111/jbfa.12071

17. SBRA - Serbian Business Registers Agency (2019). The Financial Statements Annual Bulletin, Retrieved from https://www.apr.gov.rs/upload/documents/Bilten%202019.pdf (August 8, 2020).

18. SBRA - Serbian Business Registers Agency, The Register of Financial Statements, Retrieved from http://www.apr.gov.rs (February 25, 2020).

19. Srivastava, A. (2014). Why have measures of earnings quality changed over time? *Journal of Accounting and Economics*, *57*(2-3), 196-217. https://doi.org/10.1016/j.jacceco.2014.04.001

20. Stevanović, S., & Marinković, G. (2017). Impact of sales revenue quality on the earning quality: evidence from Serbian enterprises. In *Thematic Monograph: Opportunities for inclusive and resilient growth*, Belgrade: Institute of Economic Sciences, pp. 105-116. [*in Serbian*: Стевановић, С., & Маринковић, Г. (2017). Утицај квалитета прихода од продаје на квалитет добитка: пример предузећа у Србији].

21. Stevanović, S., Belopavlović, G., & Lazarević-Moravčević, M. (2013). Creative Cash Flow Reporting–the Motivation and Opportunities. *Economic Analysis, 46*(1-2), 28-39.

RURAL RESIDENTS' PERCEPTIONS ON ECONOMIC IMPACTS OF CULTURAL AND PROMOTIONAL ASPECTS OF TOURISM

Aleksandra Vujko[1], Olgica Zečević Stanojević[2], Leposava Zečević[3], Dragan Nedeljković[4], Milija Zečević[5]

**Corresponding author E-mail: aleksandravujko@yahoo.com*

ARTICLE INFO

Review Article

Received: *02February 2020*

Accepted: *18 February2021*

doi:10.5937/ekoPolj2101155V

UDC 316.72:338.48-44(1-22)

Keywords:

rural destinations, employment, culture, marketing, residents' perceptions, tourism, Fruška Gora mountain

***JEL**: E24, O15, R11*

ABSTRACT

This study investigates residents' attitudes to tourism impacts (marketing, culture etc.) on Fruška Gora Mountain (Serbia), within the larger framework of economic impacts. The correspondence analysis of the perception of local residents showed that residents have a generally positive attitude towards the development of tourism considering its economic aspects, and then the desk study show edjustification of positive attitudes, thus confirming the main hypothesis. According to the analysis of the opinions of the local residents, it was found that the local residents positively perceived economic impact of tourism in two aspects: through increase in number of employees (employment and self-employment) as well as through the development of the community. The development of tourism in any destination in evitably leads to an increase of domestic and foreign investment, which then leads to the construction of infrastructure and suprastructure facilities, the introduction of various tourist taxis, and if it is possible, as it is the case with Fruška Gora Mountain, it can lead to a successful cross-border cooperation.

1 Aleksandra Vujko, Assstant Professor, University of Business Studies, Faculty of Tourism and Hotel Management, Jovana Dučića 23a, Banja Luka 78000, Republic of Srpska; Phone: +381 64 914 2645, E-mail: aleksandravujko@yahoo.com; ORCID ID (https://orcid.org/0000-0001-8684-4228)

2 Olgica Zečević Stanojević, Full Professor, Faculty of European Business and Marketing, Vojvode Dobrnjca 15, Belgrade 11000, Serbia, Phone: +381 11 3225598, E-mail: olgicazecevic.stanojevic@febm.edu.rs

3 Leposava Zečević, Full Professor, Faculty of European Business and Marketing, Vojvode Dobrnjca 15, Belgrade 11000, Serbia, Phone:+381 11 3225598 E-mail: leposava.zecevic@febm.edu.rs

4 Dragan Nedeljković, Full Professor, Faculty of European Business and Marketing, VojvodeDobrnjca 15, Belgrade 11000, Serbia, Phone: +381 64 2671 577, E-mail: draganedeljkovic62@gmail.com

5 Milija Zečević, Emeritus, Faculty of European Business and Marketing, Vojvode Dobrnjca 15, Belgrade 11000, Serbia, Phone: +381 64 615 0970, E-mail: febmeu@gmail.com

Introduction

There are a few visible positive impacts of tourism on the Destination development. Tourism has enabled the survival of small population settlements, and those with a more favourable position and the various featuresand other advantages may experience the population growth and immigration character. Tourism is often seen as an activity that affects the emancipation of women and increasing women's labour force activity. It is understood that the process of emancipation of women maybe more or less depending on the dynamic selection of the main directions of development of society, i.e. which economic activities will be given priority in the development, and whether the activity directly engageswomen, which is interpreted as the main factor of emancipation. However, economic impact of tourism on the destination development is the most tangible and takes upall the other effects in the long term perspectives.

The paper deals with the impact of *cultural and promotional* aspects of tourism on employment as an economic factor, and the development of the community through domestic and foreign investment, construction of infrastructure and supra-structural network, introduction of tourist taxis, as well as the benefits of cross-border cooperation (Purcell & Nevins 2005; Nunkoo&Ramkissoon 2011; Latkova& Vogt 2012). Employment is seen in the broader context of the new jobs, either in the private or public sector. Primarily through its multiplicative effect.

Therefore, the attempt of sizing the impact of *cultural and promotional* aspects of tourism on the growth of employment should statistically follow not only those who are directly employed in the tourism and hospitality industry, but also the employees in the activities that are an integral part of a complex of tourist services, and which are reflectedin the structure of tourism spending. In a narrow sense, it is the service sector: transport, trade, tourism and intermediary activities, which could not be developed only by theconsumption of the local population (Nunkoo & Ramkissoon 2011; Latkova & Vogt 2012). Besides, there are a large number of people who actively participate in the formation of tourism, but by the formal and methodological point of view they belong to the category of the inactive population. It is primarily related to the female labour forcein the households.

Households in tourist regions, where there is the process of urbanization with the help of tourism development, show the orientation to non-agricultural activities and new ways of economic engagement of households. The changes in household are a reflection of adaptation to new socio-economic circumstances and show the totality of social transformation in the economic, demographic and social plan (Liu and Wall 2006). For example, the importance that the household had before the collapse of traditional patriarchal community is getting a new modality with the development of tourism.

Although it is no longer based on the traditional family manufacture, economic activity in family households, due to providing tourist services, returns to the household long-lost functions. It should be borne in mind that the specific types of tourist service, their economic effects on the household income, the seasonal nature, the possibility of in-

volvement of all household members of different ages and gender and many other features represent an interesting and rewarding field for considerable scientific research. The infrastructure is the basis for economic development and it is the responsibility of the state and its institutions, such as roads, health care system, electricity, water, public services, police, airports, libraries and others, while tourism superstructure represents an additional set of infrastructure upgrade, such as hotels and other accommodation, restaurants, theme parks, golf courses and the like.

The development of the infrastructure is focused on the marketing promotion and creation of conditions for economic and social development, and improving the competitiveness of the region through the construction and modernization of infrastructure according to European standards. The construction of infrastructure and superstructure will create the preconditions for the generation of new jobs and also attract investment, improve the quality of life and standard of living and reduce pressure on the environment through the optimization of water resources, water treatment plants, reducing CO_2 emissions and solid waste management. The tourist fees and their amount are determined the municipality, per guest. In addition, there are certain"tourist areas" in which a tourist fee is charged for the development and 80% goes to the municipal funds and 20% to the Republic fund of tourist development (www.mfp.gov.rs).

Fruška Gora Mountain is located on the border with the Republic of Croatia (Vujko & Plavša 2010) and the encourage men to cross-border cooperationwould enable the improvement of the regional economy in a socially andenvironmentally sustainable manner and at the same time good neighbourhood relations will be promoted (www.croatia-serbia.com). Bearing in mind that households are places where the process of tourist acculturation occurs and where the standards of living and thinking are changed, the aim of this study is to show with the help of the opinion of the local residents the possible economic effects that could be achieved with the development of tourism on Fruška Gora. Owing to these economic effects, tourism makes changes to all households, and not only to those that are directly involved in tourism.

This article reports the findings of a survey of attitudes of residents living in a rural region of Fruška Gora Mountain (Serbia) towards a proposed tourism venture prior to its development. The survey method was applied for the purposes of this research, whereby 250 questionnaires were distributed and 249 of them were analyzed. This analysis led to the confirmation of the given hypothesis and refutation of other hypotheses. The SPSS program, version 20.0, and Pearson Chi-Square Test were used. In addition to the research data, the authors used the available statistical and secondary documentation.

Theoretical Background

Tourism, as practiced in developed countries, is essentially an economic endeavour, where as in developing countries it is mainly about leisure consumption as a path to development (Hung-Lee &Haun-Jan, 2019; Vujko et al. 2019; Vunjak et al. 2020). This consumption generates jobs and tourism may be the only remunerative employment

possibility in poor and peripheral regions where few other options are available to improve their marginal economic status (Almeida-Santos &Buzinde 2007; Andriotis& Vaughan 2003; Ishikawa &Fukushibe 2006; Lepp 2007; McGehee&&ereck 2004; Ryan & Cave 2005; Zhang et al. 2006; Vargas-Sanchez et al. 2010). Tourism has a high need for human capital and offers a diversity of jobs in a variety of operations of varied sizes and types (Szivas et al. 2003). However, since local people in the developing world are usually unfamiliar with the workings of a service economy, tourism is often institutionalized and manipulated predominately by bureaucratic initiatives (Liu and Wall 2006; Podovac et al. 2019).

There appears to be a general oversight by governments to address "the connection between education, ability to deliver a quality tourism experience and the need to develop a sustainable tourism industry" (Hung-Lee &Haun-Jan, 2019). It is only since the 1970s that the resident began to receive more attention, as shown by the increased number of studies and by the research objectives and methods utilized in the study of residents' attitudes (Almeida-Santos &Buzinde 2007; Andriotis& Vaughan 2003; Ishikawa &Fukushibe 2006; Lepp 2007; McGehee&Andereck 2004; Ryan & Cave 2005; Zhang et al. 2006; Vargas-Sanchez et al. 2010; Berić&Jovičić 2012; Brankov et al. 2015; Srdanović&Pavić 2015).

Tourism is commonly used as a tool to stimulate marginal economies and to promote development through the jobs and incomes that it can foster (Purcell & Nevins 2005; Bramwell 2011; Ruhanen 2013). Although not always explicitly stated, it is often hoped that it will reduce hardships through the promotion of upward labour mobility. However, the experience with tourism is varied, mainly due to heterogeneity (Vujko&Plavša 2014) and also because of the varying abilities of destinations to meet different needs. Thus, there is no widely accepted consensus on what tourism brings to the destination. In that context, tourism is seen as a tool of promotional activities (Podovac et al. 2019; Gajić et al. 2018; Gajić et al. 2019). Decision-making in such tourism developments is predominately based on the interventions of government agencies and large tourism firms, resulting in the dominance of external, often foreign, capital and the marginalization of local people. Local residents are frequently under-represented in the tourism development, both as investors and decision makers (Vuković et al. 2019). This is because they lack knowledge of tourism and associated skills, and because of the priority placed upon economic growth by the policymakers, with little concern for equity.

Most importantly, as part of promotional activitiesit will enhance the lives of local people and, as such, tourism planning should be as much about planning for residents as planning for visitors. In a developing economy, deficiencies in human capital, albeit with a labour surplus with low skills and qualifications and lack of tourism expertise, have been a major obstacle preventing the host population from participating effectively in tourism employment. Residents of any host area may perceive tourism in a positive way because of its potential for job creation, income generation, and enhanced community infrastructure, as has been found in many host communities (Saveriades 2000; Mitchell & Reid 2001).

Alternatively, the residents of host areas may perceive tourism in a negative way because of the socio-cultural and environmental costs, as has also been found in many host communities (e.g. Chen 2000). Dubois and Dubois (2012) recognize that embedding sustainability throughout an organization requires simultaneous consideration of economic, social, and environmental sustainability. More likely, residents will be aware of the positive and negative implications of tourism and will draw their conclusions based on the relative weightings they attach to the benefits and the costs. Many commentators (e.g. Hung-Lee &Haun-Jan, 2019; Vujko et al. 2019; Vunjak et al. 2020) have suggested that this balance of residents' perceptions of the costs and benefits of tourism is a major factor in visitor satisfaction and is, therefore, vital for the success of the tourism industry.

Thus, awareness of residents' perceptions of tourism development and its impacts can help planners and developers to identify real concerns and issues for appropriate policies and action to take place, optimizing the benefits and minimizing the problems. There is increasing evidence that residents of communities that attract tourists hold diverse opinions about development in their region (Kuvan& Akan 2005). This diversity of opinion has sparked increasing amounts of research into resident attitudes over the past two decades (Mason & Cheyne 2000).

The research methodology

This study was conducted on Fruška Gora Mountain, located in Vojvodina, Serbia. The region is one of the fastest-growing areas of Serbia. The first partofthis research was thefield researchand data collectionthroughdirect examinationthat was conductedin the area of Fruška Gora Mountain. We examined the local population of seven places on Fruška Gora Mountain: Petrovaradin, Sremski Karlovci, Čortanovci, Ledinci, Sremska Kamenica, Erdevik and Banstol. The survey was conducted between May and August 2018, and the questionnaire consisted of questions grouped into independent and dependent variables.

The independent variable is a group of questions related to gender, age structure and education. The dependent variables reflect the opinion of the participants about the influence that tourism has on their lives and their households. The starting point of the study was the hypothesis H stating that tourism has a positive economic effect on the local residents. The first question imposed to the participants was whether tourism has an impact on their lives. It is worth while mentioning that all of the 249 analyzed questionnaires had an affirmative answer, which actually encouraged further research.

The next variables that were singled out showed the actual opinion of local people about tourism development on Fruška Gora Mountain. There were two groups of variables. In the first group of variables there were questions concerning the purely economic impact. One of the most notable questions is: How advantageous are the impacts of tourism on employment? Within this group of variables the lower-level hypothesis (h1) has been set: h1 – Tourism creates more jobs. In the second group of variables

there were questions concerning the impact of tourism on their lives and on the entire local community.

The question that was particularly noted is: How advantageous are the impacts of tourism on the region's economy? Within this group ofvariables the lower-level hypothesis has been set: h2 – Tourism attracts more investment in the region; h3 – Tourism provides construction of hotels and other tourist facilities; h4 – Tourism has led to an increase in infrastructure for local people and h5 – The fees provide better conditions for the development of tourism; h6 – Tourism development would have an impact on cross-border cooperation.

In the area of Fruška Gora Mountain it is possible to achieve cross border cooperation. This leads to the lower-level hypothesis h6 – Tourism development would have an impact on cross-border cooperation. The second part of the paper includes the desk research. The methodology involved the perusal of official government documents available to the public. In fact, the subject of interest was the incentives provided by the Autonomous Province of Vojvodina in the economic development of tourism, particularly government subsidies and loans in order to reduce unemployment. The available sites and all supporting documentation of the relevant state institutions were investigated, such as: Vojvodina Investment Promotion, Provincial Secretariat of Finance, Provincial Secretariat for Interregional Cooperationand Local Government, Ministry of Finance of the Republic of Serbia and IP Across-border project between Serbia and Croatia.

Results and discussion

Out of the 250 questionnaires, 249 were analyzed, and the participants in this survey were residents of the mountain in the following structure: Petrovaradin (41.8%), Sremski Karlovci (12.4%), Ledinci (12%), Čortanovci (10.4%), Banstol (6.8%) and Erdevik (6.8%). Regarding the age structure of the visitors, the survey included 61.4% of the male population and 38.6% of women. The largest percentage of them (51.0%) was aged between 31 and50, followed by 42.2% over 51, those aged between 16 and 30 (2.1%), whereas the lowest participants were below 15 (1.7%). The largest percentage of them (78.5%) completed secondary school education, followed by 10.7% with university degree; 5.8% with college; 4.5% with elementary education, and 0.4% with MSc/PhD degree. The locals were asked to list the main economic impacts of tourism in their communities. Open-ended responses to this question were categorized into different types of economic impacts. The following two categories emerged: economic impacts and community development.

Economic impacts

Tourism is an economic sector of Vojvodina with the prospect of becoming one of the key pillars of its development and significant revenue, with areas ofEastern and Central Europeas primary markets. In Vojvodina the investments totalled 211 million euros of investment in 2019, whereby 5,267 people were employed (www.vip.org.rs). The results can be seen in Table 1showing that 17.6% of male participants believe that the

positive aspects of tourism development in the regionwould be reflected in employment opportunities and creating a new jobs.The high percentage ofthem (81%) believes that the great advantage of tourism is self-employment. It is similar among the female participants. Of all female participants, 28.1% said that being employed is an advantage of tourism development, while 64.6% of them said it is self-employment.

Table 1. The advantageous of tourism on employment

How advantageous are the impacts of tourism on employment?				**Provides more jobs**	**Provides more self-employments**	**There is no advantage**	**Total**
Male	Living place of participants?	Petrovaradin	Count	20	44	1	65
			% of Total	13.1%	28.8%	0.7%	42.5%
		Banstol	Count	1	5	0	6
			% of Total	0.7%	3.3%	0%	3.9%
		Ledinci	Count	1	17	0	18
			% of Total	0.7%	11.1%	0%	11.8%
		SremskaKamenica	Count	4	15	0	19
			% of Total	2.6%	9.8%	0%	12.4%
		SremskiKarlovci	Count	1	20	0	21
			% of Total	0.7%	13.1%	0%	13.7%
		Čortanovci	Count	0	13	0	13
			% of Total	0%	8.5%	0%	8.5%
		Erdevik	Count	0	10	1	11
			% of Total	0%	6.5%	0.7%	7.2%
				27	124	2	153
			Total	17.6%	810%	1,3%	100%

How advantageous are the impacts of tourism on employment?				Provides more jobs	Provides more self-employments	There is no advantage	Total
Female	Living place of participants?	Petrovaradin	Count	8	27	4	39
			% of Total	8.3%	28.1%	4.2%	40.6%
		Banstol	Count	2	9	0	11
			% of Total	2.1%	9.4%	0%	11.5%
		Ledinci	Count	2	9	1	12
			% of Total	2.1%	9.4%	10%	12.5%
		SremskaKamenica	Count	2	2	1	5
			% of Total	2.1%	2.1%	10%	5,2%
		SremskiKarlovci	Count	3	7	0	10
			% of Total	3.1%	7.3%	0%	10.4%
		Čortanovci	Count	4	8	1	13
			% of Total	4.2%	8.3%	10%	13.5%
		Erdevik	Count	6	0	0	6
			% of Total	6.3%	0%	0%	6.3%
Total				27	62	7	96
				28.1%	64.6%	7.3%	100%

Source: Own calculations

Considering the fact that the residents of these places gave similar answers, the results seen in Table 2 that there were no statistically significant differences in responses in relation to their gender and place of residence. Bearing in mind the percentage of participants who responded in favour of self-employment, there was an increasing interest in their opinions about what they would do provided that it is directly linked to the development of tourism. The results seen in Table 3 show that the highest percentage of participants gave the following answers: nurturing of old crafts (18.1%), production of wine and brandy (16.5%), handiwork (15.7%), making souvenirs (14.9%) and manufacture of traditional cheese and dried meat products (9.6%).

Table 2. Pearson Chi-Square Test

	Value	df	Statistical significance (p)
Pearson Chi-Square Test Male	23.378	12	0.025
	Value	df	Statistical significance (p)
Pearson Chi-Square Test Female	21.879	12	0.039

Source: Own calculations

After examining the Table 4 it can be concluded that there is a statistically significant difference in responses because in the results there were answers of the participants who answered the previous question that benefits of tourism development are reflected in the creation of new jobs and having an employer (25.3%). The total percentage of those who put self-employment as an advantage was 74.8%, which gave a good foundation for further research. Starting from the assumption that eachdestination has something that makesit different from other areas, it was concluded that the success of tourism development depends on the compatibility of the population that lives there.

Table 3. The most common forms of self-employment

What are the most common forms of self-employment?							
	Manufacture of traditional cheeses and dried meat products	Production of wine and brandy	Handiwork	Nurturing of old crafts	Making Souvenirs	I do not know	Total
Male	17	22	37	18	30	29	153
	6.8%	8.8%	14.9%	7.2%	12%	11.6%	61.4%
Female	7	19	2	27	7	34	96
	2.8%	7.6%	0.8%	10.8%	20.8%	13.7%	38.6%
In total	24	41	39	45	37	63	249
	9.6%	16.5%	15.7%	18.1%	14.9%	25.3%	100%

Source: Own calculations

Table 4. Pearson Chi-Square Test

Pearson Chi-Square Test	Value	df	Statistical significance (p)
	41.412	5	0.000

Source: Own calculations

The mosaic of cultural heritage of Sremis something that only Vojvodinacan offer to the tourist market of Europe. Nowhere else on the old continent such ethnic diversity can be found. Most important is that this diversity is still active in the villages, towns and low land areas. In addition to forms, ethnic tourism product, at least in terms of resources, has clearly marked and identifiable elements, i.e.forms ofexpression. Hence, it may be noticed that the local residents believe tha tall of these symbols and recognition of cultural factors should be very fied through the development of tourism (Table 5). This therefore leads to the confirmation of the lower-level hypothesis: h1 - Tourism creates more jobs.

Table 5. Examplesof someproducers of traditionalproducts andhandicrafts on the Fruška Gora Mountain

Name	Place	Description of the proposal
Winegrowers Association "Saint Tryphon"	Banoštor	On the area of 80 hectares are cultivated Alliance Riesling, Chardonnay, Traminac, Merlot, Cabernet Sauvignon, Cormorant, Cabernet franc, Franconia, Burgundy, Hamburg, pink wine and dessert wine Bermet. Annual wine production is up to 150000 litres.
NebojšaVeselinović	Rakovac	Souvenirs made of wood, clay, plaster, painted bottles, pepper tiles, ceramics etc.
Vera Žigić	Rakovac	Icon paintings on mushrooms
ZlatkoSkender	Rakovac	Production of organic wooden toys and souvenirs
Women's Association "Mountain Rose"	Rakovac	Founded on January 16, 2009. Its aim is to promote women's art, old art and cultural tradition of the region in which they live. Charity and souvenirs are also recognized when it comes to this association.
BrankaJukić	Beočin	Iconographer (Byzantine icon painting)
The Association of women "Danubian Flower"	Beočin	Craftsmen's traditional techniques of embroidery and making gold embroidery.
Beekeeping "Bikar"	SremskiKarlovci	Family firm "Beekeeping Bikar," offers a wide range of honey and honey products. Available to everyone are linden, acacia, meadow and many others. There are also wine, honey, vinegar, honey and various preparations for body care made from bee products.
Non-governmental organizations: Association for Reconstruction and development of SremskiKarlovci	SremskiKarlovci	Non-governmental organizations mainly gathers women from SremskiKarlovci and has been active in projects in the field of environment, promotion of women's rights and traditional crafts of SremskiKarlovci. Today, the organization works to promote the old methods of production of garments made of wool, so called. technique "pustovanja".
Karlowitzd.o.o.	SremskiKarlovci	The offer of the German Association of Danube is a lot of interesting things. Certainly, the most famous is traditional cake "kuglof" to which are added various spices, wine, fruit and more.
KeramikaRas	SremskiKarlovci	There is a family business that for many years engaged in the production of ceramics. These cases are a variety of motives of SremskiKarlovci, Vojvodina, Serbia.
KoviljkaŽivanov	SremskiKarlovci	Creating embroidered handicrafts
PetarEror	Rivica	Traditional meat products: sausages, ham, "kulensausage", bacon.
ZoricaAvramović	Rivica	Production of specific types of cheese and dairy products
GajaPetričević	Rivica	Production of traditional brandy so-called "rakija".
StevanGoljevački	Irig	Souvenirs of wood, typical items of Vojvodina - mill, sweep, cart, windmills etc.
DraginjaBudimčić	Irig	Souvenirs such as fridge magnets in the shape of the relief of Irig, knit bubble of gypsum (wine), vineyard keeper etc.
Vera Mulaji	Irig	Production of various types of homemade cakes

Name	Place	Description of the proposal
The Hunting Society "Zec"	Vrdnik	Hunting, trapping, farming and wildlife protection. Hunting of pheasants and other wildlife in the commercial and tourism purposes.
"Bonsai park" exhibition space	Vrdnik	Bonsai Park - the exhibition park, only in Serbia, a permanent exhibition space, 60 trees from Fruska Gora. In the park there are rare species of trees about 250 years old. The garden has herbs: geranium, sage, selenium, mint, myrtle, bonsai, etc.
MilošTešić	Jazak	Creating new and repair of old carriages, wheels, and other necessary parts.
Farm by Perko	Neradin	Its beauty and attractiveness represents a large collection of antiquities, such as yokes, wagon, ploughs, looms, wooden beds and mattresses, mirrors hand-made blankets, two hundred years old, which completes the kindness and hospitality of the host.

Source: research of the authors

Community development

Local economic development is a process through which individual stakeholders within the community work together with partners from public life, business and non-governmental sector in order to create better conditions for economic growth and new jobs. Through this process, they establish and maintain a dynamic entrepreneurial culture and create a new community and business prosperity ino rder to improve the quality of life for al lin the community. The results can be seen in Table 6 showing how the participants rated the impact of tourism on local economic development.

Both male participants (35.9%) and female participants (14.6%) said that the impact of tourism would have a positive effect on attracting investment while 24.8% of male participants and 44.8% of female participants said that it might lead to the construction of hotels and other tourist facilities. This therefore leads to the confirmation of the lower-level hypothesis: h3 – Tourism provides construction of hotels and other tourist facilities. The following item was infrastructure as replied by male participants (20.9%) and female participants (17.7%), while 12.4% of male and 15.6% of female participants emphasized the benefits fromvarious touristtaxes.

Table 6. The advantageous of the tourism impacts on the region's economy

How advantageous are the impacts of tourism on the region's economy?				Investment	Construction of hotels and other tourist facilities	Infrastructure	Fees	I do not know	Total
Male	Living place of participants?	Petrovaradin	Count	37	16	11	0	1	65
			% of Total	24.2%	10.5%	7.2%	0%	0.7%	42.5%
		Banstol	Count	2	4	0	0	0	6
			% of Total	1.3%	2.6%	0%	0%	0%	3.9%
		Ledinci	Count	6	9	3	0	0	18
			% of Total	3.9%	5.9%	20%	0%	0%	11.8%
		Sremska Kamenica	Count	4	8	7	0	0	19
			% of Total	2.6%	5.2%	4.6%	0%	0%	12.4%
		Sremski Karlovci	Count	1	1	3	9	7	21
			% of Total	0.7%	0.7%	20%	5.9%	4.6%	13.7%
		Čortanovci	Count	4	0	3	6	0	13
			% of Total	2.6%	0%	20%	3.9%	0%	8,5%
		Erdevik	Count	1	0	5	4	1	11
			% of Total	0.7%	0%	3.3%	2.6%	0.7%	7.2%
	Total			55	38	32	19	9	153
				35.9%	24.8%	20.9%	12.4%	5.9%	100%
Female	Living place of participants?	Petrovaradin	Count	7	19	9	0	4	39
			% of Total	7.3%	19.8%	9.4%	0%	4.2%	40.6%
		Banstol	Count	1	9	1	0	0	11
			% of Total	10%	9.4%	10%	0%	0%	11.5%
		Ledinci	Count	1	6	4	0	1	12
			% of Total	10%	6.3%	4.2%	0%	10%	12.5%
		SremskaKamenica	Count	1	1	2	0	1	5
			% of Total	10%	10%	2.1%	0%	10%	5.2%
		SremskiKarlovci	Count	1	2	0	7	0	10
			% of Total	10%	2.1%	0%	7.3%	0%	10.4%
		Čortanovci	Count	1	3	0	8	1	13
			% of Total	10%	3.1%	0%	8.3%	10%	13.5%
		Erdevik	Count	2	3	1	0	0	6
			% of Total	2.1%	3.1%	10%	0%	0%	6.3%
	Total			14	43	17	15	7	96
				14.6%	44.8%	17.7%	15.6%	7.3%	100%

Source: Own calculations

After examining the Table 6 it can be concluded that there is a statistically significant difference in responses. Bearing in mind the importance of the percentage of participants' answers, the authors try to obtain the detailed information in the respect of the individual responses. Subsequently, this led to the question of how to carry outlocal economic development. Taking into account the overall percentage of the responses, especially in the field

of attracting investments and building material base of tourism, the answer would be that it is directly working on building economic competitiveness of the local area in order to improve its economic future. Giving priority to the local economy and increasing competition is of the highest importance since the success of the community depends on their adaptation to the market environment that is rapidly changing and is increasingly competitive.

Table 7. Pearson Chi-Square Test

Pearson Chi-Square Test	Value	df	Statistical significance (p)
	124.020	24	0.000
	Value	df	Statistical significance (p)
	69.668	24	0.000

Source: Own calculations

The results can be seen in Table 8 showing that the Government of Vojvodina is taking some measures in encouraging the development of tourism on Fruška Gora Mountain. It is clear that success fulprivate enterprises create wealth in local communities. However, the achievement of prosperity of a private company depends on favourable local business conditions. This shows that local governments have an essential role in creating a favourable environment for business success. Therefore the lower-level hypothesis: h2 - Tourism attracts more investment in the region is confirmed.

Table 8. Support for the developmentof tourismin the AutonomousProvince of Vojvodina – budget for the year 2019.

Tourism revenue budget	Losses and expenses from revenues, income and unexpended funds transferred/din	Total/din
Services under the contract	**13.206.000,00**	13.206.000,00
Subsidies to public financial institutions	**1.500.000,00**	1.500.000,00
Subsidies to private companies	**112.000.000,00**	112.000.000,00
Transfers to other levels of government	**30.000.000,00**	30.000.000,00
Buildings	**18.000.000,00**	18.000.000,00
Grants to non-government organizations	**38.000.000,00**	38.000.000,00
Total for the Encouragement of tourism development in the Autonomous Province of Vojvodina	**212.706.000,21**	

Source: research of the authors

The experts from the Institute for Urban Planning of Vojvodina were planning that the tunnel entrance will beat Paragovo, and the exit will be in Irig. This would protect the areafrom pollution, and the tunnel would bring multiple benefits.The existing road will servefor visiting historic sites, mainly monasteries. Therefore, the improvement of the existing infrastructure for business and households, including roads, transportation, industrial and drinking water, waste disposal, energy systems, telecommunications systems, equipment for the prevention of crime (for example, street lighting), commercial and industrial areas, the beauty of the community (parks) is the answer to the question of how and in what way

infrastructure has an impact on the local community. Therefore the lower-level hypothesis: h4 - Tourism has led to an increase of infrastructure for local people is confirmed.

A small proportion of participants (13.2%) responded that the fees from tourism are something that would have a positive effect on the development of their communities. The research has shown that charging fees for entry into a protected natural area of Fruška Gora Mountain in the amount of 150 dinars was implemented on 21 April 2012. This fee includes the fee to enter the vehicle, lighting fires and using the parking lot in the park. In case the quality of environmental is burdened by a large number of vehicles, the fee makes sense. The money raised is exclusivelyearmarked for thesalaries ofpublic companies thatare custodiansof protected areas (foresters, biologists) and for the preservation and improvement of the area. Therefore the lower-level hypothesis: h5 - There should be a specific tax on tourists is confirmed.

The research has shown that the development of tourism had another advantage in the economicd evelopment of local communities, and that is cross-border cooperation. Fruška Gora Mountain is located in the municipality of Petrovaradin, Sremski Karlovci, Beočin, Bačka Palanka, Šid, Sremska Mitrovica, Irig and Inđija. The data on interregional cooperation in 2011 was provided by the four municipalities. Due to its border position with Croatia, it is clear that the best chance for cross-border cooperation lies in that fact. In 2011the documents were signed and projects and donations from The Republic of Croatia were implemented-one letter of intent (Rijeka), one treaty of friendship and cooperation (City of Vukovar) and three projects of total value of € 1,170,995.37.

First and foremost, transfrontier co-operation is a form of co-operation within cross-border "service and employment areas" traversed by all kinds of flows. In addition to this initial approach, it is important to bear in mind the wide variety of co-operation arrangements and projects, with an emphasis on cross-border cooperation. Therefore the lower-level hypothesis: h6 – Tourism development would have an impact on cross-border cooperation was confirmed.

Conclusion

The results suggest that the development of tourism must be the basis in the engagement of local communities and the coordination of this process is one of the most important levers in the business of local government leaders. This statement was confirmed by all six lower-level hypothesis (Tourism creates more jobs, Tourism attracts more investment in the region, Tourism has led to an increase in infrastructure for local people, The fees provide better conditions for the development of tourism and Tourism development would have an impact oncross-border cooperation). Where as it is obvious that tourism development is a priority, many local communities in Serbia still can not cope with it. In this particular case, the essential commitment of local communities in the mountain shows that they are making an attempt to use most of the resources for the long-term benefits – in the direction of economic development. For local management it is a challenge to present its decision to the public, then to gain support and

to persist in the implementation. We can see that this is possible only if they clearly explain the specific and long-term benefits of investing in the local community development programs as well as support programs for tourism development and human resource development. The attitude of the local community is to make an effort to attract new investment, help existing enterprises to develop, promote small and medium enterprises and/or establish programs for self-employment or starting a small business.

Therefore, the development of tourism is their choice which will result in employment, strengthening the economic structure and the general improvement of life. This makes up the process of local economic development, whereby the main hypothesis that tourism has a positive economic effecton the local residents is confirmed. It is contended that a "happy host" is essential to elicit a positive image of the destination and to generate positive word of mouth.

Tourism human resource studies (or merely tourism employment impact assessments) are generally a reflection of the manifestations of tourism as a stimulus for economic growth. Once an economy becomes largely dependent on tourism, a decline in the tourism market can be devastating. Globalization has increased the opportunities and competition for investments, financial aid, business attraction andretention. It offers opportunities for local businesses to develop new markets and also presents challenges from international competitors entering the local markets. Manufacturing, banking and service corporations that are located in multiple locations compete globally to locate a profitable area for manufacturing operations and operations management services. Technologically advanced industries require highly specialized skills nd technology infrastructure.

Local conditions determine the advantage of the community and thus its ability to attract and retain investment. It is clear how muchpriority is given tothe destinations whereit is possible to develop tourism, such as Fruška Gora Mountain. However, reaching the term "developed tourism" is not an easy task and requires cooperation and interaction of many factors of the tourism industry. All this, of course, has an impact on the local community itself. The state regulatory, tax andother legal structures have an influence on shaping the climate for domestic companies, which can help or hinder the goals of local economic development (for example, deregulation of telecommunications standards for the environment). Globally, governmental functions are decentralized, and private industry has become"free". This usually has local economic consequences.

Local communities need to be awareof the dangers but also theopportunities that they provide. Communities within and between regions competeto attract external as well as domestic investment. There are many opportunities for communities (rural and urban) to collaborate with each other in order to help their economies. This will improve the overall competition in the regional economy, while their own economies will benefit at the same time. The most important and most effective initial development activity that municipalitie make take is to improve the processes and procedures through which companies must passon the city level. A brief over view of most local governments has disclosed a large number of complex, poorly managed, expensive and unnecessary systems of registration of companies. The reduction in the negative aspects will soon make the area improve its investment environment and become known as favourable for business operations.

Conflict of interests

The authors declare no conflict of interest.

References

1. Almeida-Santos, C., & Buzinde, C. (2007). Politics of identity and space. Representational dynamics. *Journal of Travel Research, 45*(3), 322–332. https://doi.org/10.1177/0047287506295949
2. Andriotis, K., & Vaughan, R. (2003). Urban residents´ attitudes toward tourism development: The case of creta. *Journal of Travel Research*, *42*(2), 172–185. http://dx.doi.org/10.1177/0047287503257488v
3. Berić, D., &J ovičić, A. (2012). Cruising tourism Novi Sad and Belgrade residents' experience analyse. *Journal of the Geographical Institute "Jovan Cvijić" SASA, 62*(2), 67-80. https://doi.org/10.2298/IJGI1202067B
4. Bramwell, B. (2011). Governance, the state and sustainable tourism: a political economy approach. *Journal of Sustainable Tourism, 19*(4/5), 459–477. https://doi.org/10.1080/09669582.2011.576765
5. Brankov, J., Jovičić, D., &Milijašević, D. (2015). Sustainable Tourism in National Park "Đerdap", Serbia – Attitudes of Local Population. *Journal of the Geographical Institute "Jovan Cvijić" SASA, 65*(2), 183-199. https://doi.org/10.2298/IJGI1502183B
6. Chen, J.S. (2000). An Investigation of Urban Tourism Residents' Loyalty of Tourism. *Journal of Travel and Tourism Research, 24*(1), 5–19. https://doi.org/10.1108/09596110110381870
7. Cross-border programme Croatia-Serbia. Retrieved from www.croatia-serbia.com (January 21, 2020).
8. Dubois, C.L.Z., & Dubois, D.A. (2012). Strategic HRM as social design for environmental sustainability in organization. *Human resource management, 51*(6), 799–821. https://doi.org/10.1002/hrm.21504
9. Gajić, T., Vujko, A., Tretiakova, N.T., Petrović, M., Radovanović, M., & Vuković, D. (2019). Evaluation of service quality and development of rural tourism – (Serbia) Case Study. *Deturope – The Central European Journal of Regional Development and Tourism, 11*(2), 4-22.
10. Gajić, T., Vujko, A., Petrović, M.D., Mrkša, M., & Penić, M. (2018). Examination of regional disparity in the level of tourist offer in rural clusters of Serbia. *Economics of Agriculture, 65*(3), 911-929. https://doi.org/10.5937/ekoPolj1803911G
11. Hung-Lee, T., & Haun-Jan, F. (2019). Can community-based tourism contribute to sustainable development? Evidence from residents' perceptions of the sustainability. *Tourism Management*, *70*, 368-380. https://doi.org/10.1016/j.tourman.2018.09.003

12. Ishikawa, N., & Fukushibe, M. (2006). Who expects the municipalities to take initiative in tourism development? Residents´ attitudes of AmamiOshima Island in Japan. *Tourism Management, 28*, 461–475. https://doi.org/10.1016/j.tourman.2006.03.008
13. Kuvan, Y., & Akan, P. (2005). Residents' attitudes toward general and forest-related impacts of tourism: the case of Belek, Antalya. *Tourism Management, 26*(5), 691–706. https://doi.org/10.1016/j.tourman.2004.02.019
14. Lepp, A. (2007). Residents´ attitudes towards tourism in Bigodi village, Uganda. *Tourism Management, 28*(3), 876–885. https://doi.org/10.1016/j.tourman.2006.03.004
15. Latkova, P., & Vogt, C.A. (2012). Residents' attitudes toward existing and future tourism development in rural communities. *Journal of Travel Research, 51*, 50-67. https://doi.org/10.1177/0047287510394193
16. Liu, A., & Wall, G. (2006). Planning tourism employment: a developing country perspective. *Tourism management, 27*(1), 159–170. https://doi.org/10.1016/j.tourman.2004.08.004
17. Mason, P., & Cheyne, J. (2000). Residents attitudes to proposed tourism development. *Annals of Tourism Research, 27*(2), 391-411. https://doi.org/10.1016/S0160-7383(99)00084-5
18. McGehee, N., & Andereck, K. (2004). Factors predicting rural residents´ support of tourism. *Journal of Travel Research, 43*(2), 131–140. https://doi.org/10.1177/0047287504268234
19. Ministry of Finance and economy, Republic of Serbia. Retrieved from www.mfp.gov.rs (January 21, 2020).
20. Mitchell, R.E., & Reid, D.G. (2001). Community Integration: Island Tourism in Peru. *Annals of Tourism Research, 28*(1), 113-139. https://doi.org/10.1016/S0160-7383(00)00013-X
21. Nunkoo, R., &Ramkissoon, H. (2011). Developing a community support model for tourism. *Annals of Tourism Research, 38*(3), 964-988. https://doi.org/10.1016/j.annals.2011.01.017
22. Purcell, M., & Nevins, J. (2005). Pushing the boundary: state restructuring, state theory, and the case of US: Mexico border enforcement in the 1990s. *Political Geography, 24*(2), 211–235. https://doi.org/10.1016/j.polgeo.2004.09.015
23. Podovac, M., Đorđević, N., & Milićević, S. (2019). Rural tourism in the function of life quality improvement of rural population on Gočmountain. *Economics of Agriculture, 66*(1), 205-221. https://doi.org/10.5937/ekoPolj1901205P
24. Ryan, C., & Cave, J. (2005). Structuring destination image: A qualitative approach. *Journal of Travel Research, 44*(2), 143–150. https://doi.org/10.1177/0047287505278991

25. Ruhanen, L. (2013). Local government: facilitator or inhibitor of sustainable tourism development. *Journal of Sustainable Tourism, 21*(1), 80–98. https://doi.org/10.1080/09669582.2012.680463

26. Saveriades, A. (2000). Establishing the Social Tourism Carrying Capacity for theTourist Resorts of the East Coast of the Republic of Cyprus. *Tourism Management, 21*(2), 147-156. https://doi.org/10.1016/S0261-5177(99)00044-8

27. Schoroeder, T. (1996). The relationship the residents' image of their state as a tourist destination and their support for tourism. *Journal of Travel Research, 34*(4), 71–74. https://doi.org/10.1177/004728759603400411

28. Srdanović, M., & Pavić, D. (2015). Tourists' attitudes on tourism offer in north-western part of Montenegro.*Journal of the Geographical Institute "Jovan Cvijić" SASA, 65*(2), 97-108. https://doi.org/10.2298/IJGI1502201S

29. Szivas, E., Riley, M., & Airey, D. (2003). Labor mobility into tourism: attraction and satisfaction. *Annals of Tourism Research, 30*(1), 64–76. https://doi.org/10.1016/S0160-7383(02)00036-1

30. Vargas-Sanchez, A., Porras-Bueno, N., & Plaza-Mejia, A. (2010). Explaining residentsatitudes to tourism, is a universal model possible. *Annals of Tourism Research, 38*(2), 460–480. https://doi.org/10.1016/j.annals.2010.10.004

31. Vojvodina Investment Promotion. Retrieved from www.vip.org.rs (January 21, 2020).

32. Vujko, A., & Plavša, J. (2014). Evaluation of National Park Fruška Gora (Serbia) for sport and recreational tourism. *ActageographicaSlovenica*, *54*(2), 321-334. https://doi.org/10.3986/AGS54206

33. Vujko, A., Gajić, T., Penić, M., & Petrović, M. (2019). Development Perspectives of Rural Tourism Policy – a Comparative Study of Rural Tourism Competitiveness Based on Perceptions of Tourism Workers in Slovenia and Serbia. *Eastern European Countryside, 24*(1), 144-154. https://doi.org/10.2478/eec-2018-0007

34. Vujko, A., Delić-Jović, M., Zečević, S.O., Zečević, L., & Nedeljković, D. (2020). Gastronomy as a mean of marketing management and rural destination development. *Serbian Journal of Engeenering Management, 5*(1), 1-13. https://doi.org/10.5937/SJEM2001001V

35. Vuković, D., Vujko, A., Maiti, M., & Riad, S. (2019). Residents' perceptions of wine tourism on the rural destinations development. *British Food Journal, 122*(8), 2739-2753. https://doi.org/10.1108/BFJ-04-2019-0291

36. Vunjak, M.N., Vujko, A., Dragosavac, M., & Antonijević, N.T. (2020): Descriptive statistics in corporate management and employee engagement in rural destinations. *Economics of Agriculture, 67*(4), 1087-1101. https://doi.org/10.5937/ekoPolj2004087V

37. Zhang, J., Inbakaran-Robert, J., & Jackson-Mervyn, S. (2006). Understanding community attitudes towards tourism and host–guest interaction in the urban-rural border region. *Tourism Geographies, 88*(2), 182–204. https://doi.org/10.1080/14616680600585455

SERBIAN AGRICULTURAL COOPERATIVES AND THEIR PATH TOWARDS THE EUROPEAN UNION - LEGAL ASPECT

Gordana Ljubojević[1], Nina Maksimović Sekulić[2]

**Corresponding author E-mail: nina.maksimovicbg@gmail.com*

ARTICLE INFO

Review Article

Received: *08 December 2020*

Accepted: *08 February 2021*

doi:10.5937/ekoPolj2101173L

UDC 006.024:349.422.2(497.11)(4-6EU)

Keywords:

agricultural cooperatives, European integration process, agricultural policy

JEL: *Q18, K39*

ABSTRACT

The association of farmers as a model of sustainable rural development is a significant factor in the rapid development of agriculture and the improvement of the position of agricultural producers. The economic importance of cooperatives in the world and Europe is continuously growing, especially in the conditions of global and regional economic and financial crises, when cooperatives show a high degree of resistance to the shocks of these crises and a high percent of survival on the market. The European Union recognizes the growing role of cooperatives. The European Commission define the cooperative sector as protector and promoter of the European model of social economy, and as an extremely important factor in building and preserving local "social capital" - trust, mutual assistance and horizontal ties between citizens and organizations. New EU members and candidate countries preparing to join the EU, including the Republic of Serbia, should promote cooperatives as a key aspect of economic development and social policy. The aim of this paper is to analyze the current legal position of agricultural cooperatives in Serbia, and to determine the degree of harmonization with EU regulations and comparative analysis of their legal regulation in the EU Member States. Based on the conducted analysis, recommendations will be proposed in order to improve the legislative framework of agricultural cooperatives in Republic of Serbia in order their future successful functioning on the EU market.

1 Gordana Ljubojević Ph..D., Associate Professor, Novi Sad School of Business, Vladimira Perića – Valtera 4, 21000 Novi Sad, Phone:+381 63 360 873, E-mail: ljubojevic.vps@gmail.com, ORCID ID (https://orcid.org/0000-0003-0087-3947)

2 Nina Maksimović Sekulić, Ph.D., Assistant Professor, Modern business school Belgrade, st. Terazije 27, 11 000 Belgrade, Serbia, Phone: +381 62 206 642, E-mail: nina.maksimovicbg@gmail.com, ORCID ID (https://orcid.org/0000-0002-4330-0666)

Introduction

The major source of income in rural areas is the agriculture. The dominant support for the development of agricultural producers, marginalized groups (women, youth) is provided by agricultural cooperatives, by creating new jobs and implementing business models. In this way, rural areas become more sustainable and resilient to economic fluctuations. Also, the fresh air is the reason of migratory movement towards rural areas (Bellini et al., 2019; Nicolescu & Drăgan, 2020). Through cooperation and association, producers have access to new markets, information and technologies, suppliers of raw materials and agricultural machinery, as well as numerous trainings. Furthermore, associating producers facilitates decision-making at all levels."Development and improvement of agricultural cooperatives in Serbia and throughout the developing world is a very important practical task that is based in respect of the principle of agricultural cooperatives and set standards of the European Union and the International Cooperative Alliance – ICA, in which establishment is involved the Association of Serbian agricultural cooperatives together with other national associations."(Bojić, Vapa Tankosic, 2015).

"Cooperatives are of enormous importance for the agricultural sector in Serbia mainly for the reason of small average surfaces of agricultural holdings of 5.4 ha only, which are divided in more than three plots, on average. (Republic Statistical Office, 2012) In most cases, it is neither possible to organize an efficient and profitable production nor apply modern agronomic practices and new technologies on small holdings. The result of small holdings also reflects on the exportation of agricultural commodities" (Petković, Krasavac, Kovačević, 2016).

Through cooperatives, farmers can achieve numerous benefits: more favorable procurement of wholesale inputs, placement of products without intermediaries, construction of processing plants, purchase of modern machinery, obtaining government incentives and help, hiring experts, etc (Zakić, Nikolić, 2018).

"According to the data of the Cooperative Union of Serbia", since 2017, twice more new agricultural cooperatives have been formed in the central part of the Republic of Serbia in relation to the area of Vojvodina. Evidently, this is the result of the program adopted to improve the work of agricultural cooperatives by "the Government of the Republic of Serbia", where priority was given to the Nisava, Toplica, Jablanica and Pcinja districts (Zakic, Nikolic, 2018).

In EU MS, small, medium and large producers have a need for economic integration into cooperatives. In the most developed EU countries - between 50% and 98% of the turnover of all agricultural products is done through cooperatives - this is an indication that large producers are also part of the cooperative system.

Methods of research and sources of data

Based on the set goals, the analysis of the content of secondary data sources was used as the basic methods of research. Secondary data, information on the EU Agricultural

cooperatives were taken mostly from the official European Commission documents and relevant literature. The data on the state of the Serbian agrarian sector and cooperatives, as well as the current and potential problems that the RS faces on the basis of the literature on RS agricultural policy, strategic documents, Serbia's Progress Report on the Accession Process.

The paper analyzes the current state of legislation, and the Cooperatives Act, "the Law on companies, the Law on association, the Law on Agriculture and Rural Development" were mostly used in drafting the paper. Data from the Association of Agrarian Economists of Serbia and the study Association of Farmers in the Western Balkan countries, as well as data from the Republic Statistical Office, were used to analyze the position of agricultural cooperatives in Serbia.

Research results

Legal position of agricultural cooperatives in Serbia

The main sources of law for this issue are "the Law on Agriculture and Rural Development ("Official Gazette of the RS", No. 41/2009, 10/2013 - other law and 101/2016), the Law on Cooperatives, ("Official Gazette of RS", No. 112/2015), and the Law on Companies of RS ("Official Gazette of RS", No. 36/2011)".

We consider it necessary to point out certain terms which we will use in our work, for the sake of precision and correct understanding of terms.("Art. 2. The Law on Agriculture and Rural Development") Thus, agriculture is an economic activity that includes those activities that are classified by law as agriculture. "An agricultural holding is a production unit on which a business company, agricultural cooperative, institution or other legal entity, entrepreneur or farmer performs agricultural production. A family agricultural farm is an agricultural farm on which a natural person-farmer together with members of his household performs agricultural production. The holder of a family agricultural holding is a natural person, farmer and entrepreneur who performs agricultural production, and who is registered in the Register of Agricultural Holdings, as the holder of a family agricultural holding. A farmer is a holder or member of an agricultural holding who is exclusively engaged in agricultural production".

"Pursuant Article 3. the Law on Agriculture and Rural Development, Agricultural policy and rural development policy of the Republic of Serbia is implemented through the implementation of the Strategy of Agriculture and Rural Development of the Republic of Serbia, the National Program for Agriculture and the National Program for Rural Development, as well as the IPARD program. The register of agricultural holdings is kept, the contract on the use of incentives is prepared between the Management and the users of incentive funds, as well as decides on the right to incentives. (Art. 8a the Law on Agriculture and Rural Development)"

There are several types of incentives, (Articles 9-12, "the Law on Agriculture and Rural Development"):

1 / direct incentives, which include:

a / premiums

b / production incentives

c / regression

d / support to non-commercial agricultural holdings

2 / market incentives, such as:

a / export incentives

b / storage costs

c / credit support,

3 / structural incentives, where we mention:

a / rural development measures

b / improving the protection and quality of agricultural land

c / institutional support measures

In the following text, we will deal with agricultural cooperatives as a form of performing agricultural activities on agricultural farms. Agricultural cooperatives, as well as companies, and other legal entities, such as institutions, schools, monasteries, churches and other organizations, entrepreneurs and farmers engaged in agricultural production are entered in the Register of Agricultural Holdings, as users of agricultural land on the basis of:

- property rights,

- decisions on consolidation,

-leasing agreement

- transfer of agricultural land for use ("Art. 21. the Law on Agriculture and Rural Development").

With the day of registration, the cooperative acquires the status of a legal entity, unlike the branch, as a separate organizational part through which the cooperative can perform activities, and which cannot have that status. It may not be organized as a company, nor may it be merged or merged with another company or legal entity that is not a cooperative, nor may it change its form into a company or other legal entity. On the other hand, it can be the founder, ie a member of another legal entity, and in accordance with the law and cooperative rules. The cooperative has its own business name, headquarters (as the place from which the business of the cooperative is managed), as well as the

activity, which are all elements of its individualization. The predominant activity of the cooperative determines the type of cooperative. Agricultural or agricultural cooperatives can be established as general and specialized (when they deal with the organization of production of certain products, their processing and marketing). Otherwise, they take over and buy, process and sell agricultural, food and other products of cooperatives and cooperatives, supply cooperatives with reproductive material, energy, means of production, parts for agricultural machinery and other goods, trade goods and services of cooperatives, cooperatives, and for cooperatives and provide services to farmers' households in organizing and developing rural tourism and perform all other tasks of interest to the cooperative's business (Art. 11. Item. 1 and 2. Law on cooperatives).

Foundation of a cooperative (Articles 14-22, Law on cooperatives) implies:

1 / Convening of the founding assembly

The cooperative can be founded by at least five able-bodied domestic or foreign natural persons, deposits or membership fees, in accordance with the founding agreement and cooperative rules, by convening the founding assembly by the representatives of the founders.The contributions of the co-operative members form the basic capital of the co-operative, and can be monetary or non-monetary (when they are expressed in monetary equivalent). The minimum share capital of the cooperative is 100 dinars, and the rules of the cooperative determine the minimum individual contribution. A co-operative member may have only one stake in the co-operative, and the stakes need not be equal. Deposits cannot be transferred by legal transaction. When a cooperative is established by the membership fee of the cooperative member, the amount of the membership fee is determined by the cooperative rules in the same amount for all founders, as well as cooperative members who later join the cooperative, and after the establishment.The founding assembly implies a quorum of at least five founders, and decisions are made by a majority vote of those present, provided that a minimum of five votes of the founders is required for valid decision-making. The founders are obliged to pay the contributions, ie membership fees, within 30 days from the day of the founding assembly.

2 / Concluding a memorandum of association, implies that it be made in writing, where the signatures of the founders must be certified (ie, a special written legal form). The memorandum of association contains provisions on the business name, registered office, predominant activity of the cooperative, designation of the cooperative member, and designation of the first director, ie the person who will represent the cooperative as acting director, information on whether the cooperative operates membership fees or contributions. payment of the monetary contribution of each founder, description of the type, value, manner and time of entering the non-monetary contribution of each founder, amount, time and manner of payment of membership fees for founders of cooperatives established and operating without deposits, manner of providing funds to cover importance for the establishment of a cooperative.

3 / Adoption of cooperative rules, which are a general act of the cooperative which, above all, regulates the management and operations of the cooperative, the internal organization of the cooperative, as well as other issues in accordance with the law (thus, the rights and obligations of cooperatives capital, manner and conditions of increase or decrease of the share capital of the cooperative, formation of the management and supervisory board, distribution of profits and loss coverage, status changes and termination of the cooperative, manner of determining and paying contributions to cooperative members in case of termination of cooperative status

4 / Selection of bodies. The cooperative is managed by the cooperative members, and they have the same right to vote, according to the principle of "one cooperative member, one vote" in the assembly of the cooperative. The bodies of the cooperative are: the assembly, the board of directors, the supervisory board and the director. The provisions of the law governing the position of companies shall apply accordingly to the responsibility of the members of the cooperative's bodies, in the part which regulates special duties towards the company, unless otherwise provided by law. The specificity is that the president of the assembly, president and members of the board of directors, supervisory board and director are elected for a period determined by the cooperative rules, which cannot be longer than five years, with the possibility of re-election. If the cooperative has less than twenty members, it can be envisaged that the assembly of the cooperative performs the function of the management and supervisory board of the cooperative. (Art. 34 Law on Cooperatives). The quorum for the Assembly, Management and Supervisory Board is more than half of the total number of members, and decisions are made by a majority vote of the total number of members present, except in cases referred to in Article 36. Law on cooperatives, which stipulates that the competent body of the cooperative decides on status changes, sale of immovable property, adoption of amendments to the founding act and cooperative rules by a majority vote of the total number of cooperative members, while a two-thirds majority of the total number of cooperative members decides on initiating liquidation proceedings.

Jurisdiction of Assembly, Board of directors and Supervisory Board

The assembly of the cooperative has competencies (art. 31.Law on cooperatives) which we could classify in:

a) Status-legal and election, which includes the adoption and amendment of the founding act, cooperative rules, as well as the rules of procedure, deciding on changes in the elements of individualization, as well as the type of cooperative or branch closure, status changes and termination of the cooperative company and other legal entity, election and removal of the president and members of the board of directors, and the president and members of the supervisory board, election and dismissal of the director of the cooperative, appointment and dismissal of the liquidator

b) Mostly business, where we can classify the establishment of business policy of the cooperative, the adoption of development programs, financial plan and work plans, adoption of business reports, investment decisions and decisions on the disposal of assets

c) Mostly financial, in terms of decisions to increase and decrease the share capital of the cooperative, education or closing of funds for various purposes, adoption of annual accounts and business reports and financial statements, deciding on profit distribution and loss coverage, investment decisions, decides on cooperative audits and the selection of the audit association, as well as considers their final report and the actions taken to eliminate any irregularities

Assembly sessions can be regular (held once a year, before the deadline for submission of regular annual financial reports) and extraordinary (held as needed or when determined by cooperative rules) (Article 38 of the Law). If the cooperative has more than 100 cooperative members, the cooperative rules may determine the manner of their representation in the assembly, provided that the representatives cannot decide on the status changes of the cooperative, termination of the cooperative and disposal of its property (Article 39 of the Law).

The Board of Directors consists of at least three members who are elected from among the members of the cooperative, at the assembly of the cooperative (Article 40 of the Law on cooperatives). The competencies of the board of directors (Article 37 of the Law on cooperatives) have the character of:

a) competencies of the executive body (proposes and implements the business policy of the cooperative, work plan, financial plan and development program, considers and proposes business reports, as well as adoption of financial reports, prepares draft decisions for the cooperative assembly and executes its decisions, proposing profit distribution and way of covering losses, proposes to the assembly the election and dismissal of the director, proposes the adoption of investment decisions, as well as decisions on the disposal of assets

b) Decision-making bodies (adoption of rules of procedure and performance of other tasks determined by law, the founding agreement and cooperative rules.

The members of the board of directors are required to perform their functions conscientiously, honestly and responsibly towards the cooperative with the attention of a good businessman and in accordance with the interests of the cooperative and the cooperative members. If cooperatives cause damage, they are responsible for it. (Art. 42 the law on cooperatives) The Supervisory Board consists of at least three members, who are elected from among the members of the cooperative. Its competence includes:

a) Supervision over the work of the Board of Directors and the Director

b) Review of financial and other reports, as well as business reports, and inform the Assembly about it

c) Controls the compliance of the cooperative's operations with the law and the cooperative rules

d) adopts the rules of procedure for its work,

e) Performs other tasks, in accordance with the law and cooperative rules. (Art. 44 the law on cooperatives)

The director of the cooperative organizes and manages the business of the cooperative, represents the cooperative, takes care of the legality and is responsible for the legality of the work of the cooperative, prepares the work plan, development program of the cooperative, as well as the business report, financial reports. Other activities determined by law, founding act and cooperative rules. (Art. 48 the Law on Cooperatives)

The current situation in the cooperative is not such that we can be proud of it. While in many European countries cooperatives supply the market with their products in more than dominant percent, in Serbia the situation is almost the opposite, and cooperatives in Serbia contribute with only 1.5% of gross value added of agricultural production. The state's lack of interest in this area is clearly reflected in the lack of precise statistical data on the shares of cooperatives in certain areas of agricultural production. Also, other forms in which association can be implemented have not been sufficiently used. There are numerous obstacles to this, some of which relate to the poor legal framework and others to the lack of information of farmers, and the lack of ambition to find alternatives to traditional forms of association when they fail.

Legal status of agricultural cooperatives in the EU

"The EU is guided by its Common Agricultural Policy (CAP) and its guidance on producer organizations, the CAP gives each of the 27 member states of the EU a level of autonomy in how they individually define and support APCs and whether they incentivize or discourage cooperative participation. In the he EU, there is a huge variety of national laws on cooperatives, which correspond to at least six formally different models of legislation: - no cooperative law (e.g. Ireland); - cooperative regulation in a formally independent act (e.g. Austria, Germany); - cooperative regulation in the commercial code (e.g. Czech Republic, Slovakia); - cooperative regulation in the company law (e.g. Luxembourg) or in the companies code (e.g. Belgium); - cooperative regulation in the civil code (e.g. Italy, the Netherlands); - cooperative regulation in the code of cooperatives (e.g. Portugal). A few countries, such as Japan, even have separate cooperative laws for each sector. The United States, on the other hand, do not have a specific federal law on the establishment of cooperatives, but federal law does apply to cooperatives' tax exemptions. With each of the 50 states having its own statutes on cooperatives, these add up to approximately 85 in total. In many countries, cooperatives can have a legal status either as a cooperative society with limited or unlimited liability, as an economic interest grouping or as a joint-stock company. There are also diverging national requirements regarding members and capital stock. A minimum number of members are not always required by law. Some countries have no mandatory provisions in this regard (e.g. Bulgaria, Denmark, Luxembourg), while others require the presence of at least three members (e.g. Germany, Sweden, USA), and yet others require even more. For instance, Poland requires 10 natural persons or three legal entities to set up and run an agricultural cooperative, while Japan requires a minimum of 15 members (European Parliamentary Research Service, 2019)".

In each of the EU member states, agricultural cooperatives have a different form and type, while their basic principles of organization and functioning are regulated by a directive of the European Council. There are three different levels of organization of agricultural cooperatives in the Union. The first level is first-class cooperatives as a simple form of association. The second levels are second-class cooperatives that collect or process agricultural products. The tertiary level consists of national and regional cooperatives and represents strong financial, commercial and industrial groups (basic focus - product processing and marketing).

At the level of the European Union, the countries with the largest network of cooperatives are: Italy, Greece, Germany, Spain, and France. But the greatest economic power lies in agricultural cooperatives in the following countries: France, Germany, Denmark, and the Netherlands. In Greece, Spain, Italy, the number of cooperatives is large, but despite this, their power is smaller.

It is also necessary to emphasize the horizontal and vertical organization of cooperatives and cooperative associations in the form of cooperative agricultural and food chains. Economic agents from each branch of the chain from the primary to the tertiary level perform horizontal cooperation. Individual farmers and associations create vertical cooperation.

In the EU market, agricultural cooperatives account for a large share, with differences from country to country and from product to product. (Borst, 2017).

European Cooperative

The basic principles of cooperatives in the countries of the European Union are (Jurić, 2006):

- voluntary and open membership,
- democratic governance of members,
- members are owners - they control the cooperative and its assets,
- autonomous and independent organization
- providing education and training for members,
- cooperatives cooperate with each other,
- cooperatives care about their community.

"According to Council Regulation (EC) no. 1435/2003 of 22 July 2003 on the Statute for a European Cooperative Society, a cooperative is an independent association of persons who unite on a voluntary basis to meet their common economic, social and cultural needs through joint ownership and democratic control of the enterprise". Cooperatives differ in many elements from profit-oriented companies. It differs in the way decisions are made because the principle of "one member vote" is applied or the number of votes of an individual member is limited, the shares of individual members in the share capital are equal, the return on profit is limited and proportional to which

gives the advantage of the cooperative as a flexible legal form for performing economic activity on the market (Jurić, 2006).

A member of a European cooperative is liable for the obligations of the cooperative up to the amount of the paid business share, unless otherwise provided by the statute. The basic precondition for the establishment of a European cooperative is that the founders have their permanent residence, i.e. that they have nationality in at least two different EU member states. In the case of a legal person, it is established under the law of a Member State and has its registered office and central administration located in the EU. The rules on the European Cooperative Society have been in force since the summer of 2006. The aim of these regulations is to establish a single legal position for cooperatives in the EU internal market for economic activities where the emphasis is not on profit but on promoting the common interest of cooperative members and the community. Therefore, cooperatives are particularly suitable for small and medium enterprises. Cooperatives are defined as open voluntary associations of persons united to meet common economic, social and cultural goals. They achieve their goals through joint ownership and a democratically controlled enterprise. Cooperatives are companies that serve the needs of their members who contribute to their capital. Every country in Europe has its own strategy for economic growth and development through cooperative policy.

A European cooperative is registered within the European Union in the same Member State as its management headquarters. The basic goal is to meet the needs of its members and / or the development of their economic and social activities by concluding an agreement on the supply of goods and services or the execution of works performed or commissioned by the European Cooperative Society. A European cooperative may be set up by: "five or more natural persons residing in at least two Member States; five or more natural and legal persons residing or having their registered office in at least two Member States; legal persons established in at least two Member States". A European cooperative may also be established by merging cooperatives from at least two Member States; by transforming the cooperative if it has had a subsidiary or branch in another Member State for at least two years. The share capital divided into shares of members is at least € 30,000 denominated in local currency. It is variable and its change does not require a change in the statute.

Beside the Assembly, the bodies of the European Cooperative Society are the Supervisory Board and the Management Board or only the Supervisory Board. The founders of the European Cooperative Society adopt the statute. The statute shall at least include: the name before or after which the abbreviation "European Cooperative" must appear; goal and activity of the cooperative; name of natural persons and name of legal entities of the founder of the cooperative; cooperative headquarters; conditions and procedure for admission to membership; rights and obligations of members; nominal value of shares, amount of subscribed capital; special provisions.

It can be concluded that cooperatives are defined as open voluntary associations of persons united to meet common economic, social and cultural goals. They achieve their

goals through joint ownership and a democratically controlled enterprise. Cooperatives are companies that serve the needs of their members who contribute to their capital. Cooperatives have a great influence on the contribution to the development of the European economy. Every country in Europe has its own strategy for economic growth and development through cooperative policy (Jurić, 2006).

Cooperatives have proved particularly effective in times of crisis, especially with their contribution to economic and financial stability and job retention and job creation. Cooperatives contribute to improving the European transport and energy system and in particular to improving communication infrastructure and services in isolated areas. There is an increase in small and medium-sized cooperatives in all service and manufacturing sectors. They are a local alternative to global trade. Many cooperatives have provided women with the opportunity to become entrepreneurs and have access to decent work: they have improved access to credit, products and market information, technology, and training in the areas of cooperative management and development. Cooperatives direct a significant part of their resources to the education and training of their employees. Cooperatives provide sustainable jobs to disadvantaged workers, such as people with disabilities, the long-term unemployed and the socially marginalized. Cooperatives participate in Erasmus for Young Entrepreneurs (international exchange). There are cooperative universities that have the support of cooperatives, but globally - the education system ignores cooperatives. It can be concluded that cooperatives contribute to the EU 2020 strategy through various business activities. The goals, knowledge and experience of cooperatives and cooperative members should perfectly overlap with many EU 2020 goals.

COPA - COGECA

COPA- Committee of Professional Agricultural Organizations consists of over 60 organizations, of which 27 organizations are from EU member states, and 36 partner organizations are from other European countries such as Iceland, Norway, Switzerland and Turkey. The basic competencies are:

- consideration of all issues related to the development of the Common Agricultural Policy;
- representing the interests of the agricultural sector as a whole;
- seeking solutions that are of common interest;
- Maintaining and developing relations with EU bodies and any other representative organizations or social partners established at European and world level.

The activities are organized in 50 working groups, which deal with specific issues related to agricultural production (cereals, beef) or general issues (environment, rural development). Most of these working groups are made up of members from both organizations, but COPA and COGECA also have independent working branches. The working structures of COPA-COGECA determine three basic ideas:

- enabling representatives of the European Union from different agricultural production sectors and areas to discuss issues related to a particular sector or area;
- coordination of work in the overall context of agriculture, agricultural policy and policy in general;
- Joint representation of all sectors and areas.

COGECA, a member of the International Alliance of Cooperatives, has 35 full members from EU member states, four associate members and 36 partner organizations, which include representatives of countries such as Switzerland, Norway, Iceland and Turkey. COGECA is also a member of the Cooperative of Europe, ie the International Alliance of Cooperatives (ICA), and the current president of this COGECA is the Swede Thomas Magnusson. The most important COGECA goals:

- Representing and defending the general and specific interests of European agricultural, forestry and fisheries cooperatives and contributing to the development of cooperatives in general;
- Influencing decisions related to the activities of agricultural cooperatives by lobbying EU public institutions and other organizations at EU and international level;
- promotion of the role of agricultural, forestry, fishing and agricultural cooperatives;
- providing a platform for EU member organizations and cooperatives to hold policy discussions and exchanges on policy issues and add value to agricultural products and businesses;
- seeking and promoting solutions to important issues of general interest;
- Facilitating and coordinating links between its members and its members' offices in Brussels, as well as providing cooperative networking services;
- Promoting discussion and exchange of views with COPA and other representatives of organizations at the level of the European Union and at the international level;
- Conducting legal, economic, financial, social and other analyzes and studies of interest to agriculture, forestry, fisheries and agri-food cooperatives.

Due to all the above, it is clear that COPA and COGECA are very important organizations of farmers, who are fighting for the realization of their interests in the European Union and abroad. To this end, the two organizations work closely with the European Commissariat for Agriculture and Rural Development and discuss all key issues related to the Common Agricultural Policy (CAP), food production, agricultural market, rural development and environmental protection.

Recommendations for improving the position of agricultural organizations in the EU accession process

"The Serbian agriculture sector in the past decades, after all the negative challenges that it faced in the past, experienced a serious economic downturn and economic crisis. Recovery of Serbian agriculture and rural development, economic growth and competitiveness of agricultural products, improvement of standards and preservation of the environment, are possible only with the integration and implementation of CPU regulations. In recent years, Serbia has embarked on systemic and structural reforms of the agrarian sector "(Maksimovic Sekulic, Živadinović, Dimitrijevic, 2018).

Cooperatives are the second largest form of association of farmers. They are established to represent the interests of their founders, to provide advisory services (taxes, legal issues), cooperation with donors, other associations and institutions. According to the Association of Farmers data in the Western Balkan countries, there are 724 farmers' associations in Serbia, of which, however, as many as 409 are inactive. More than 80% of these associations were formed in the period from 2000, so some of them can be seen as an escape of farmers from the legal uncertainty that exists in the cooperative sector. Associations, unlike cooperatives, are usually specialized, and beekeepers' associations are the most organized.

In large part, agricultural producers in the Republic of Serbia, uncompetitive to agricultural producers in the EU, and that agricultural holdings are largely fragmented and not strong enough to withstand competition in the market, it is necessary to focus the current unorganized agricultural production on association and joint planning in ordet to increase the volume and quality of yield that would be easier to place on the market through organized associations, cooperatives. Accordingly, it is necessary to inform about the possibilities of cooperative organization, to raise awareness about the need and importance of association, to encourage personal initiatives among producers.

In the EU accession process, it is necessary to harmonize domestic regulations, but also to constantly monitor and listen to the needs of agricultural producers in order to improve them, which can be improved by joining and the need to separate a certain percentage of profits, to finance joint activities, which have been transferred to the cooperative, as their service for easier market access and production improvement. It is also necessary to provide measures to raise awareness of the need to cooperate with the scientific community in order to improve production and increase innovation and thus product value, which is more easily achieved through the cooperative, so that the needs are properly transferred and included in the development of strategic documents related to agricultural production and development, as well as protected from the shocks that market liberalization may cause. This protection is achieved by harmonizing monitoring and planning and thus by timely anticipating the challenges that may arise.

State incentives for development projects are crucial in improving competitiveness. (Employment incentives, tax breaks; improving the knowledge of cooperatives and

management in cooperatives…etc). In that way, the state would have an active role in solving the huge problems in which the agriculture of Serbia finds itself, which is also the economic branch with the largest net exports. If all or at least part of the potential that Serbian agriculture has was realized, this export balance could be further improved in a short time. This could have an even greater impact on strengthening the food industry, as well as attracting investors in this area, and the state must and should take all necessary steps in this direction.

After the accession of the Republic of Serbia to the European Union, as well as other EU MS, there will be two models of cooperatives, according to "the law of the Republic of Serbia and at the level of the European Economic Area cooperatives established under the Regulation". Over time, the content differences between these two forms will gradually diminish. However, it is right to expect that cooperatives will preserve their identity as independent organizational forms and those they will contribute to the affirmation of cooperative law. The European Cooperative Society is also in a special property law system.

Conclusions

The large part of agricultural producers in the Republic of Serbia are uncompetitive to agricultural producers in the EU, and agricultural holdings are largely fragmented and not strong enough to withstand competition in the market, it is necessary the current unorganized agricultural production direct on association and joint planning in order to obtain the volume and quality of yield that would be easier to place on the market through organized associations-cooperatives. In order to achieve this, more active participation of state institutions and the non-governmental sector is needed in the coming period in order to support any serious initiative of associated agricultural producers. Association in cooperatives brings additional benefits for the population in rural areas because it does not require clear differentiation, ie conditionality that all members are engaged in the production of the same agricultural products or engaging in similar activities. The cooperative also enables the connection of production and supply chains, which are best reflected in the development of rural tourism, as a secondary activity in relation to primary agricultural production. The members of the cooperative can provide tourist services in the field of rural tourism, and they give additional value to these services by serving domestic agricultural products from the same environment, as well as products of domestic handicrafts. In the process of negotiations on EU membership, it is necessary to harmonize domestic regulations, but also to constantly monitor and listen to the needs of agricultural producers in order to improve them, which can be improved by joining and the need to set aside a certain percentage of profits to finance joint activities that were transferred to the cooperative, as their service for easier access to the market and improvement of production. It is also necessary to envisage measures to raise awareness of the need for cooperation with the scientific community in order to improve production and increase innovation, and thus the value of products, which is more easily achieved through the cooperative.

needs were appropriately communicated and included in the development of strategic documents related to agricultural production and development, as well as protected from the shocks that market liberalization may cause. This protection is achieved by harmonizing monitoring and planning and thus by timely anticipation of challenges that may arise.

In order to financially support the development of associations of agricultural producers, it is necessary for the Government and line ministries of agriculture, economy and finance to develop incentive financial mechanisms for association of agricultural producers (subsidies, soft loans, incentive tax policy, etc.), and in particular to provide individual agricultural producers with access to the funds of the Development Fund; · It is necessary to improve the work of advisory services of the Ministry of Agriculture and Environmental Protection on the issue of providing assistance to agricultural producers during the establishment and the first years of operation of cooperatives. The assistance of advisors should be reflected in providing information on the importance and possibilities of association of agricultural producers, regulations, sources of funding, as well as information on the work of state and local institutions relevant to the functioning of cooperatives.

In this way, the state would have an active role in solving the huge problems of Serbian agriculture, which is also the industry with the largest net exports. If all or at least part of the potential that Serbian agriculture has was realized, this export balance could be further improved in a short time. This could have an even greater impact on strengthening the food industry, as well as attracting investors in this area, and the state must and should take all necessary steps in this direction. Activities of state bodies in the process of rehabilitation of cooperatives in Serbia should be aimed at building a modernly organized cooperative, integral in business terms, autonomous and stimulating for the owners of agricultural farms who through cooperatives can realize their production, business and other interest. The activities of state bodies in this area should primarily relate to the regulation of the legislative framework, tax treatment and the availability of sources of funding for cooperatives in Serbia.

The acceptance of this Statute for a European Cooperative commits the member states to adopt measures to implement and incorporate into their national regulations some provisions of the Directive to the workers involved in the decision making process of SCE. The European Commission considers "that this is a good benefit for the national governments and investors to pile on initiatives to improve cooperative legislation and create a more favorable environment for their development. Republic of Serbia on its path towards the European Union is bound to meet these tasks if it wants to become part of unique agricultural markets and to improve its agricultural cooperatives and the approaches to the legal and organizational standards of the European Union, which is certainly an imperative".

Starting from the experiences of EU countries, the supporting measures for cooperatives development could include certain tax breaks and subsidies for cooperatives. From

the of particular importance is the amendment of legislation that would allow again establishment of savings and loan cooperatives, which are key factor in cooperative sector of EU countries. Finally, all measures to support the development of cooperatives in Serbia, both current and future, they must be accompanied by an appropriate cooperative control system, in order to avoid abuse of business in this legal form of enterprise.

Conflict of interests

The authors declare no conflict of interest.

References

1. Bellini, F., Dulskaia, I., Savastano, M., & D'Ascenzo, F. (2019). Business models innovation for sustainable urban mobility in small and medium-sized European cities. *Management & Marketing. Challenges for the Knowledge Society*, 14(3), 266-277. https://doi:10.2478/mmcks-2019-0019
2. Birchall, J. & Ketilson Lou, H. (2009). *Resilience of the Cooperative Business Model in Times of Crisis*. International Labour Organization
3. Borst, A. (2017). *Agricultural production cooperatives in the e.u.: explaining variation in cooperative development*, Sally McDonnell Barksdale Honors College The University of Mississippi.
4. Census of Agriculture 2012 (2012). Republic of Serbia: Republic Statistical Office, Retrieved from http://popispoljoprivrede.stat.rs/ (November 1, 2020).
5. Cogeca (2015). Development of Agricultural Cooperatives in the EU 2014, 5 February 2015, Brussels.
6. Cooperatives Europe (2016). *The power of cooperation – Cooperatives Europe key figures* 201. Brussels.
7. Council Regulation (EC) no. 1435/2003 of 22 July 2003 on the Statute for a European Cooperative Society.
8. Czachorska-Jones, B., Finkelstein, J.G., & Samsami, B. (2013). 'United States', in Fici et al. (eds.): *International Handbook of Cooperative Law*, 759-778.
9. Fici, A. (2012). *Cooperative identity and the law*, EURICSE Working Paper, No. 023.
10. Fici, A. (2017). *A European Statute for Social and Solidarity-Based Enterprise*, Policy Department for Citizens' Rights and Constitutional Affairs, European Parliament.
11. Fici, A., Cracogna, D., & Henrÿ, H. (2013). *International Handbook of Cooperative Law*, Berlin/Heidelberg, Springer.
12. Guide through Farmers' Cooperatives, (2012), Belgrade.
13. Henrÿ, H. (2012). *Guidelines for Cooperative Legislation*, third revised edition, ILO, Geneva.

14. ICA (International Cooperative Alliance) and EURICSE (2018). World Cooperative Monitor, Exploring the Cooperative Economy, Report.
15. Jakob, D., Huber, R., & Rauber, K. (2009). Nonprofit Law in Switzerland, *The Johns Hopkins Comparative Nonprofit Sector Project*, Working Paper No 47.
16. Jurić, D. (2006). *European cooperative society (SCE*), Law and taxes, 6.
17. Kurimoto, A. (2013) in: Fici et al. (eds.): *International Handbook of Cooperative Law*, 503-523.
18. Law on Agriculture and Rural Development ("Official Gazette of the RS", No. 41/2009, 10/2013 - other law and 101/2016).
19. Law on Cooperatives, ("Official Gazette of RS", No. 112/2015).
20. Law on Companies of RS ("Official Gazette of RS", No. 36/2011).
21. Liger, Q., Stefan, M., & Britton, J. (2016). *Social Economy, Policy Department for Economic and Scientific Policies*, European Parliament.
22. MacDonald, T., Wallace, G., & MacPherson, I. (2013). *Co-operative Enterprise Building a Better World*. Sarasota: Global Co-operative Development Group, Inc.
23. MacPherson, I. (1996). *Co-operative Principles*. International Co-operative Information Centre, ICA/UWCC.
24. Maksimović Sekulić, N., Živadinović, J., & Dimitrijević, Lj. (2018). Concerns about hamonization process of Serbian agricultural policy with EU standards. *Economics of Agriculture*, *65*(4), 1627-1639. https://doi.org/10.5937/ekoPolj1902617D
25. Mazzarol, T. Simmons, R., & Limnios, M. (2011). *A conceptual framework for research into co-operative enterprise*, Centre for Entrepreneurial Management and Innovation (CEMI), Discussion Paper 1102.
26. Measuring the Size and Scope of the Cooperative Economy: Results of the2014, Global Census on Co-operatives. (2014). United Nation's Secretariat, Department of Economic and Social Affairs, Division for Social Policy and Development. Retrieved from http://www.un.org/esa/socdev/documents/2014/coopsegm/grace.pdf (November 15, 2020)
27. Nikolić, M. (2009). *Evolution of cooperative legislation in Serbia,* Society of Agricultural Economists of Serbia, Belgrade.
28. Nikolić, M. (2014). *Implementation of cooperative values and principles and their influence on business of agricultural cooperatives in Serbia,* University of Belgrade, Faculty of Agriculture.
29. Nicolescu, A. F., & Drăgan, G. (2020). Integrating the non-EU immigrants into the EU labour market. An econometric analysis of some of the specific factors. *Management & Marketing. Challenges for the Knowledge Society*, 15(3), 364-380. https:// doi: 10.2478/mmcks-2020-0021.

30. Petković, G., Chroneos-Krasavac, B., & Kovačević, V. (2016). A critical review of legal framework as a factor of coops development: Case of Serbia. *Economic of agriculture*, *63*(1), 261-278. https://doi.org/10.5937/ekoPolj1601261P
31. Program of support for the implementation of measures for balanced regional development of the Republic of Serbia through the participation of the state in economic and financial incentives for cooperatives in 2018. Government of the Republic of Serbia.
32. Rulebook on cooperative audit of cooperative union. Ministry of Economy of the Republic of Serbia, Retrieved from http://www.privreda.gov.rs/test-2 (November 2, 2020).
33. Rixon, D. (2013). Are co-operative principles reflected in performance reporting? a case study of insurance co-operatives. *International journal of co-operative management*, *6*(2), 76-90.
34. Study on the implementation of the Regulation 1435/2003 on the Statute for European Cooperative Society (SCE), (2010) EURICSE (European Research Institute on Cooperative and Social Enterprises).
35. Thirion, E. (2017). *Statute for social and solidarity-based enterprises*, EPRS, European Parliament.
36. Widuto, A. (2017*). EU support for social entrepreneurs*, EPRS, European Parliament.
37. Zakić, V., & Nikolić, M. (2018). State financial support to cooperatives in Serbia. *School of business,*158 – 174.
38. Zakić, V., Nikolić, M., & Tasić, V. (2018). *The possibilities of improving the regulative and methodology of the cooperative audit in Serbia*, *Reviser*, 82/2018, 57-68.

POSSIBILITY OF APPLYING CONTEMPORARY ANALYTICAL METHODS IN AUDITING PROCUREMENTS OF AGRICULTURAL COMPANIES

Milan Mihajlović[1], Marko Špiler[2], Jelena Avakumović[3], Svetlana Tasić[4], Dejan Vukosavljević[5], Snežana Krstić[6]

**Corresponding author E-mail: milan.mih83@gmail.com*

ARTICLE INFO

Review Article

Received: *27 September 2020*

Accepted: *04 January 2021*

doi:10.5937/ekoPolj2101191M

UDC 303:657.631.8]:631.164.6

Keywords:

public procurement, performance audit, data mining, agricultural company

***JEL**: F14, P52*

ABSTRACT

Despite the significant results that State Audit Institution achieved in the domain of determining regularities of doing business and truthfulness of financial reports of budget users, performance audit was given significantly less attention, which points to the necessity of developing a methodology for this discipline, as well as a technique to apply it. This contribution represents an attempt to apply a technique of finding hidden knowledge-implicit knowledge (Data mining – DM) in the process of auditing public procurement procedures and illustrating the significance of developing a technique for assessing the purposefulness of using budget assets on an example of public procurements performed in an agricultural company.

1 Milan Mihajlović, Ph.D., Assistant Professor, Military Academy, University of Defence, Pavla Jurišića Šturma 33, Belgrade, Republic of Serbia, Phone: +381 64 30 21 951, E-mail: milan.mih83@gmail.com, ORCID ID (https://orcid.org/0000-0001-7949-2631)

2 Marko Špiler, Ph.D., Assistant Professor, Faculty of Management, Union – Nikola Tesla University, Njegoševa 1a, 21205 Sremski Karlovci, Serbia, Phone: +381 64 24 80 025, E-mail: mspiler@cmn.rs, ORCID ID (https://orcid.org/0000-0001-6319-2597)

3 Jelena Avakumović, Ph.D., Assistant Professor, Faculty of Management, Union – Nikola Tesla University, Njegoševa 1a, 21205 Sremski Karlovci, Serbia, Phone: +381 69 47 75 447, E-mail: jelena.avakumovic@famns.edu.rs ORCID ID (https://orcid.org/0000-0002-7856-8064)

4 Svetlana Tasić, Ph.D., Assistant Professor, Faculty of Management, Union – Nikola Tesla University, Njegoševa 1a, 21205 Sremski Karlovci, Serbia, Phone: +381 60 71 12 711, E-mail: cecatasic1@gmail.com, ORCID ID (https://orcid.org/0000-0003-3049-6396)

5 Dejan Vukosavljević, Ph.D., Assistant Professor, Faculty of Management, Union – Nikola Tesla University, Njegoševa 1a, 21205 Sremski Karlovci, Serbia, Phone: +381 63 203 300, E-mail: dejan.vukosavljevic@famns.edu.rs, ORCID ID (https://orcid.org/0000-0001-7475-2764)

6 Snežana Krstić, Ph.D., Associate Professor, Military Academy, University of Defence, Pavla Jurišića Šturma 33, 11000 Belgrade, Serbia, E-mail: snezanakrstic17@gmail.com ORCID ID (https://orcid.org/0000-0001-6666-6401)

Introduction

Performance audit is the way in which taxpayers, financiers, legislators, executive authority, regular citizens and media gain an ability to control public funds (Vidovič, & Milunović, 2017; Pavlović & Čelić 2020; Milojević et al., 2020) and see the effects of operations within different government activities. Such audit reports contain answers to questions, for example: "Could the money have been spent better?"

Performance audit is searching for an answer to two basic questions (Arens, Elder & Beasley, 2014): Was everything done in the right way (were the business politics decisions conducted correctly)? Was the right thing done (were the appropriate politics implemented in an adequate way)? From the practical experience of an auditor, irregularities and corruptive activities most often happen in the domain of public procurements, which deserves a more detailed analysis to be performed in this area by applying more contemporary methods.

Public procurement audit can be conducted as an individual task or as a part of a more complex audit. Within auditing public procurements, an auditor can decide to only revise a contract or review an entire public procurement procedure (Stanojević, Vidovič, 2014).

This paper represents possible public procurement auditing methods, which are as a rule, applied by state auditors when auditing public sector users. According to that, solutions that are established by the current Law on Public Procurements (LPP) will be taken into consideration, as well knowledge of several world auditing institutions on auditing public procurements.

Public procurements represent a procedure in which public sector subjects – contracting authorities perform procurement of goods, works and services. LPP ("Off. Herald of RS", No. 91/2019) defines public procurement as procurement of goods, services or works by the contracting authority, in the manner and under conditions defined by this Law. Certain principles apply for public procurements. One of the basic principles is ensuring competition among bidders. In rare cases LPP allows contracting authorities to enter into a contract directly with the contractor, without conducting an open public procurement procedure. Competition in public procurement signifies equal treatment of all bidders, fairness and honesty when applying the criteria, as well as consistent application of regulations regarding protection of competition. Contracting authorities must ensure lawful, economical and efficient use of public assets when conducting public procurements (Picard, & Rusli, 2018). Well and clearly defined public procurement system can greatly contribute to improvement of public services, reduction of business costs and prevention of inefficient use of public assets and thus indirectly improve competitiveness of the state (Stanojević, & Milunović, 2020; Vujić et al., 2020).

Public procurement process begins by identifying the needs and ends by concluding a contract or by expiration date of a public procurement object. If conducted by the current Law, public procurement procedure enhances business of the entire public

sector contracting authorities, considering that the main goal of LPP is to ensure economic use of public assets, taking into consideration the purpose and the object of public procurement. Well planned works, then procurement of goods and services, as well as correctly conducted public procurement procedures can contribute to significant savings for the contracting authority.

Each public procurement evaluated as medium or high level of risk, as well as high value public procurements are defined as projects. Roles and jurisdictions of all personnel included in the public procurement procedure (Engel, Fischer, & Galetovic, 2013) are clearly defined and agreed upon, so everyone knows their roles and what is to be expected of them. All phases in the public procurement process are clearly defined in written form (Farooq, & Shehata, 2018; Grbić & Jovanović 2020).

Main goal of good management in public procurements is achieving results that were planned within the decision on conducting the public procurement procedure. The contracting authority determines the object of public procurement, i.e. what is expected from the supplier, as well as a way of evaluating achieved results. Clearly defined contractual provisions enable the contracting authority, contractor and auditor to reveal and correctly define each deviation from the contract more easily. Good management practice with contracts includes ongoing cost control, because inadequate management can easily lead to overdrafts of contracted amounts, while good management can lead to savings.

When conducting public procurement, all contracting authorities are obliged to respect basic principles of public procurements defined in LPP, as well as good practice. Among the principles of public procurements are:

- Principle of Efficiency and Cost-Effectiveness
- Principle of Ensuring Competition
- Principle of Transparency in Public Procurement Procedure
- Principle of Equality of Bidders.

The aforementioned principles are the basis for good practice in conducting public procurements.

Auditing public procurements of agricultural companies owned by the state

The auditor (Milojević, Andžić, & Vladisavljević, 2018) questions the regularity of public procurement procedures in all defined phases. Thereby, more attention is paid to some phases depending on how materiality is defined and how it's decided to assess irregularity (Duin, i dr., 2017; Pešić, & Miljković, 2020). For example, the auditor can check in detail the application of criteria, evaluation of bids and choosing the most favorable bidder, without checking whether the contracting authority sent the notification on concluded public procurement contract (Vasić, 2015). The range and debt of research depend on audit goals and types of public procurement procedures

(Eilifsen, et al., 2014; Stanojević, & Vidovič, 2014). In public procurements where the Law is applied, auditing is more complex and demands more time related to public procurements exempt from the Law. The auditor must primarily separate investments (Mićović, & Miletić, 2019), procurement of goods or services that are, or aren't exempt from the law. In public procurements (Milojević, Obradović, & Nešić, 2018) that aren't exempt from the law (Kostić, 2020) the auditor must check the regularity of the procedure that the audit subject is obliged to conduct in accordance with the LPP.

The auditor initiates the public procurement audit procedure within audited subject (Milojević, & Mihajlović, 2019; Savić, & Milojević, 2019) by determining the existence of control, testing business effectiveness and based on risk assessment determines the approach that he will apply when conducting the auditing tasks.

In our article the emphasis is on analyzing public procurements from the aspect of attributive qualification of public procurements, as a basis for applying DM techniques and analyzing results with the purpose of illustrating one of the techniques and methods of performance audit (cost benefit, Monte Carlo, Delphi method, Discrete process method etc.), which is in our case DM.

Applying DATA MINING in analyzing public procurements

Researching data (data mining) includes the application of machine learning methods as a special area of Artificial Intelligence, and it relates to development of algorithms and techniques that enable computers to "learn", as well as other methods for finding samples in observed data. Data mining is also known as a process of Knowledge-Discovery in Databases (KDD) or Knowledge-Discovery and Data Mining (Bejju, 2016).

All data mining methods use learning based on induction. This is a process of defining general conceptual definitions by observing specific examples from which one learns inductively with the help of a teacher (Supervised learning), a type of learning performed based on classified examples, i.e. decisions made.

Induction or inductive learning is also sometimes called inductive logic, a process of making decisions in which the premises of an argument support the conclusion, but don't guarantee it. Inductive learning of concepts is a machine learning form whose goal is induction of description of concepts (category, class of objects), which are understandable to people dealing with a particular issue, i.e. those that correspond to concepts that a person would produce when considering the same entities (Milojević, et al., 2020).

Basic techniques of data mining are decision tree, association rules, closest point algorithm and genetic learning. Production rules, decision lists and decision trees are examples of understandable way of representing empirical knowledge.

Inductive learning methods are used in researching data because they give understandable results that can be directly interpreted. Prediction accuracy of these methods is also high and can be compared with the most successful methods of inductive learning.

It should be mentioned precisely here what a computer can learn. Learning is a complex process. We can defined four levels of learning: Facts – Facts are simply stating the truth, Concepts – Concepts are a set of objects, symbols or events grouped together because they share certain characteristics, Procedures – Procedures are a flow of actions in order to reach a goal, and Principles – Principles or rules of behavior represent the greatest level of learning. Those are general truths or laws that are the basis for other truths.

The aforementioned learning procedures can be conducted in two cases:

- Supervised learning and
- Unsupervised learning.

Supervised learning is a machine learning technique based on a data set that is called training data. Training data consists of input objects and desired outputs. The output function can have a continuous value (called regression) or it can predict the class of input objects (called classification). Basic goal of such learning is predicting the value of an output function for each valid input object after seeing a certain number of examples of such instances (with certain input and output values) (Zhenhua, Nobuhiko, & Jonathan, 2016).

Most often, supervised learning generates a global model that maps input objects to desired outputs. In some cases, furthermore, the map is implemented as a set of local models.

In an aim of solving supervised learning problems, there are certain steps (Agresti, 2002):

- Determining the example type for learning. Determining the type of data in our case are quantitative data on internal control in IT surroundings.
- Gathering a training set. Data on completeness, accuracy and promptness of data in IT processing.
- Determining input characteristics. Number of characteristics describing the object.
- Determining the corresponding learning algorithm. For example, neuron networks, decision trees, etc.
- Completed plan. Run the chosen learning algorithm on the collected training set. Parameters of the learning algorithm can be set by optimizing performances on a subset of the training set (validation set) or by cross-validation.

Unsupervised learning is different from supervised learning because it doesn't have a priority output. A set of input objects was gathered and unsupervised learning treats a set of input objects as a set of random variables.

In the following part of the paper we will try to sublimate the given premises on an example of applying multivariate discriminant analysis (Stanišić, & Stanojević, 2009).

Statistical technique defined as multivariate linear discriminant analysis is developed in the 1930's as a statistical category, that formally-quantitatively performs discrimination

among classes of biological and other phenomena and observations associated with them (Ismail et al., 2015). Soon these researches began application in other areas, especially economy. A series of papers were recorded in the domain of analyzing government bond quality rankings, determining credit potential of banks and their clients, classifying errors in the domain of accounting – business transactions, etc. In time this technique became a standard asset in economy, as well as accounting and auditing expertise. However, application of discriminant analysis in context of finding hidden (implicit) knowledge (data mining) has a special dimension because the analysis isn't reduced to applying the model but rather Supervised learning is performed on a sample of discriminant analysis model on several occasions so the solution would be more accurate.

Case study of applying DATA MINING in auditing agricultural company procurements

Let us assume that the following parameters were determined in the public procurement procedure:

Table 1. Model parameters

Modalities of public procurement defined Type of procedure	Number of participants in public procurement	Disclosed value for public procurement
Competitive dialogue	Small number of participants	Small
Competitive dialogue	Small number of participants	Small
Competitive dialogue	High number of participants	Medium
Competitive dialogue	High number of participants	Small
Restrictive procedure	Small number of participants	Medium
Restrictive procedure	Small number of participants	Small
Restrictive procedure	High number of participants	Large
Restrictive procedure	High number of participants	Medium
Open procedure	Small number of participants	Large
Open procedure	Small number of participants	Medium
Open procedure	High number of participants	Large
Open procedure	High number of participants	Large

Source: Authors' calculations

Thus formed table deserves a special comment. Primarily it was taken with the purpose of illustrating relations between: modalities of public procurement determined by the type of procedure, number of participants and disclosed available budget, i.e. value of public procurement. Illustrative sample is on twelve modalities of relations between these three variables.

Public procurement modalities determined by the participants vary for the needs of this research in the domain of performance audit on three levels: open procedure, restrictive procedure and competitive dialogue.

Number of participants in the public procurement procedure vary in two domains: small and high number of participants.

Size of available budget – value of public procurement is a target variable that contains certain relationship between public procurement modalities determined by the type of procedure and number of participant in the public procurement procedure. A research question arises, what is the relation-codependence between these three variables and what can be used to measure their connection. More precisely, how publicly disclosed budget for a specific public procurement defines-influences the number of participants, as well as their predestination for the offered value of the public procurement project.

Furthermore, one of the essential determinations is what DM technique is adequate for assessing interrelations between attributive-descriptive variables. We decided to use the discriminant correspondence analysis (DCA).

Discriminant correspondence analysis

Output is based on results of correspondence analysis but they are presented differently. Without getting into statistical explanation, we will clarify the results.

Matrix trace = 0.39583 – indicates the amount of information that can be modeled between Target variable (Budget) and other two variables (type of procedure and number of participants)

Table 2. Results of the analysis

Factor	Canonical correlation R	Square R	Explanation (between) variations		
			Characteristic values	Proportion (%)	Cumulative (%)
1	0.8539	0.7292	0.36458	92.11	92.11
2	0.2500	0.0625	0.03125	7.89	100.00
Tot.			**Tot.**	**0.39583**	100.00

Source: Authors' calculations

Characteristic values (λ) indicate how much potential factors depend on the size of the budget (Berkhin, 2006). In our case the first and the second one together are:

$$0.36458 + 0.03125 = 0.39583$$

Correlation relationship (square root R) is the relationship between variations of group affiliation (for example λ_1=0.36458) and total factor variances. For the first factor the value is η^2_1=0.7292, i.e. 72.92% of dispersion is explained.

Finally, canonical correlation is $\eta_1 = \sqrt{\eta^2_1} = \sqrt{0.7292} = 0.8539$.

Table that shows group medium for each factor

Table 3. Group medium for each factor

Characterization				Coord.		Contribution (%)		COS	
Values	**Weight**	**Sq. Dist.**	**Inertia**	**coord 1**	**coord 2**	**ctr 1**	**ctr 2**	**cos 1**	**cos 2**
Large	0.33333	0.56250	0.18750	0.73951	-0.12500	50.0	16.67	0.97(0.97)	0.03(1.00)
Small	0.33333	0.56250	0.18750	-0.7395	-0.12500	50.0	16.67	0.97(0.97)	0.03(1.00)
Medium	0.33333	0.06250	0.02083	0.00000	0.25000	0.00	66.67	0.00(0.00)	1.00(1.00)

Source: Authors' calculations

Without getting into detailed statistical explanation we will point to the fact that the size of the budget is of influence and in our case Large budget – open procedure mostly on determining selection modalities by the participants. On the other hand, there a paradoxal situation in competitive dialogue, with a negative relation in the same amount compared to open procedure, but with a contribution of 50% compared to 50%. While the contribution of restrictive procedure is significantly smaller 25% and grouped in the second factor.

Canonical structure

Canonical structure shows the coordinates and the influence of factors – descriptive values with the aim of determining the factors and their influence. Namely, it allows for an explanation of differences between modalities and target attribute (budget).

It is visible in the table that type of procedure offered by participants corresponds to the size of the budget and is of dominant significance, however the number of participants isn't significant for participation in public procurements. Regarding the number of participants, the number is even for small and large budget.

Table 4. Results of the analysis

Characterization of rows				coord.		Contributions (%)			COS
Values	**Weight**	**Sq. Dist.**	**Inertia**	coord 1	coord 2	ctr 1	ctr 2	cos 1	cos 2
Type of procedure = competitive dialogue	**0.16667**	**0.87500**	**0.14583**	-0.91856	-0.176	38.6	16.7	0.96(0.96)	0.04(1.00)
Type of procedure = restrictive procedure	**0.16667**	**0.12500**	**0.02083**	0.00000	0.353	0.0	66.7	0.00(0.00)	1.00(1.00)
Type of procedure = open procedure	**0.16667**	**0.87500**	**0.14583**	0.91856	-0.176	38.6	16.7	0.96(0.96)	0.04(1.00)
Number of participants in public procurement = small	**0.25000**	**0.16667**	**0.04167**	-0.40825	0.000	11.4	0.0	1.00(1.00)	0.00(1.00)
Number of participants in public procurement = high	**0.25000**	**0.16667**	**0.04167**	0.40825	0.000	11.4	0.0	1.00(1.00)	0.00(1.00)

Table 5. Canonical coefficients

Attributive value	Factor 1	Factor 2
Type of procedure = competitive dialogue	-0.7606388	-0.4999999
Type of procedure = restrictive procedure	0.0000000	1.0000001
Type of procedure = open procedure	0.7606388	-0.4999999
Number of participants in public procurement = small	-0.3380617	0.0000001
Number of participants in public procurement = high	0.3380617	0.0000001

Source: Authors' calculations

Canonical coefficients point to domination of size of public procurement, more precisely the frequency of participating in public procurements when it's about public procurements with an open procedure, but at the same time an analogous structure is formed, the number of participants is same in a competitive dialogue.

Conclusions

The example is extremely simplified and illustrative but it talks about possible predestinations of participants in public procurements. Who will offer a smaller amount or apply i.e. offer to do the business for smaller amounts, which may be unrealistic or vice versa offer to do business for unrealistically large amounts. In our case the grouping, regardless of the procedure type and number of participants, indicates that the public procurement procedure, when we talk about public procurement modalities determined by the number of participants variating from small, medium or high, has a distinctively negative correlation depending on the budget concentrated on the competitive dialogue, meaning a smaller number of offered public procurements in competitive dialogue, bigger number of applying participants. In case of public procurement offered in open procedure, a positive correlation occurs, generating a high number of bidders. For our simplified example, it's interesting that the negative and positive canonical structure of contributions is the same and amounts to + and - 0.91856, which points to a dominance of competitive dialogue and open procedure when conducting public procurement, while the other factor with smaller value determines and relates to public procurement modalities determined by participants as medium contribution value is 0.3555. The essence of the contribution is to point to a possibility of characteristic of number of participants on public procurement modalities, as well as a number of participants (low, high) is in accordance with budget resources. The example is extremely simplified but it clearly illustrates the possibility of applying this method, which clearly points to hidden information in many areas of spending budget assets where Data Mining is of inestimable importance.

Conflict of interests

The authors declare no conflict of interest.

References

1. Agresti A. (2002). *Categorical Data Analysis 2nd ed.,* Wiley, New York.
2. Arens, A.A., Elder, R.J., & Beasley, M.S. (2014). *Auditing and assurance services*. Global Edition.
3. Berkhin, P. (2006). *A survey of clustering data mining techniques. In Grouping multidimensional data*, 25–71. https://doi.org/10.1007/3-540-28349-8_2
4. Bejju A. (2016). Sales Analysis of E-Commerce Websites using Data Mining Techniques. *International Journal of Computer Applications, 133*(5), 36-40. https://doi.org/10.5120/ijca2016907812
5. Duin, D., Krstić, D., Nešić, B., & Kaluđerović, N. (2017). Revizija svrsishodnosti javnih nabavki budžetskih korisnika. *Oditor-časopis za menadžment, finansije i pravo*, *3*(3), 61-72. [*in English*: Duin, D., Krstić, D., Nešić, B., & Kaluđerović, N. (2017). Audit of the expediency of public procurement of budget users. *Oditor-Journal of Management, Finance and Law*, 3 (3), 61-72.]
6. Eilifsen, A., Messier, W.F., Glover, S.M., & Prawitt, D.F. (2014). *Auditing and assurance services (3rd international ed.)*. London: McGraw-Hill.
7. Engel, E., Fischer, R.D., & Galetovic, A. (2013). The basic public finance of public-private partnerships. *Journal of the European Economic Association, 11*(1), 83–111. https://doi.org/10.2307/23355049
8. Farooq, O., & Shehata, N. F. (2018). Does external auditing combat corruption? Evidence from private firms. *Managerial Auditing Journal, 33*(3), 267–287.
9. Grbić, M., & Jovanović, D. (2020). Comparative financial systems: Implications for economic growth. *Oditor-časopis za menadžment, finansije i pravo, 6*(1), 49-65. https://doi.org/10.5937/Oditor2001046G
10. Ismail M., Ibrahim M., Sanusi Z., & Cemal Nat N. (2015). Data Mining in Electronic Commerce: Benefits and Challenges. *International Journal of Communications, Network and System Sciences, 8*(12), 501-509. https://doi.org/10.4236/ijcns.2015.812045
11. Kostić, R. (2020). Revizija ostvarivanja ciljeva budžetskih programa. *Održivi razvoj, 2*(1), 41-52. https://doi.org/10.5937/OdrRaz2001041K[*in English*: Kostic, R. (2020). Audit of achieving the goals of budget programs. *Sustainable Development*, 2 (1), 41-52.].
12. Mićović, S., & Miletić, J. (2019). Poslovni subjekt kao osnova održivosti razvoja. *Održivi razvoj, 1*(1), 43-51. https://doi.org/10.5937/OdrRaz1901043M[*in English*: Mićović, S., & Miletić, J. (2019). Business entity as a basis for sustainable development. *Sustainable Development*, 1 (1), 43-51].
13. Milojević, I., Andžić, R., & Vladisavljević, V. (2018). Accounting aspects of auditing the budget system. *Economics of agriculture, 65*(1), 337-348. https://doi.org/10.5937/ekoPolj1801337M

14. Milojević, I.M., Obradović, B.V., & Nešić, B. (2018). Nabavka kao predmet revizije. *Vojno delo, 70*(2), 351-359. https://doi.org/10.5937/vojdelo1802351M [*in English*: Milojević, IM, Obradović, BV, & Nešić, B. (2018). Procurement as a subject of audit. *Military Work*, 70 (2), 351-359]
15. Milojević, I., & Mihajlović, M. (2019). Primena metoda ocene investicionih projekata u javnom sektoru. *Oditor, 5*(1), 19-31. https://doi.org/10.5937/Oditor1901019M [*in English*: Milojević, I., & Mihajlović, M. (2019). Application of methods for evaluating investment projects in the public sector. *Oditor*, 5 (1), 19-31]
16. Milojević, I., Mihajlović, M., Popović, M., & Pantić, N. (2020). Application of quantitative models in the organization of the financial function of agricultural enterprises. *Economics of agriculture, 67*(3), 747-762. https://doi.org/10.5937/ekoPolj2003747M
17. Milojević, I., Mihajlović, M., & Pantić, N. (2020). Collection and documentation of audit evidence. *Oditor-časopis za menadžment, finansije i pravo, 6*(2), 77-90. https://doi.org/10.5937/Oditor2002077M
18. Pavlović, N., & Čelić, I. (2020). The analysis of competitive strategies from the perspective of small and medium enterprises. *Hotel and Tourism Management*, *8*(1), 101-110. https://doi.org/10.5937/menhottur2001101P
19. Pešić, H., & Miljković, M. (2020). Održivost budžetskih načela i procedura. *Održivi razvoj, 2*(2), 15-29. https://doi.org/10.5937/OdrRaz2002015P[*in English*: Pešić, H., & Miljković, M. (2020). Sustainability of budget principles and procedures. *Sustainable Development*, 2 (2), 15-29.]
20. Picard, P.M., & Rusli, R.D. (2018). State-owned firms and private debt. *J. Public Econ. Theory, 20*(5), 672–702 https://doi.org/10.1111/jpet.12297
21. Savić, B., & Milojević, I. (2019). Izazovi i dometi revizije prihoda. *Vojno delo, 71*(7), 394-403. https://doi.org/10.5937/vojdelo1907394S [*in English*: Savić, B., & Milojević, I. (2019). Challenges and scope of revenue auditing. *Military Work*, 71 (7), 394-403.]
22. Stanišić, M., & Stanojević, Lj. (2009). *Revizija i primena kompjutera. Cicero print*, Čugura, Beograd. [*in English*: Stanisic, M., & Stanojevic, Lj. (2009). *Computer revision and application*. Cicero print, Čugura, Belgrade.]
23. Stanojević. Lj., & Vidovič, Z. (2014). *Revizija javnog sektora*. Poslovni Biro, Beograd. [*in English*: Stanojevic. Lj., & Vidovič, Z. (2014). *Public sector audit*. Business Bureau, Belgrade.]
24. Stanojević, S., & Milunović, M. (2020). Okončanje postupka državne revizije. *Akcionarstvo, 26*(1), 35-48. [*in English*: Stanojević, S., & Milunović, M. (2020). Completion of the state audit procedure. *Shareholding,* 26 (1), 35-48.]
25. Vasić Z. (2015). Poreska kontrola uslov funkcionisanja budžetskog sistema. *Akcionarstvo, 21*(1), 5-22. [*in English*: Vasić Z. (2015). Tax control is a condition for the functioning of the budget system. *Shareholding*, 21 (1), 5-22.]

26. Vidovič, Z., & Milunović, M. (2017). Revizija svrsishodnosti poslovanja. *Oditor, 3*(2), 37-53. [*in English*: Vidovič, Z., & Milunović, M. (2017). Business purpose audit. Auditor, 3 (2), 37-53]

27. Vujić, M., Sekulić, D., & Cvijanović, D. (2020). The importance of intangible elements in the assessment of service quality in hotels in Kolubara District . *Hotel and Tourism Management*, *8*(2), 43-52. https://doi.org/10.5937/menhottur2002043V

28. Zakon o javnim nabavkama ("Sl. glasnik RS", 91/2019). [*in English*: Law on Public Procurement ("Official Gazette of RS", 91/2019).]

29. Zhenhua, C., Nobuhiko, D., & Jonathan G.L. (2016). Data review of transportation infrastructure public-private partnership: a meta-analysis. *Transport Reviews, 36* (2), 228–250. https://doi.org/10.1080/01441647.2015.1076535

GOOGLE TRENDS AS PREDICTOR OF GRAIN PRICES

Raúl Gómez Martínez[1], Carmen Orden-Cruz[2], Camilo Prado Román[3]

**Corresponding author E-mail: raul.gomez.martinez@urjc.es*

ARTICLE INFO

Review Article

Received: *22 March 2020*

Accepted: *01 February 2021*

doi:10.5937/ekoPolj2101203G

UDC 332.05:336.01]:631.164.6

Keywords:

google trends, grains price, algorithmic trading system

JEL: *G17, Q14*

ABSTRACT

This paper examines the predictive power of Google trends on the grain's futures price movement. The aim was to validate if an algorithmic trading system designed was profitable and able of beating the market. In the research was used data from soybean futures and corn futures, both contracts are listed in the Chicago Mercantile Exchange. The results of the research show that its forecasting power is high when predicting soybean futures and corn futures prices. According to the findings, the formulation of such predictive analysis is a good option for individual traders, investors, and commercial firms.

Introduction

Uncertainties press the agriculture prices. Li and Lu (2012) identify several factors such as the rapid growth of some important emerging countries (China, India), speculative trading from financial markets, the climate change, variations in harvest and inventory levels of agricultural and the biofuel programs of the United States and the European Union

According to Valiente (2013), the formation of the price of physical commodities and futures contracts is a combination of idiosyncratic factors (such as product characteristics – quality, storability, etc.- and supply and demand factors –capital intensity, industry concentration, technological developments, etc.-) and exogenous factors (such as access to finance, public subsidies and interventions and the weather). In particular, the price of agricultural and soft commodities is more influenced by demand factors (i.e. income growth) and exogenous factors that can cause supply shocks (i.e. government policies or weather). Also, wide academic literature shows the impact of macroeconomic and

1 Raúl Gómez Martínez, Ph.D., Full Professor, Rey Juan Carlos University, Paseo de los Artilleros, 38, 28032 Madrid, Phone: +34 91 488 80 39, E-mail: raul.gomez.martinez@urjc.es, ORCID ID (https://orcid.org/0000-0002-6810-0628)

2 Carmen Orden-Cruz, Ph.D., Full Professor, Rey Juan Carlos University, Paseo de los Artilleros, 38, 28032 Madrid, Phone: +34 91 488 80 39, E-mail: carmen.delaorden@urjc.es, ORCID ID (http://orcid.org/0000-0002-1411-9286)

3 Camilo Prado Román, Ph.D., Full Professor, Rey Juan Carlos University, Paseo de los Artilleros, 38, 28032 Madrid, Phone: +34 91 488 80 39, E-mail: camilo.prado.roman@urjc.es

monetary factors on commodity prices (Anzuini et al., 2013; Frankel and Hardouvelis, 1985; Gilbert, 2010; Gordon and Rouwenhorst, 2006; Gubler and Hertweck, 2013; Hammoudeh et al., 2015).

But another question is crop forecasting. FAO (2019) points that it is based on various kind of data collected from different sources: meteorological data, agrometeorological (phenology, yield), soil (water holding capacity), remotely sensed, agricultural statistics. Crop forecasting is the art of predicting crop yields and production before the harvest takes place, typically a couple of months in advance. The crop yield prediction models have been studied by multiple authors such as Agarawal (2004) using weather details or Jame and Cutforth (1996) thorough correlation and regression analysis based in DSSAT or decision support system, between others.

Nowadays, crop simulation models (CSM) has converted a useful tool for economic agents related to agriculture harvest. It has been developed as functions of soil scenario, atmospheric condition and crop management practices trying to show how it works (Hoogenboom et al., 2004). The different crop yield forecasting methods can be found in Basso et al. (2013). Predicting the crop would help to take measures for selling and storage.

But would it possible to know if there is an expectation of a good or bad harvest using the big data? To answer this question, Google trends could be a useful tool. This service provides aggregated information on the volume of queries for different search terms and its evolution over time. So, multiple academic literature evidence that Google trends is a good predictor in Medicine (Carneiro and Mylonakis, 2009), Economy (Choi and Varian, 2012), Engineering (Rech, 2007), between others. In Finance, Preis, Moat and Stanley (2013) points that Google trends is be able to anticipate the stock market falls because in the precede period investors reflects their concerns about financial market. In this way, Gómez (2013) elaborated a "Risk Aversion Index" based on the stats of Google trends for certain economic and financial terms that relate to market growth. Through an econometric model, he shows that Google trends provide relevant information on the performance of financial markets and may generate investment signs that can be used to predict the performance of major European stock markets. According to this approach, we propose an algorithmic trading system that issues buy and sell orders by measuring the level of aversion to risk, if an increase in tolerance towards risk, this implies a bull market and an increase in aversion to risk, a bear market

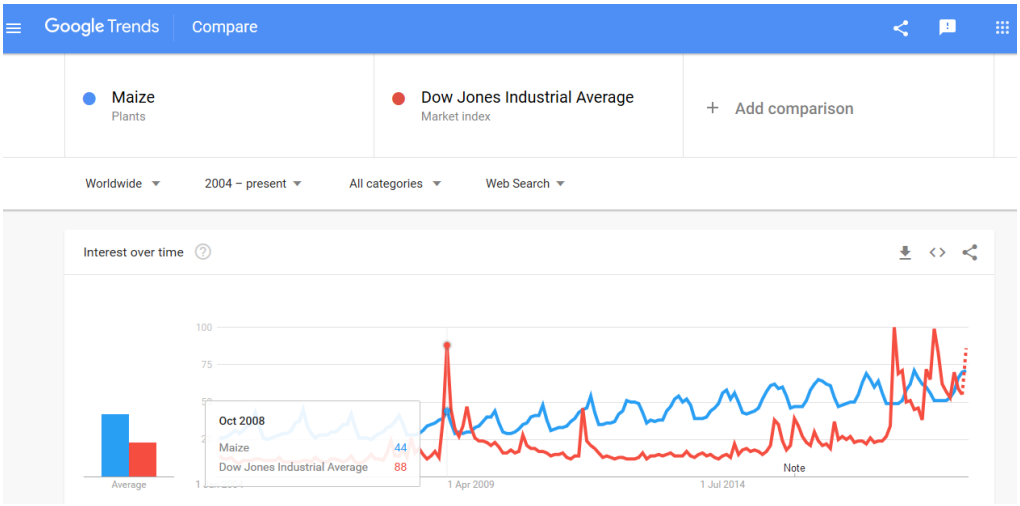
For grain commodities case, Google trends peaks are observed in moments of maximum tension on a topic. Figure 1 show the historical series of Google searches of the topics "Dow Jones" and "Maize". It is noted that the largest searches for Dow Jones occurred in October 2008, coincide with the bankruptcy of Lehman Brothers, so we can check that Google trends is a good thermometer to measure stock market uncertainty. For cereals, we see in Figure 1 that there is a pattern in the searches of the topic "Maize" with higher

number of searches after the summer and low number of searches during winter. Then, could it be said that the price of grain follows the evolution of the expectations patter draw by Google trends?

In this paper we will describe a trading algorithmic system that opens long and short positions according to the patter shown by Google trends. If a higher (lower) number of searches could be understood as a higher (lower) level of uncertainty, the trading system will open a short (long) position in the corn and soybean futures markets.

After this introduction, in section 2 hypothesis and methodology are presented, in section 3 results are showed, and the last section is the conclusion.

Figure 1. Google trends on maize futures and DJIA



Source: Google trends webpage

Hypothesis and methodology

The hypothesis to test is the following one:

> H0: Grains prices follows a seasonal pattern determined by the expectations observed in Google trends

The data used for the analysis was agricultural futures contracts. The underlying assets were soybean and corn because they are the ones with the highest trading volume in the Chicago Mercantile Exchange (CME, 2019), the most important agricultural derivatives market (CME, Jun 04, 2019). The period of the data was selected prices of futures on corn and futures on soybean from January 1, 2004 to August 31, 2019.

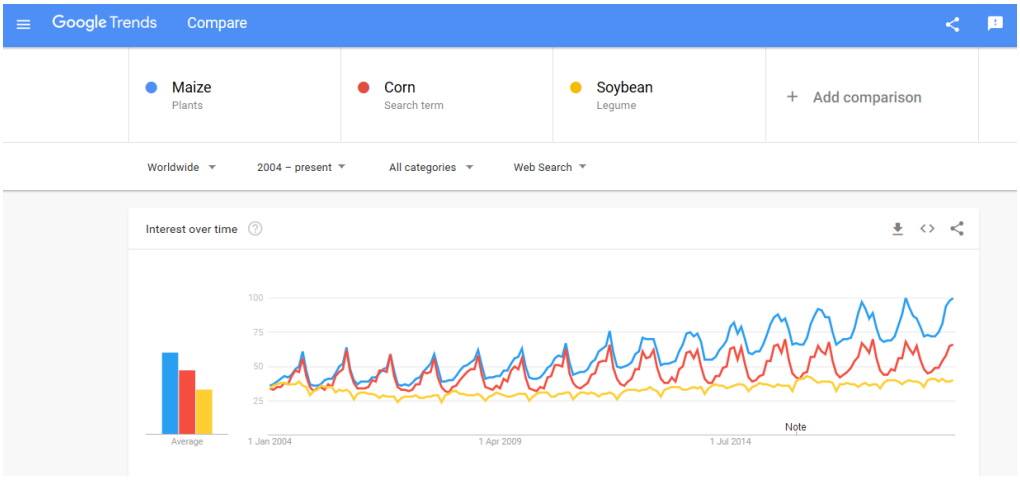
To validate the hypothesis H0, the algorithmic trading system was designed to open long and short positions according to the evolution of Google trends on the types of grain chosen. The trading system points out the short positions in the months that Google

searches increase and, therefore, it is interpreted that uncertainty about the price of grain increases. And long positions will be taken in the months in which searches decrease.

We will validate H0 if the algorithmic trading systems developed are profitable and records a good performance with profit factor (the sum up of winning amounts divided by the sum up of losing amounts) bigger than 1, winning sessions ratio bigger than 50% and a positive Sharpe ratio (Kaufman, 2016).

In Figure 2, we can check that the pattern draw by Google trends for uncertainty is similar for the topics "Maize", "corn" and "Soybean".

Figure 2. Google trends of maize, corn and soybean



Source: Google trends webpage

According to Figure 2, a strategy was defined going short position from January to September and long from position from October to December.

The H0 hypothesis would be validated if the algorithmic trading system designed was profitable and able of beating the market.

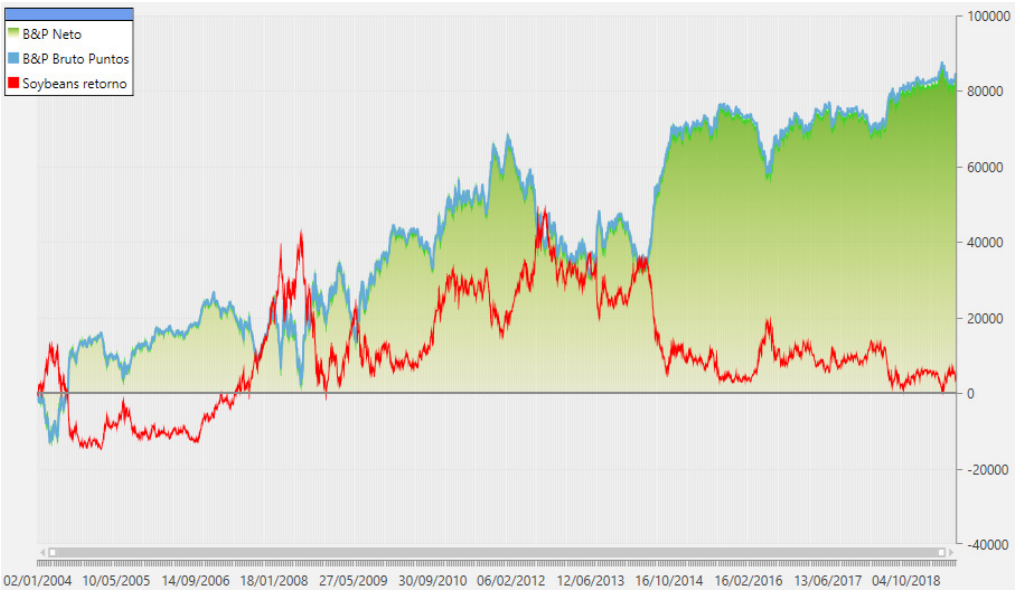
Considering that we observe the statistics of Google trends since January 2004 to August 2019 with monthly frequency, the backtesting was carried out from that same date and with that same frequency.

The simulation of the back testing was carried out with the Trading Motion SDK (IBroker Global, 2021) that obtains prices directly from the market by belonging to the iBroker Global Markets company.

Results

Figure 3 plots the profit and loses chart of the trading algorithmic system for soybean futures.

Figure 3. Profit and loses soybean futures algorithmic trading system



Source: Trading Motion SDK

We can check in Figure 3 that the algorithmic trading system is profitable for the studied period whereas soybean price is almost plane for the fifteen years period studied. The performance of this system is sum up in Table 1.

Net and Gross Profit and Loses are positive, as it was shown in Figure 3, but there is another statistic that points out the profitability of the system. We can check that "profit factor" is bigger than 1, so the systems should be profitable. Sharpe ratio is also positive, and the winning sessions ratio is over 50%.

Table 1. Performance of the strategy with soybean futures

Performance summary	
Net P&L	82.554,13 $
Gross P&L	84.012,50 $
Profit factor	1,07
Sharpe ratio	0,40
Slippage per side	-0,013130326
Commission per side	11,00 $
Mathematical expectation	2625,390625
Session analysis	
Analyzed sessions	3931
Sessions in market	3896
Winning sessions	1972

Winning sessions profit	1172729,45 $
Winning sessions average	594,69 $
Losing sessions	1924
Losing sessions profit	-1090175,31 $
Losing sessions average	-566,62 $
Worst drawdown	-37606,50 $ (11/06/2013)
Best session	7112,50 $ (22/07/2013)
Worst session	-3900,00 $ (18/08/2008)

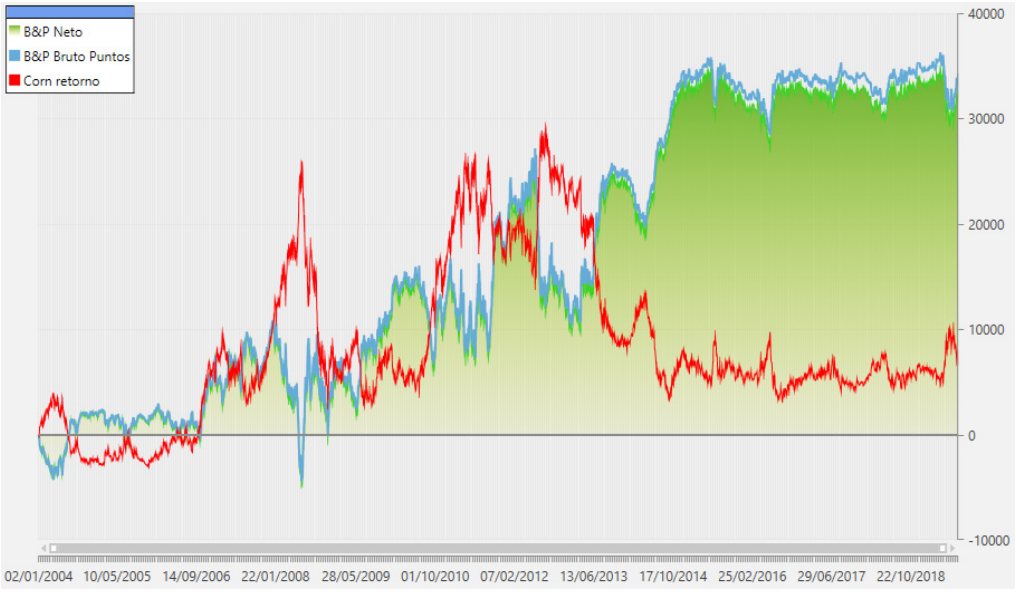
Source: Trading Motion SDK

Figure 4 plots the profit and loses chart of the trading algorithmic system for corn futures, the second underlaying asset to study in this paper. Again, the chart shows a profitable system (green area) that beats underlaying market price for the period studied form 2004 (red line).

The stats of the backtest of the algorithmic trading system for corn futures are like the stats of the algorithmic trading system for soybean futures. Again, Net and Gross profit are positive, with profit factor bigger than 1 and a winning sessions rate over 50%.

The main stats of the algorithmic trading system for soybean futures are presented in Table 2.

Figure 4. Profit and looses corn futures algorithmic trading system



Source: Trading Motion SDK

Table 2. Performance of the strategy with corn futures

Performance summary	
Net P&L	32876,68 $
Gross P&L	34287,50 $
Profit factor	1,06
Sharpe ratio	0,33
Slippage per side	-0,011261878
Commission per side	11,00 $
Mathematical expectation	1071,484375
Session analysis	
Analyzed sessions	3918
Sessions in market	3860
Winning sessions	1958
Winning sessions profit	575673,49 $
Winning sessions average	294,01 $
Losing sessions	1902
Losing sessions profit	-542796,81 $
Losing sessions average	-285,38 $
Worst drawdown	-16919,00 $ (31/01/2013)
Best session	3612,50 $ (17/06/2013)
Worst session	-2150,00 $ (18/08/2008)

Source: Trading Motion SDK

Conclusion

For many years, stock market analysis on any financial instrument was based on technical analysis or fundamental analysis. In the field of soft commodities, specifically for commodities in the agricultural sector, multiple investment strategies have been developed based on prices supports and resistances, or on several technical analysis indicators.

In contrast to this traditional approach, the development of behavioral finance is facilitating the appearance of new trading strategies, based on the investors' mood from different indicators extracted from the big data and social networks.

This article shows the development of two algorithmic trading systems that are not based on the traditional quantitative models of technical analysis. In this case, the investment decisions have been deducted from the interest that investments in soy and corn generate on the Internet.

Thus, we have observed that Google trends helps to identify patterns of uncertainty about an item, in this case the prices of the main agricultural commodities such as soybeans and corn, which allows us to anticipate price formation and obtain positive returns.

The main contribution of this article is to show how individual traders, investors and trading firms could anticipate market price movements using Google trends for their strategy. This is new evidence that Google trends is a good predictor, in this case, in the agricultural price forecast.

Conflict of interests

The authors declare no conflict of interest.

References

1. Agarawal, R. (2004). *Forecasting Techniques in Crops*. Indian Agricultural Statistics Research Institute, New Delhi.
2. Anzuini, A., Lombardi, M.J., Pagano, P. (2013). The impact of monetary policy shocks on commodity prices. *International Journal of Central Banking, 9*(3), 125–150.
3. Basso, B., Cammarano, D., & Carfagna, E. (2013). *Review of crop yield forecasting methods and early warning systems.* In Proceedings of the first meeting of the scientific advisory committee of the global strategy to improve agricultural and rural statistics, FAO Headquarters, Rome, Italy, 18-19.
4. Carneiro, H.A., & Mylonakis, E. (2009). Google Trends: a web-based tool for real-time surveillance of disease outbreaks. *Clinical infectious diseases, 49*(10), 1557-1564. https://doi.org/10.1086/630200
5. CME Group. (2021). Daily agricultural volume and open interest. Retrieved from https://www.cmegroup.com/market-data/volume-open-interest/agriculture-commodities-volume.html (January 15, 2020).
6. Choi, H., & Varian, H. (2012). Predicting the present with Google Trends. *Economic Record*, *88*, 2-9. https://doi.org/10.1111/j.1475-4932.2012.00809.x
7. CME (2019). CME Group Reaches Second-Highest Monthly Volume Ever, Averaging 23.9 Million Contracts Per Day in May 2019. News release. Retrieved from https://www.cmegroup.com/media-room/press-releases/2019/6/04 (January 10, 2020).
8. FAO (2019). Crop monitoring and forecasting. Retrieved from http://www.fao.org/nr/climpag/aw_3_en.asp (January 18, 2020).
9. Frankel, J.A., & Hardouvelis, G.A. (1985). Commodity prices, money surprises and fed credibility. *Journal of Money Credit Banking, 17*(4), 425–438.
10. Gilbert, C.L. (2010). How to understand high food prices. *Journal of Agricultular Economics, 61*(2), 398–425. https://doi.org/10.1111/j.1477-9552.2010.00248.x
11. Google Ireland Limited. (2020). Google trends: Descubre qué está buscando el mundo. Retrieved from https://trends.google.es/trends/?geo=ES (January 18, 2020).
12. Gordon, G., & Rouwenhorst, K.G. (2006). Facts and fantasies about commodity futures. *Financial Analysis Journal, 62*, 47–68.

13. Gubler, M., Hertweck, M.S., (2013). Commodity price shocks and the business cycle: structural evidence from the US. *Journal of International Money and Finance, 37*(C), 324–352 https://doi.org/10.1016/j.jimonfin.2013.06.012

14. Hammoudeh, S., Nguyen, D.K., & Sousa, R.M. (2015). US monetary policy and sectoral commodity prices. *Journal of International Money and Finance*, *57*(C), 61–85. https://doi.org/10.1016/j.jimonfin.2015.06.003

15. Hoogenboom, G., White, J. W., & Messina, C. D. (2004). From genome to crop: integration through simulation modeling. *Field Crops Research, 90*(1), 145-163. https://doi.org/10.1016/j.fcr.2004.07.014

16. IBroker Global Markets SV, SA. (2021). Trading motion: The marketplace for automated trading strategies. Retrieved from https://www.tradingmotion.com/ (January 18, 2020).

17. Jame, Y. W., & Cutforth, H. W. (1996). Crop growth models for decision support systems. *Canadian Journal of Plant Science, 76*(1), 9-19. https://doi.org/10.4141/cjps96-003

18. Kaufman, P. J. (2016). *A Guide to Creating A Successful Algorithmic Trading Strategy*. Wiley.

19. Li, Z., & Lu, X. (2012). Cross-correlations between agricultural commodity futures markets in the US and China. *Physica A: Statistical Mechanics and Its Applications, 391*(15), 3930–3941. https://doi.org/10.1016/j.physa.2012.02.029

20. Martínez, R.G. (2013). Señales de inversión basadas en un índice de aversión al riesgo. Investigaciones Europeas de Dirección y Economía de la Empresa, 19(3), 147-157. https://doi.org/10.1016/j.iedee.2012.12.001

21. Preis, T., Moat, H.S., & Stanley, H.E. (2013). *Quantifying trading behavior in financial markets using Google Trends*. Scientific Reports, 3.

22. Rech, J. (2007). Discovering trends in software engineering with Google Trends. *ACM SIGSOFT Software Engineering Notes, 32*(2), 1-2. https://doi.org/10.1145/1234741.1234765

23. Valiente, D. (2013). Price Formation Commodities Markets: Financialisation and Beyond. CEPS-ECMI Task Force Report. Centre for European Policy Studies. Retrieved from https://www.ceps.eu/ceps-publications/price-formation-commodities-markets-financialisation-and-beyond/ (January 18, 2020).

IDENTIFYING MEDIUM-SIZED AGRICULTURAL ENTERPRISES WITH THE GREATEST POTENTIAL FOR INNOVATION DEVELOPMENT

Sonja Đuričin[1], Isidora Beraha[2]

**Corresponding author E-mail: sonja.djuricin@ien.bg.ac.rs*

ARTICLE INFO

Review Article

Received: *09 April 2020*

Accepted: *26 November 2020*

doi:10.5937/ekoPolj2101213D

UDC 631.164.6:330.341.1

Keywords:

medium-sized agricultural enterprises, financial strength, bankruptcy, innovation

JEL: *Q12, Q16*

ABSTRACT

The aim of the research is to identify medium-sized agricultural enterprises with the greatest potential for innovation development. The subject of the research is the key financial performance of the observed enterprises in 2017. Data were obtained from official financial statements publicly available on the website of the Serbian Business Registers Agency (SBRA). The aim of the research was realized by applying financial analysis methods and the Altman Z-score model. The purpose of the research is to improve the efficiency of limited funds for financing innovative activities in the agricultural sector. The research results are data on enterprises with negligible probability of bankruptcy and which thus have the greatest potential for innovation development.

Introduction

Compared to the EU average, the Republic of Serbia has recorded a significant deviation in R&D investment (Đuričin, 2018). The average investment in R&D is 0.84% of GDP in the Republic of Serbia (SORS, 2017), and 2.03% of GDP in the European Union (Eurostat, 2018). Furthermore, the Republic of Serbia is characterized by a lack of efficiency of budget funds intended for financing innovation activities (Đuričin, 2018). Pursuant to the Law on Innovation Activity (″Official Gazette of RS″., No. 110/05, 18/10 and 55/13), the beneficiaries of the state incentive measures and budgetary funds for the development of the innovation activity can be only the subjects entered into the Innovation Activity Registry (the Registry). In the period 2007-2017, a large number of projects were co-financed by the budget funds, which were led by innovation organizations that were deleted from the Registry, i.e. which no longer exist

1 Sonja Đuričin, Ph.D., Research Associate, Institute of Economic Sciences, 12 Zmaj Jovina Street, Belgrade, Phone: +381 63 84 38 896, E-mail: sonja.djuricin@ien.bg.ac.rs, ORCID ID (https://orcid.org/0000-0002-8181-7332)

2 Isidora Beraha, Ph.D., Research Associate, Institute of Economic Sciences, 12 Zmaj Jovina Street, Belgrade, Phone: +381 64 14 55 955, E-mail: isidora.beraha@ien.bg.ac.rs, ORCID ID (https://orcid.org/0000-0002-0819-4909)

(Đuričin, 2018). Out of 125 organizations registered for innovation, 55 were deleted from the Registry (MESTD, LRIO, 2018). According to financial statements, publicly available on the Serbian Business Registers Agency's website, the structure of active innovation organizations comprises 52% of micro enterprises, 45% of small- and 3% of medium-sized enterprises. On the other hand, a small number of projects in the field of agriculture were financed from the funds of the Innovation Fund.

The aim of the research was determined by inefficient placement of budgetary funds and their presence in small percentage in medium-sized enterprises. The aim of the research is to identify medium-sized agricultural enterprises with the greatest potential for innovation development. This approach to research resulted from the large number of closed innovation organizations that had funded their projects from budgetary funds. Although they are not entered in the Registry and have no right to use budgetary funds to finance their innovative activities, it is of utmost importance to determine whether medium-sized agricultural enterprises have the potential to develop innovation at all. Medium-sized enterprises, as bearers of national economic growth, fulfil all the conditions to become bearers of innovation activities. The question is whether they have the financial potential to develop innovation, i.e. which of them are most eligible for innovative activities in terms of financial failure assessment.

In the total number of companies, medium-sized enterprises account for 2% and generate 16% of employment, 17% of revenues, 16% of expenditures and 16% of the total net profit of all companies in the country (Đuričin, Beraha, 2018a). In the agricultural sector, they account for 7% of the total number of medium-sized enterprises (Ibidem.). The research aims to identify in the total number of medium-sized agricultural enterprises those which have the greatest potential for innovation development. The purpose of the research is to improve the efficiency of placement of limited funds for financing innovative activities in the agricultural sector.

The subject of the research is the key financial performance of medium-sized agricultural enterprises in 2017. Data were obtained from official financial statements publicly available on the website of the Serbian Business Registers Agency (SBRA). The aim of the research was realized by applying the methods of financial analysis, Altman Z-score model, as well as the standard methods of data acquisition and analysis and synthesis methods.

Methods

The application of standard methods of data collection and analysis determined the number of projects in the field of agriculture, co-financed by the Ministry of Education, Science and Technological Development in the period 2007-2017. Furthermore, the organizations that led those projects were identified. Among them, there is a percentage of organizations who no longer do business (status: "deleted from the Registry"). The same method was used for identifying project leaders in the field of agriculture, where project implementation was co-financed with the funds of the Innovation Fund. The

leaders of these projects were also analysed from the aspect: "active" / "deleted from the Registry". Three programs were specifically observed within the Innovation Fund: Mini Grants Program, Collaborative Grant Scheme Program, and Matching Grants Program.

Based on the data from the financial statements, the probability of bankruptcy of medium-sized agricultural enterprises was assessed using the Altman Z score method (Altman, 1968; Đuričin, Bodroža, 2013; Đuričin, 2018). Assessment of bankruptcy probability of medium-sized agricultural enterprises enables identification of business entities operating in the white zone of business and as such having the greatest potential for innovation development.

The most used method in predicting the bankruptcy of the company was created as a result of Altman and other authors in the period from 1968 to 2002 (Rajin, Milenković & Radojević, 2016). Altman Z score method was used to assess the financial failure of medium-sized agricultural enterprises (Đuričin, 2018). In order to assess the probability of bankruptcy as accurately as possible, the data from the company's official financial statements for 2017 were used. Data for only one business year was used to reduce the risk of inaccurate assessment of bankruptcy. Bankruptcy assessments were made based on the Altman Z score model aimed at unlisted companies (Altman, 2000):

$$Z = 0.717\ x_1 + 0.847\ x_2 + 3.107\ x_3 + 0.420\ x_4 + 0.998\ x_5 \quad (1)$$

Each indicator is weighted by a specific coefficient. The coefficients are calculated as follows:

- X_1 – *Working capital / Total Assets*
- X_2 – *Retained Earnings / Total Assets*
- X_3 – *Earnings before interest and taxes / Total Assets; EBIT / Total Assets*
- X_4 – *Book value of equity / Book Value of Total Debt*
- X_5 – *Sales / Total Assets*.

According to the zone of discrimination, after calculating the value of Z score, the probability of bankruptcy was assessed. The discrimination zone in the model used is as follows:

- Black zone $Z < 1.23$,
- Grey zone $1.23 < Z > 2.90$, and
- White zone $Z > 2.90$.

The method of financial analysis was then applied in the research. The subject of financial analysis is the performance of medium-sized agricultural enterprises operating in the white zone. Applying the quantitative and qualitative analysis of each individual financial indicator in the Altman Z score model provided data on liquidity, indebtedness, productivity, reproductive capacity and ability to sell products and services (Đuričin et al., 2018).

The knowledge of the subject of the research was obtained using synthesis methods. The description of the acquired knowledge drew conclusions about medium-sized agricultural enterprises with the greatest potential for innovation development.

Results and Discussion

In the period 2007-2017, the MESTD financed a total of 398 projects, of which 37 were projects in the field of agriculture (9%). Projects in the field of agriculture were run by 20 innovation organizations. This means that one innovation organization ran two or more projects. Out of a total of 20 innovation organizations whose projects were funded by the MESTD, 4 were deleted from the Registry. These four organizations were in charge of five projects in the field of agriculture.

With regard to the Innovation Fund, projects analysed were in the field of food industry and agriculture and were co-financed under 3 programs: Mini Grants Program, Collaborative Grant Scheme Program, and Matching Grants Program.

A total of 61 projects were co-financed under the 2012-2018 Mini Grants Program. Out of the total number of co-financed projects, only 5 projects were from the food industry and agriculture. Projects in the field of food industry and agriculture were co-financed by 8% of the total amount of the Fund used for co-financing projects under the Mini Grants Program. Five projects in the field of food industry and agriculture were implemented by four companies. One company appeared as the Leader of two projects. All four companies that ran these projects belong to the group of micro enterprises and still operate as active business entities.

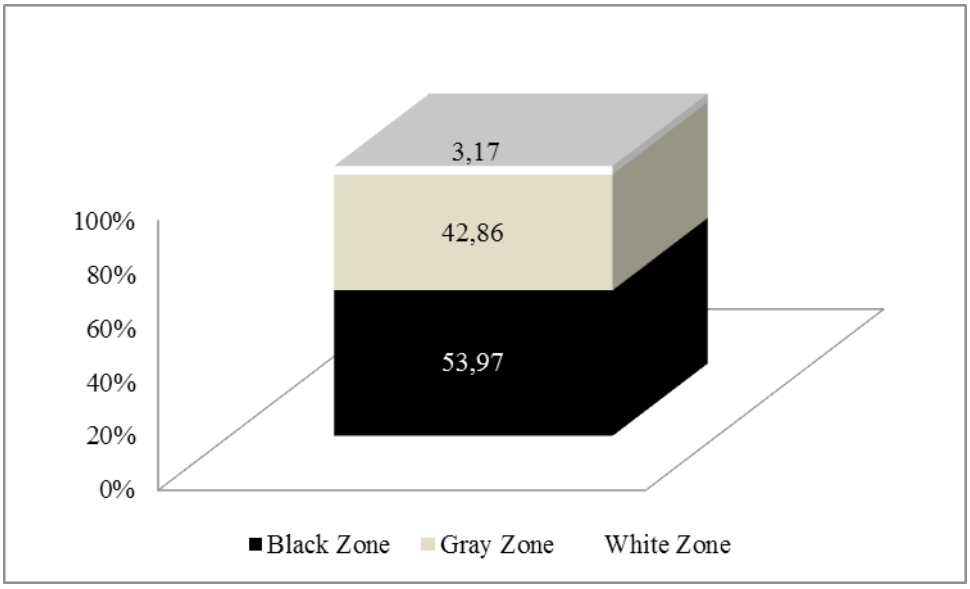
In the period 2017-2019, a total of 14 projects were co-financed under the Collaborative Grant Scheme Program, 4 of which were in the field of food and agriculture. All four projects were implemented by different institutions, i.e. two institutes and two faculties in the field of technological sciences. The institutes and faculties that ran these projects still operate as active legal entities. Projects in the field of food and agriculture were co-financed by 29% of the total amount used to co-finance projects under the Collaborative Grant Scheme Program.

In the period 2013-2018, a total of 17 projects were implemented under the Matching Grants Program. Out of the total number of co-financed projects, one was in the field of food industry and agriculture. Only 5% of the funds used to co-finance projects under this Program were spent on projects in the food and agriculture sectors. The project was run by a micro enterprise that is still active.

When it comes to the potential for innovation development within medium-sized agricultural enterprises, the following results were obtained using the Altman Z score method:

- 53.97% in black zone,
- 42.86% in grey zone, and
- 3.17% in white zone.

Figure 1. Results of Altman Z score model in medium-sized agricultural enterprises, 2017
- in % -



Source: Authors' calculation

The agricultural businesses suffer from a lack of capital and unfavourable loan conditions (Kocsis, Major, 2017). In order to effectively allocate limited funds intended for financing innovative activities, it is necessary to co-finance projects run by medium-sized agricultural enterprises operating in the white zone of business and for which the probability of bankruptcy is negligible. Medium-sized agricultural enterprises operating in the white zone of business are predominantly engaged in growing cereals (except rice), legumes and oil plants. Besides producing foods, small- and medium-sized enterprises (SMEs) play an important role in food processing and retail—and thus in the overall food value chain (Demmler, 2020).

The Z score indicate the financial position of the companies in the analyzed period and whether it is repaired or worsened (Vukadinović, Vujovič & Vojnović, 2108). In addition to the Z score, a precise co-financing decision requires a detailed analysis of each financial component (indicator) of the model. Accordingly, a detailed analysis of the operations of medium-sized agricultural enterprises operating in the white zone shows that:

— all enterprises record a negative value of the X1 indicator. Although there is not a defined optimum value for the X1 indicator, those enterprises where this value is recoding a growing trend are positively evaluated. A negative value indicates the absence of financial stability and liquidity, while different positive values of this indicator indicate a lesser or greater degree of ability to settle due liabilities and expand operating operations.

— all enterprises record unprofitable operations. X2 indicator with a value of zero or less than zero (X2≤0) indicates unprofitable business operations and the absence of the possibility of enterprise's survival in extraordinary adverse circumstances.

— all enterprises are characterized by low financial strength and low asset productivity. A value of indicator X3 that is zero or below zero (X3≤0) indicates that enterprises are unable to make a profit from the total invested assets.

— 50% of medium-sized agricultural enterprises operating in the white zone are capable to maintain their own reproduction, i.e. they record the value of X4 indicator higher than zero. As they use their own sources of financing for reproduction purposes, these enterprises do not burden the gross financial result with financing costs (Đuričin, S., 2012). The value of the previous indicators leads to the assumption that 50% of enterprises can finance only simple reproduction. Simple reproduction funding implies the re-acquisition of fixed assets and inventories at unchanged physical level. In this way, the business operation is ensured in an unchanged physical volume, but it is not possible to increase business activity.

— 50% of medium-sized agricultural enterprises operating in the white zone record successful sales based on assets employed. The value of X5 indicator higher than zero (X5≥0) indicates a progressive market share. Any enterprise with successful sales based on the assets employed has a stable market share but not great potential for its growth.

The research results indicate a small number of enterprises operating in the white zone out of the total number of medium-sized agricultural enterprises. A detailed analysis of the financial indicators of each individual enterprise in this group shows that operation in the white zone does not necessarily imply readiness for innovative activities. Enterprises operating in the white zone have greater potential for innovation development than those enterprises operating in the grey and black zones. The presence of potential for innovation development does not necessarily imply readiness to pursue innovative activities (Đuričin, Beraha, 2018b). Therefore, it is necessary to analyse the key financial indicators for each individual enterprise from the white zone. Only 50% of medium-sized agricultural enterprises operating in the white zone are capable to maintain their own reproduction and record growth in market share, while all enterprises are characterized by insufficient profitability, i.e. insufficient financial strength and stability.

The previous analysis results led to further research of the potential for the development of innovative activities in medium-sized enterprises operating in the processing industry. Medium-sized enterprises from the food processing industry were considered. A more detailed research aims to determine whether agriculture is more likely to develop innovative activities if it is in the function of the processing industry. Furthermore, it is thus possible to make a comparative analysis between the potential for the development of innovative

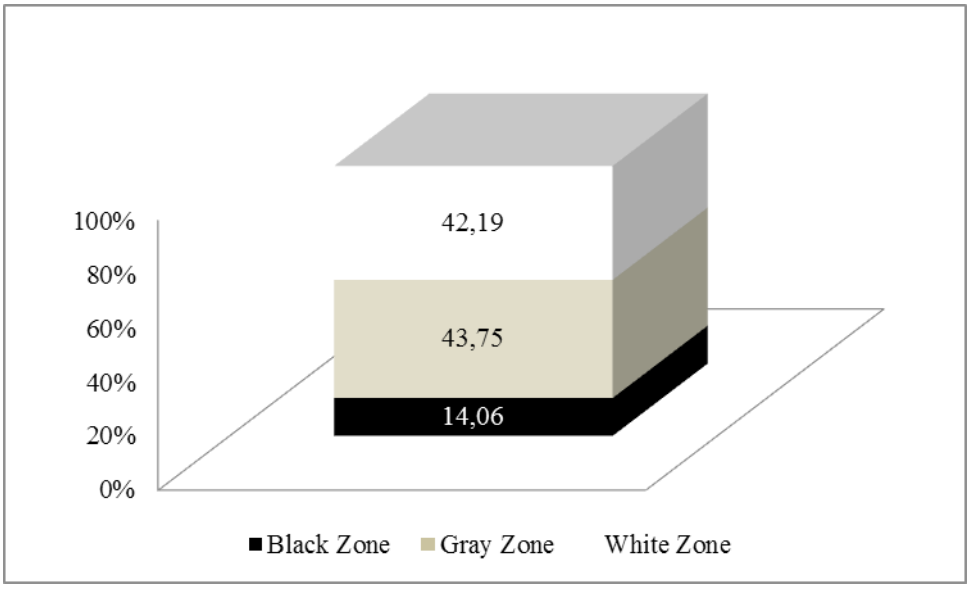
activities in enterprises registered in agriculture and enterprises registered in the food processing industry. The food industry determines not only the export but also the food security of the country, and it provides the production of raw materials for other industries and has a manifold influence and importance for complementary agricultural development and intensification of production in it (Milanovi et al., 2016; Mićić, Zeremski, 2011).

Using the Altman Z score method, the following results were obtained about the financial failure of medium-sized enterprises in the food processing industry:

- 14.06% in black zone,
- 43.75% in grey zone, and
- 42.19% in white zone.

Figure 2. Results of the Altman Z score model in medium-sized food processing enterprises

- in % -



Source: Authors' calculation

A detailed analysis of each financial component of the Z score model in medium-sized enterprises operating in the white zone within the food processing industry shows:

- 74% of enterprises record a positive value of X1 indicator. The determined value of this indicator points to the fact that 74% of the enterprises operating in the white zone are characterized by liquid business, i.e. business operation with financial stability and the ability to expand its operating business.
- 33% of enterprises record a positive value of X2 indicator, which indicates their profitable business and the possibility of surviving in extraordinary adverse circumstances.

— given the value of X3 indicator, all enterprises are characterized by low productivity of assets.

— all medium-sized food processing enterprises operating in the white zone are capable to maintain their own reproduction, i.e. they record a value of X4 indicator that is higher than zero. Among these enterprises, 22% are capable to perform their own simple reproduction and 78% the expanded own reproduction. Enterprises that are capable to perform extended reproduction from their own resources can maintain fixed assets and fixed stock at an unchanged physical level, but also acquire new fixed assets and fixed stocks that affect the increase in the physical volume of business (Đuričin, 2018).

— 78% of medium-sized agricultural enterprises operating in the white zone record successful sales based on assets employed. These enterprises have a value of X5 indicator higher than one ($X5 \geq 1$) indicating a progressive market share.

A comparative analysis of the results obtained using the Altman Z score method indicates a significantly larger number of food processing enterprises operating in the white zone. Population growth, technology development and differentiation of taste preferences expand the importance and role of food industry in the contemporary society (Topleva, Prokopov, 2020). Compared to medium-sized agricultural enterprises, medium-sized enterprises operating in the food processing industry have greater financial stability, asset liquidity and productivity, more profitable operations and more progressive market share. This means that agribusinesses are able to generate more sales by using their assets more efficiently in the food processing sector as compared to other sectors of the economy (Katchova, Enlow, 2013). Consequently, the potential for the development of innovative activities in the field of agriculture can be realized through more intensive cooperation with enterprises in the field of food processing industry. Ratings of the most potential sectors were analysed for more precise targeting of the branches of agricultural activity that have the greatest potential for developing cooperation with the food processing industry. The most potential sectors within the food processing industry with which cooperation needs to be established were observed according to the value of the Altman Z score model indicators. The analysis provided the following results:

— In terms of the potential for growth of market share and the ability to perform own extended reproduction, the greatest potential is recorded in medium-sized enterprises registered for:

  - 1061: Manufacture of grain mill products, and
  - 1091: Manufacture of prepared feeds for farm animals.

— In terms of asset productivity, the greatest potential is recorded in medium-sized enterprises registered for:

- 1091: Manufacture of prepared feeds for farm animals,
- 1032: Manufacture of fruit and vegetable juice, and
- 1051: Operation of dairies and cheese making.

— In terms of profitability and the possibility to survive in extraordinary adverse circumstances, the greatest potential is recorded in medium-sized enterprises registered for:

- 1091: Manufacture of prepared feeds for farm animals,
- 1011: Processing and preserving of meat,
- 1061: Manufacture of grain mill products, and
- 1051: Operation of dairies and cheese making.

— In terms of liquidity and financial stability, the greatest potential is recorded in medium-sized enterprises registered for:

- 1061: Manufacture of grain mill products
- 1091: Manufacture of prepared feeds for farm animals
- 1032: Manufacture of fruit and vegetable juice
- 1051: Operation of dairies and cheese making
- 1039: Other processing and preserving of fruit and vegetables
- 1011: Processing and preserving of meat
- 1107: Manufacture of soft drinks, production of mineral waters and other bottled waters

At the modern stage of development of economy, development and implementation of breakthrough innovations in food industry in concentrated in the production sphere of activities of large food associations that have a structure of holding or concern, with a reserve of financial sustainability, sufficient volume of investment resources, and availability of necessary preconditions for formation of synergetic effect (Sibirskaya et al., 2017). Food industry innovation strategies need to be based on the total technology in the food system and concerned not only with the technological changes but also with the social and environmental changes, so as to produce food that satisfies the nutritional, personal and social needs and wants of all communities (Earle, 1997).

Opportunities for indirect development of innovative activities in the agricultural sector in cooperation with the food processing industry are growing in proportion to improving the cooperation between science and industry (Beraha, 2019). The university business cooperation includes many elements from human resources involved (academic staff, students, company employees), to intellectual property rights, legal aspects in contracts, funding start-ups and spin-offs to communication and promotion of the relationship and

common projects (Dan, 2013). To realize these goals, initiatives to strengthen existing knowledge flows between universities and firms must be developed, and policies to encourage new university-industry linkages must be implemented (Bramwell et al., 2012). Therefore, the largest percentage of co-financed projects is in the field of food and agriculture within the Collaborative Grant Scheme Program implemented by the Innovation Fund. The co-financing effects of these projects were evaluated in the study "Quantitative Analysis of the Impact of Innovation Policy and Industry 4.0 on Development of Economy, Technological Progress and Entrepreneurship in Serbia". The study was conducted by the Institute of Economic Sciences for the needs of the Cabinet of Minister without portfolio responsible for innovation and technological development. The research was conducted in 2018 and was funded by HELVETAS Swiss Intercooperation SRB as part of the PERFORM project.

According to the research results of the PERFORM project, the co-financing effects of innovative activities under the three programs are different. Within the Collaborative Grant Scheme Program, the co-financing effects of innovative activities are as follows:

- Out of 14 projects funded, 30% are from the food and agriculture sectors,
- Goals of participating in the Program are multiple but most beneficiaries wanted to develop a new product/service,
- The biggest obstacles beneficiaries face when implementing innovative/R&D activities are costs/finance, technical challenges and equipment/research infrastructure,
- Given the implementation of projects, all beneficiaries improved technical/R&D activities, 85.7% of them improved technical knowledge/understanding, 60% of beneficiaries increased availability of equipment/research infrastructure, 60% of beneficiaries improved cooperation and knowledge transfer, and 43% of them improved innovative culture and innovative capacities;
- The most significant direct effect of project implementation so far on the business performance of beneficiaries is the increase in the number of beneficiaries' employees (85.7%), while beneficiaries' sales and export revenues increased by 28.6%,
- Without the financial support of the Fund, 27% of projects would probably be realized, 43% might be realized, 15% would probably not be realized, and 15% would certainly not be realized,
- Thanks to participation in the Program, 86% of beneficiaries improved their image/reputation to some extent,
- The most pronounced impact on society is exerted by projects in the field of access to information and technologies and environmental protection, and to a lesser extent by projects in the fields of education, agriculture and food technology and communication, etc.

Besides considering the effects arising from projects implemented under the Collaborative Grant Scheme Program, it is also necessary to consider the awareness of the need to develop innovative activities and the cooperation between economy and scientific and research organizations. According to the research results of the PERFORM project:

- 6% of SMEs and entrepreneurs (SMEEs) are fully familiar and 23% of SMEEs are not at all familiar with current national regulations governing innovation,
- 30% of SMEEs are fully familiar and 3% of SMEs are not at all familiar with the concept of innovation,
- 9.7% of SMEEs are fully aware and 29% are not familiar with the services of organizations providing infrastructure support for innovation,
- Strategic documents and/or business plans define goals for innovative development in 67.74% of SMEEs, i.e. they do not exist in 32.3% of SMEEs,
- As the most represented innovative activity in their enterprise, 54.8% of SMEEs consider the procurement of machines, equipment and software made for the purpose of innovation development,
- In the SMEEs innovation, which occur as a result of innovative activities, product/service innovation accounts for 45%, process innovation 25%, organization innovation 17%, and marketing innovation 13%.
- 25% of institutes and faculties cooperate with large enterprises and SMEE sector, while 75% of them have not developed this type of cooperation,
- 50% of institutes and faculties rate the application of scientific knowledge in practice as decent, 25% of them rate it as good, and 25% as poor,
- 62.5% of institutes and faculties believe that the level of technology transfer to the economy is decent. 12.5% of them assess the level of technology transfer to the economy as good and 25% as poor,
- Out of the total number of institutes and faculties that use funds from the budget of the Republic of Serbia, 62.5% of them use funds for research and development, and 25% for financing innovative activities, etc.

Conclusion

A small number of medium-sized agricultural enterprises operate in the white zone of business. Enterprises operating in the white zone have greater potential for innovation development, but this potential does not necessarily imply the willingness to pursue innovative activities. Only 50% of medium-sized agricultural enterprises operating in the white zone are capable to maintain their own reproduction and record growth in market share, while all enterprises are characterized by insufficient profitability, i.e. insufficient financial strength and stability.

Weak economic and financial strength of medium-sized agricultural enterprises has influenced the deepening of research and examining the possibility of developing innovative activities through cooperation with food companies. The results of further research show that medium-sized enterprises in the food industry have much greater potential to develop innovative activities. Compared to medium-sized agricultural enterprises, medium-sized enterprises operating in the food processing industry report better asset productivity and greater liquidity. Furthermore, these companies are characterized by financial stability, progressive market share and profitable operations.

The branch of agriculture with the greatest prospect of developing innovative activities is the one providing raw materials for the food processing industry under code 1091: Manufacture of prepared feeds for farm animals. Furthermore, the perspective for development is exercised by the agricultural branches that deal with the following activities of the food industry: 1061: Manufacture of grain mill products, 1032: Manufacture of fruit and vegetable juice, 1051: Operation of dairies and cheese making, 1011: Processing and preserving of meat, 1039: Other processing and preserving of fruit and vegetables, and 1107: Manufacture of soft drinks, production of mineral waters and other bottled waters.

The development of innovation activities in agriculture in cooperation with the food processing industry is possible through the intensification of cooperation between science and economy. The effects of realized projects under the Collaborative Grant Scheme Program, funded by the Innovation Fund, were examined in order to improve the cooperation between science and economy. Observing the effects of the implemented projects within the Collaborative Grant Scheme Program, was aimed at indicating the current situation, and therefore the elements of cooperation that need to be intensified and improved. Research findings show that the biggest barriers facing Program beneficiaries are related to costs/finance, technical challenges and equipment/research infrastructure. In addition to the mentioned barriers that the Program beneficiaries encountered during the implementation of the projects, the most significant results of cooperation between science and economy were identified. Thanks to the realization of the projects, all beneficiaries improved technical/R&D activities. Approximately 86% of beneficiaries upgraded technical knowledge and 60% of them increased the availability of research infrastructure and improved collaboration and knowledge transfer. Improvement of innovative culture and innovative capacities was observed in 43% of beneficiaries of the Collaborative Grant Scheme Program.

To remove the barriers that exist in the implementation of projects under the Collaborative Grant Scheme Program, the results of the intensity of innovative activities of the SMEE sector and scientific research organizations were presented in the research. These results represent only part of the PERFORM project and indicate, among other things, that only 6% of SMEEs are fully aware of current national regulations governing innovation. In addition, 9.7% of SMEEs are fully aware and 29% of SMEEs are not at all familiar with the organizations' services of infrastructure support for innovation. Furthermore, 25% of institutes and faculties developed cooperation with large enterprises and SMEE

sector, while 75% of them did not develop this type of cooperation. 62.5% of institutes and faculties believe that the level of technology transfer to the economy is decent. 12.5% of them assess the level of technology transfer to the economy as good and 25% as poor. Out of the total number of institutes and faculties that use funds from the budget of the Republic of Serbia, 62.5% of them use funds for research and development, and 25% for financing innovative activities, etc.

The research results indicate that the potential for the development of innovative activities in medium-sized agricultural enterprises can be improved through cooperation with food processing companies, primarily through strengthening the cooperation between science and economy and more intensive transfer of technological solutions to the economy. Furthermore, for the above conclusions, information was presented that could encourage future research aimed at enhancing the cooperation between science and economy, especially in the field of food industry and agriculture. In this way, a more efficient placement of funds intended for financing innovative activities will be ensured in the future.

Acknowledgements

This paper is a result of research financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia. Also, this research is supported by PERFORM project of Swiss Agency for Development and Cooperation (SDC), implemented by HELVETAS Swiss Inter-cooperation and University of Fribourg. The views set out in this research are those of the authors and do not necessarily reflect the opinion and views of the Swiss Agency for Development and Cooperation nor the HELVETAS Swiss Intercooperation and the University of Fribourg.

Conflict of interests

The authors declare no conflict of interest.

References

1. Altman, E.I. (1968). Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy. *The Journal of Finance*, *23*(4), 589-609. https://doi.org/10.2307/2978933
2. Altman, E.I. (2000). Predicting Financial Distress of Companies: Revisiting the Z-Score and Zeta Models, *Stern School of Business*, Paper is adapted and updated from E. Altman, Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy, *Journal of Finance*, September 1968; and E. Altman, R. Haldeman and P. Narayanan. 1997. Zeta Analysis: A New Model to Identify Bankruptcy Risk of Corporations, *Journal of Banking & Finance*, *23*(4), 589-609. https://doi.org/10.4337/9780857936097.00027
3. Beraha, I. (2019) Ocena inovativnih performansi Republike Srbije. *Ekonomski vidici*, *24*(3-4), 137-151.

4. Bramwell, A., Hepburn, N., & Wolfe, D.A. (2012). *Growing Innovation Ecosystems: University-Industry Knowledge Transfer and Regional Economic Development in Canada*, Knowledge Synthesis Paper on Leveraging Investments in HERD Final Report to the Social Sciences and Humanities Research Council of Canada.
5. Dan, M.C. (2013) Why Should University and Business Cooperate? A Discussion of Advantages and Disadvantages. *International Journal of Economic Practices and Theories*, *3*(1), 67-74.
6. Demmler, K.M. (2020). The role of small and mediumsized enterprises in nutritious food supply chains in Africa, GAIN Working Paper Series n°2, Retrieved from: https://www.gainhealth.org/sites/default/files/publications/documents/gain-working-paper-series-2-the-role-of-small-and-medium-sized-enterprises-in-nutritious-food-supply-chains-in-africa.pdf (December 20, 2020).
7. Đuričin, S. & Beraha, I. (2018a). *Financial power and development potential of environmentally responsible medium sized enterprises in the Serbian industrial sector*, Sustainable growth and development in small open economies, Budapest: Institute of World Economics; Centre for Economic and Regional Studies of the Hungarian Academy of Sciences, 124-142.
8. Đuričin, S. & Beraha, I. (2018b). *Promoting the Intensity of Innovative Activities of SMEs in the Republic of Serbia*, Western Balkans Economies in EU Integration: past, present and future, CEMAFI International Association, 188-201.
9. Đuričin, S. (2012). *Analiza poslovanja i mogućnosti izlaska preduzeća iz zone gubitka*. Institute of economic sciences, Belgrade.
10. Đuričin, S. (2018). *Improving the Efficient Use of the Government Budget Allocations for Financing Innovation Activities*, Digital transformation: new challenges and business opportunities, London: Silver and Smith Publishers, 311-328.
11. Đuričin, S. (2019). *Strategijsko & finansijsko upravljanje organizacionim performansama*. Institute of economic sciences, Belgrade.
12. Đuričin, S., & Bodroža, D. (2013). The impact of drought on yield position of the group of enterprises from agriculture sector, *Economics of agriculture, 60*(1), 25-39.
13. Đuričin, S., Beraha, I., & Bodroža, D. (2018). Alternatives for Exiting the Loss Zone for Mediumsized Agricultural Enterprises in the Republic of Serbia. *Economics of agriculture*, *65*(1), 391-411. https://doi.org/10.5937/ekoPolj1801391D
14. Earle, M.D. (1997). Innovation in the food industry. *Trends in Food Science & Technology*, *8*(5), 166-175. https://doi.org/10.1016/S0924-2244(97)01026-1
15. Elena, V., Sibirskaya, E.V., Lyapina, I.R., Vlasova, M.A., Petrukhina, E.P. & Timofeeva, S.A. (2017). Synergetic Effectiveness of Investing the Innovative Activities in Russian Food Industry, Russia and the European Union, 245-251.
16. Eurostat, Retrieved from http://ec.europa.eu/eurostat/web/science-technology-innovation/data/main-tables (July 20, 2018).

17. Institut ekonomskih nauka (2018). Kvantitativna analiza uticaja inovacione politike i industrije 4.0 na razvoj ekonomije, tehnološkog napretka i preduzetništva u Srbiji, PERFORM projekat, HELVETAS Swiss Intercorporation SRB.
18. Katchova, A.L., & Enlow, S.J. (2013). Financial performance of publicly & traded agribusinesses. *Agricultural Finance Review*, *73*(1), 58-73.
19. Kocsis, J., & Major, K. (2017). A General Overview of Agriculture and Profitability in Agricultural Enterprises in Central Europe, Managing Agricultural Enterprises, Part IV, 243-265.
20. Mićić, V. & Zeremski, A. (2011). Deindustrijalizacija i reindustrijalizacija privrede Srbije. *Industrija*, *39*(2), 51-68.
21. Milanović, M.R., Stevanović, S. & Dimitrijević, B. (2016). Agrarian potentials in the reindustrialization of Serbia - import of inputs and the opportunity costs of development. *Economics of agriculture*, *63*(1), 143-158. https://doi.org/10.5937/ekoPolj1601143M
22. Ministry of Education, Science and Technological Development (MESTD). Retrieved from http://www.mpn.gov.rs/tehnoloski-razvoj-2/inovaciona-delatnost/registar-inovacione-delatnosti/ (March 15, 2018).
23. Rajin, D., Milenković, D., & Radojević, T. (2016). Bankruptcy prediction models in the Serbian agricultural sector. *Economics of agriculture*, *63*(1), 89-105. https://doi.org/10.5937/ekoPolj1601089R
24. Statistical Office of the Republic of Serbia (SORS), Statistical yearbook (2017). Retrieved from http://pod2.stat.gov.rs/ObjavljenePublikacije/G2017/pdf/G20172022.pdf (July 12, 2018).
25. Topleva, S.A., & Prokopov, T.V. (2020). Integrated business model for sustainability of small and medium-sized enterprises in the food industry: Creating value added through ecodesign. *British Food Journal, 122*(5), 1463-1483. https://doi.org/10.1108/BFJ-03-2019-0208
26. Vukadinović, P., Vujović, S., & Vojnović, B. (2018). Analysis of the financial position of enterprises in privatization in the agricultural sector in Serbia. *Economics of agriculture*, *65*(3), 955-970. https://doi.org/10.5937/ekoPolj1803955V

BULGARIA'S PROCESSED FOOD INDUSTRY – TRANSITION TO MARKET ECONOMY

Svetlana Ignjatijević[1], Antoaneta Vassileva[2], Jelena Vapa Tankosić [3], Bojan Vapa[4], Kristijan Ristić[5], Milan Mihajlović[6]

**Corresponding author E-mail: ceca@fimek.edu.rs*

ARTICLE INFO

Review Article

Received: *10 December 2020*

Accepted: *15 January 2021*

doi:10.5937/ekoPolj2101229I

UDC 338.439.52:339.13(497.2)

Keywords:

processed food sector, comparative advantage, Balassa RCA index, Grubel–Lloyd index, Bulgaria

JEL: *F14, P52*

ABSTRACT

The subject of the research is the analysis of the competitiveness and comparative advantage of the agricultural products and processed food products of Bulgaria on the international market. The study covers the period from 1998 to 2017. In order to measure the level of comparative advantage of the export and the degree of specialization in international trade RCA and GL indices have been used. The aim of or research was to identify products that have previously before the EU accession had, and still have, export potential. That is, the objective was to point the trend of changes in the foreign trade of processed food sector in the period before and after the EU accession in 2007. The results indicate that after joining the EU Bulgaria has changed its foreign trade structure. The decrease of exports and increase of imports of processed food sector products requires a comprehensive export strategy in order to strengthen its competitiveness.

1 Svetlana Ignjatijević, Ph.D., Associate Professor, Faculty of Economics and Engineering Management in Novi Sad, Cvećarska 2, 21000 Novi Sad, Phone: +381 60 644 22 33, E-mail: ceca@fimek.edu.rs ORCID ID (https://orcid.org/0000-0002-9578-3823)

2 Antoaneta Vassileva, Ph.D., Professor, Faculty of International Economics and Politics, University of National and World Economy, 1700 Sofia, Student Town, UNWE, Bulgaria, Phone: +381 61 154 15 71, E-mail: antoaneta_vassileva@yahoo.com ORCID ID (https://orcid.org/0000-0002-5861-641X)

3 Jelena Vapa Tankosić, Ph.D., Full Professor, Faculty of Economics and Engineering Management in Novi Sad, Cvećarska 2, 21000 Novi Sad, Republic of Serbia, Phone: +381 63 460 585, E-mail: jvapa@fimek.edu.rs ORCID ID (https://orcid.org/0000-0001-8062-1154)

4 Bojan Vapa, Ph.D., Assistant Professor, Academy for Business Economics, Bulevar Vuka Karadžića 5, 32000 Čačak, Phone: +381 65 888 82 72 E-mail: bojanvapa@gmail.com ORCID ID (https://orcid.org/0000-0002-8528-7957)

5 Kristijan Ristić, Ph.D., Assistant Professor, Faculty of Business and Low, Union – Nikola Tesla University, Knez Mihailova 33, 11000 Beograd, E-mail: kristijanristic.fpim@yahoo.com, ORCID ID (https://orcid.org/0000-0001-8907-1304)

6 Milan Mihajlović, Ph.D., Assistant Professor, Modern business school Belgrade, Terazije 27, Phone: +381 63 569 076, E-mail: milan@mbs.edu.rs, ORICD ID (https://orcid.org/0000-0002-1285-0403)

Introduction

Competitiveness is always a comparative category that shows the ability of the economy to raise the overall national productivity and quality and to compete with other economies regionally and globally. The food industry(Vasić, 2015) has a significant importance for the economy of Bulgaria with its potential to enhance considerably the delivery of growth and jobs in a resource-efficient way. The research findings of the authors Boneva (2011, 2012), as well as Ignjatijević and Milojević (2011), have well proven the notable share of agricultural products and especially food products in the export structure of Bulgaria.

The study of the comparative advantage in Bulgaria's exports of processed food products indicates problems and changes in production(Grbić & Jovanović, 2020; Nadoveza & Pešić, 2020) and positioning in the world market. Especially important is the cooperation of all participants in the value chain: manufacturers, distributors, exporters, scientists, etc. Therefore, the subject of the research is the analysis of the comparative advantages in the export of processed food sector(Hasanov, 2019; Dimitrovski et al., 2019; Krunić, Matić & Đukić, 2019; Zekić, 2015; Pantić et al., 2019) and specialization of international trade of Bulgaria. Furthermore, the argument presented conveys the need to manage the comparative advantage in exports in order to intensify, modernize and harness the potential of Bulgaria's processed food sector.

The paper is structured as follows: an overview of the literature on competitiveness is presented below, especially on the competitiveness of the processed food sector and the targeted processed food sector of Bulgaria. The research method is then described, followed by results and discussion. The last section contains concluding remarks.

Literature review

The conceptual framework of competitiveness at a sectorial level (Bojnec, Fertő, 2015; Collignon, Esposito, 2017) combine definitions and indicators based on foreign trade performance with those based on productivity and labor costs. Bojnec et al. (2005) have pointed out the significance of the structural reforms in the food sector of Slovenia in EU integration, while Jaklič and Svetličič (2017) have argued that lack of experience and knowledge about investing, administrative procedures in international business entry into foreign markets, international marketing and management are the biggest obstacles in the process of integration in the EU market. An emphasis on the change of the export structure of Czech Republic was put by Vološin et al. (2011), Svatoš and Smutka (2012), De Castro and Hnát (2017); Hungarian industry was put by Smutka et al. (2017), Fertö and Hubbard (2002), Bojnec and Fertö (2006), Török and Jámbor (2013); Ukraina was put by Qineti et al. (2009) and Slovakia was put by Simo et al. (2016).

Bulgaria appears to be in the focus of the research of Bojnec and Fertö (2015) and they have shown that Bulgaria is a stable net exporter of food products. This advantage has been proven once again by Ignjatijević and Milojević (2011) and Ignjatijević et al. (2013a) have pointed out that Bulgaria is the one of the biggest exporters of agro-food products.

The interest about the competitive advantage of the processed food sector of Bulgaria and its market position continues to be present in the further works of Ignjatijević et al. (2014, 2015). Balogh and Jámbor (2017) went even further, identifying key industry specific causes for changing patterns in comparative advantage in the EU using the wine industry as an example. Slavova (2016) has examined the activities of companies in the food industry in order to create recommendations for improving the managerial level of the production process and quality in the company. Terziev and Arabska (2015) have analyzed the Bulgarian agriculture from the point of view of its impact on the development of rural areas through the exchange of knowledge on production, marketing, processing and management of natural resources and emphasized the need to establish the Knowledge and Innovation System in Agriculture (AKIS). Vassileva et al. (2014), as well as Zhelev and Tzanov (2012), have pointed out that the sectors of the Bulgarian economy have experienced uneven development since 2000. Boneva (2011) points out that although efforts seem to be made, there remains an impression of absence of a strategic link between goals, resources, organization and management of the development process and the strengthening of the export competitiveness of Bulgarian companies in the food processing sector. Kopeva et al. (2016) have critically assessed the existing instruments and conclude that they have to be included in a comprehensive long-term sectorial strategy which is to be consistently implemented. Ivanov (2015) has examined the competitiveness of the canning industry in Bulgaria and suggests two ways for its improvement: through increasing the efficiency of the use of competitive advantages, and complex reengineering approach.

Materials and methods

The subject of this research is to analyze the comparative advantage of Bulgaria's processed food sector exports, with the aim of measuring the comparative advantage of exporting sector and point out which products have a stable position on the international market. Referring to the research of Buturac (2008, 2009), the logarithmic form of the comparative advantage of exports has been applied. The formula for calculating the expressed comparative advantage is the following:

$$RCA = \mathbf{h}\left[\frac{X_i}{M_i}\right] \times \left(\frac{\sum_{i=1}^{n} X_i}{\sum_{i=1}^{n} M_i}\right) \times 100 \quad ,$$

Where X is the export value and M is the sign for the import value. Index i indicates the processed food sector as a whole or products of that sector. For the purpose of a detailed survey of the foreign trade exchange of processed food sector in Bulgaria analysis of the export of product groups that are present in the export of Bulgaria, has been made (3digit SITC). Grubel Lloyd's index is used to analyze the level of specialization in intra-industrial exchange. The Grubel Lloyd index is calculated using the formula (1975):

GL_i^t is the Grubel Lloyd's index value for the product group *i*. X_i^t represents the value of exports and *M* is the value of imports. The index ranges from 0 to 1. Values closer to 0 indicate the inter-industrial character of the exchange, and values closer to 1 indicate the intra-industrial character of the exchange

Results and discussion

The Bulgarian food industry is traditionally export-oriented a serious threat to the balance of trade is the increase of the imports (Kopeva et al., 2016). In 1998, exports accounted for 9.46% in total export, actually this favorable position has not recurred to date. During the period (1998-2006) Bulgaria had a positive trade balance amounting to an average of $ 40 million, competitive prices and standardized quality. The exports of food products have grown steadily, with an increase in imports and a foreign trade deficit in the period 2007-2009 (Boneva, 2011). The turnover of food products (in the period 1998 - 2017) increased 5.36 times - from USD 406 million to USD 2.178 million (Table 1).

Table 1. Export and import, RCA and GL index of processed food sector in Bulgaria in the period from 1998 to 2017

		Processed food sector (In 000$)			Total (% share)		RCA	GL
		Export	Import	Neto export	Export	Import		
Before the EU	1998	406,047	241,149	164,898	9.46	4.83	0.45	0.75
	Average 98-06	397,009	356,364	40,645	5.74	3.52	0.10	0.93
Year of joining the EU	**2007**	**825,453**	**1,009,336**	**-183,883**	**4.44**	**3.36**	**-0.12**	**0.9**
After joining the EU	2008	1,132,397	1,422,206	-289,809	5.04	3.84	-0.14	0.89
	2017	2,178,371	1,879,253	299,118	7.22	5.5	0.13	0.93
	Average 08-17	1,728,504	1,612,224	116,280	6.75	5.20	0.05	0.94

Source: UN Comtrade and authors' calculation

The significant increase of imports of 4.18 times resulted in foreign trade deficit of USD 184 million. Although the increase in exports by 2017 is accompanied by an increase in imports, there is a surplus of exports of food products at an average of USD 116 million (2007-2017).

The period of Bulgaria's accession to the EU also coincides with the prohibition of exports of live animals from Bulgaria to the EU, due to the "bluetongue" illness pork and veal practically did not participate in exports because of non-tariff restrictions (quotas for

the export of pigs, pork and mutton). In later years, biosecurity and risk mitigation measures were introduced in line with the European regulations. Vaccination against lumpy skin diseases (since 2017) and against bluetongue (since 2016) is being introduced (Slette, Boshnakova, 2018; Jolović & Bobera, 2019). During this period, there were non-tariff export restrictions and negotiations were underway to list dairy exports to the EU, at that time only three Bulgarian companies were involved (Ivanov, 2007; Ivanova et al., 2007). An increase in consumption and production of yoghurt has been noticed compared to the overall growth of the milk market. Yoghurt and cheese are among the most traditional dairy products in the country, there is an increase in production even after a sharp slowdown in growth in the years of accession, as well as in the years of economic crisis. An analysis of exports and imports in the period after 2007 shows that the disappearance of restrictions on trade of food products to the EU countries in a 10 years period contributed to an increase in exports 2,64 times (from USD 825 million in 2007 to USD 2,178 billion in 2017). Bulgarian companies base their international market entry strategy on price and quality. The export-oriented companies have one or more internationally recognized quality certificates (Kopeva et al., 2016**).**

As per Bulgaria's processed food sector exports, foreign trade of processed food sector in the period 1998-2006 amounted to USD 753 million average, of which exports accounted for an average of 397 thousand. The average share of exports of processed food products in the country's total exports amounted to 5.74%, while imports accounted for 3.52%, which indicates a greater export importance of the sector. In 2007 when Bulgaria became a member of the EU, the export of processed food sector amounted to USD 825 million with a negative foreign trade balance of USD 183 million. In the period after joining the EU, Bulgaria increased the export and the import of products of the processed food sector several times (Svatoš Smutka, 2009). Foreign trade of processed food in the period 2008-2017 amounted to USD 3,341 million, of which exports amounted to USD 1,728 million. The share of exports of this sector in the country's total exports has enhanced with the increase of the share of imports in total imports.

Comparative advantage in the export of processed food sector

The results of the research on the presence of comparative advantage in the export of processed food sector of Bulgaria are presented in Table 2. Previous research of Ignjatijević et al. (2013b) on the competitiveness of the Bulgarian food industry pointed out the high share of processed food sector in the total exports of the country (Kopeva et al., 2016) and the positive value of RCA index in the period up to 2000 (Gorton et al., 2000) and the period after 2005 (Ignjatijević et al., 2013b). The analysis of the comparative advantage of exports of processed food sector has showed that it had positive values in the period before EU accession (except in 2001 and 2006), with an average value of RCA = 0.1. In fact, in the period from 2006 to 2009 a negative balance was achieved in foreign exchange, which resulted in a decrease of the value of the RCA index. However, after 2009 Bulgaria has increased exports and positive RCA index has been present throughout the next coming period. During the analyzed period, the processed food sector has had a high intra-industrial exchange value.

Table 2. Ranking of processed food sectors products by RCA index in 1998 and 2017

	Bulgaria 1998 (name and number of products groups)	RCA	GL		Bulgaria 2017 (number of products groups)	RCA	GL
Exeptional RCA	Fruit and prepared products -058	2.65	0.09	Notable RCA	421	1.76	0.49
	Non-alcoholic beverages - 111	2.58	0.1		046	0.97	0.64
	Tobacco, processed - 122	2.40	0.11		037	0.90	0.7
Notable RCA	Alcoholic beverages – 112	1.80	0.22		058	0.88	0.58
	Cheese and curd - 024	1.27	0.37		025	0.80	0.96
	Fixed vegetable fats, soft oils - 421	1.23	0.39		048	0.59	0.77
	Vegetables, roots and tubers, processed - 056	1.01	0.47		042	0.54	0.5
Satisfactory RCA	Preparations of cereals, flour, starch - 048	0.71	0.61		551	0.47	0.47
	Chocolate and other food preparations with cocoa – 073	0.57	0.68		081	0.43	0.46
	Fish, dried, salted, in brine, smoked - 035	0.37	0.79		122	0.27	0.58
	Fish and crustaceans, molluscs, Preserved - 037	0.33	0.81		024	0.08	0.53
	Edible products and preparations - 098	0.19	0.89		035	0.07	0.83
	Birds eggs and egg yolks, fresh, dried, egg whites - 025	0.09	0.95		061	0.00	0.76
	Fruit and vegetables juices- 059	0.00	1		073	-0.05	0.42
Negatve RCA	Meat and edible offal, preserved – 017	-0.12	0.93		017	-0.06	0.43
	Flour, groats and meal of wheat – 046	-0.34	0.8		431	-0.14	0.74
	Animal food - 081	-0.42	0.76		062	-0.30	0.97
	Sugar products - 062	-0.45	0.75		056	-0.42	0.54
	Rice - 042	-0.51	0.71		098	-0.49	0.45
	Sugar, molasses and honey - 061	-0.87	0.53		112	-0.55	0.85
	Essential oils, perfumery products - 551	-1.00	0.48		047	-0.67	0.68
	Animal oils and fats - 411	-1.09	0.44		059	-0.79	1
	Meat and edible offal, salted, dried – 016	-1.26	0.38		422	-1.01	0.92
	Margarine and other edible fats – 091	-1.51	0.29		091	-1.04	0.73
	Milk products, except butter or cheese - 022	-1.77	0.23		411	-1.07	0.24
	Butter and other fats from milk, dairy spreads - 023	-2.11	0.16		111	-1.08	0.7
	Animal and vegetable fats, oils - 431	-2.24	0.14		016	-1.14	0.97
	Groats and meal of other cereals - 047	-3.15	0.05		022	-1.18	0.13
	Fixed vegetable fats, oils – 422	-4.47	0.01		023	-2.39	0.96

Source: Authors' calculations

In 14 out of 29 commodity groups in the processed food sector the value of RCA index in 1998 is positive as well as in13 commodity groups in 2017. An increase in RCA values was observed in 17 commodity groups. There are 10 product groups in which there is the biggest increase of RCA index. The results show that for some products a decrease in the RCA index has been noticed. They also show that Bulgaria's EU membership did not guarantee an increase in exports. The figures from 2017 indicate a drastic decline in exports of the spirits and non-alcoholic beverages sector. The reasons should be sought in the lack of adaptability to the requirements of the European market.

The paired-sample test has estimated the level of change in the comparative advantage of exports of Bulgaria's food industry (RCA). A decrease in the value of RCA has been confirmed since 1998, i.e. the beginning of the analysis (M = 0.079; SD = 0.16) to 2017 or after joining the EU (M = 0.029; SD = 0.11), t (9) = 0.64, p = 0.538. The average decrease in RCA was 0.05, while the 95% confidence interval extends from -0.13 to 0.078. The value of eta squared (0.04) shows that the impact of accession was small. As far as the separate groups of products are concerned, the change is well noticed, but in the case of the entire group of products the processed food sector loses significance (because the value of some groups of products decreases and for some groups of goods increases).

The paired-sample test estimates the level of change in intra-industrial exchange in exports of the Bulgarian food industry (GL) An increase of the value of GL from the start of the analysis has been confirmed (1998) (M = 0.923; SD = 0.076) to 2017, or after EU accession (M = 0.939; SD = 0.039 t (9) = -0.791, p = 0.449. The average increase of the value of GL was 0.016, while the interval 95% confidence interval extends from -0.06 to 0.0297. The value of eta squared (0.065) shows that the impact of the accession to the EU was moderate.

Further research has established a correlation between the changes of comparative advantage in exports and intra-industrial character of exchange. A strong negative statistically significant correlation between the two variables was present $r = -0.591$, $n = 21$, $p < 0.005$, whereby an increase in the comparative advantage of exports is accompanied by a decrease in intra-industrial character, that is, strengthening of inter-industrial character. The result from the Paired Samples Test confirms the correlation results that a decrease in RCA values is accompanied by an increase in the GL index. In our case 34.9% of GL variance is caused by RCA variance.

Conclusions

Based on our research and previous analysis we found out that the accession of Bulgaria to the EU did not enhance automatically the opportunities for export of the processed food sector. In short, we can say that the development and restructuring of the food industry in the analyzed period has been influenced by many internal and international factors, which resulted in different rates of production growth in the period 1998 - 2017. In the period immediately after the accession investments contributed to the improvement of technology, creating new products and modernization of packing. The food industry

sector has utilized the SAPARD and RDP (Rural Development Program 2007-2013) programs. More than 1/5 of funds were intended for the introduction of European standards of food hygiene and food safety standards, which has led to the increase of production and productivity, and ultimately exports. Based on the results, we can see that the total value of exports has increased many times and has been accompanied by a change in the structure of exports. The research on Bulgaria's processed food sector has pointed out the commodity groups that have a high share in the country's exports and have achieved a positive comparative export advantage (RCA). The study of the comparative advantage of the exports of the sector as a whole or of the separate processed food sectors indicates the following results: the comparative advantage of the export sector as a whole indicates a reduction of RCA index in 2017, 10 years after the accession of Bulgaria to the EU. The result can be considered as a dynamic change in the value of the index in the last year of analysis compared to some earlier years, or as a static category of ex post analysis, but it still deserves deeper analysis.

Further integration within EU has accelerated the structural transformation and technological upgrading of the sector in the country but the process is still rather slow. Bulgaria has not managed to take full advantage of its EU integration and enhance its export competitiveness. Despite the steady increase in the value of exports before the global economic crises occurred, the imports were exceeding, thus leading to a trade deficit, a meaningful sign of inadequate export competitiveness (Zhelev, Tzanov, 2016). The RCA index of exports of processed food sector had positive values before the accession of Bulgaria to the EU, then it had decreased, and after 2009 it had reached positive values in the next coming period. In order to improve its international competitiveness and not to remain steadily anchored to low value-added traditional export the processed food sector can no longer rely on its previous achievements but rather on a well-focused export strategy on a national, sectorial and company level. By far one of the most important issues for the Bulgarian processed food sector is stronger support from the state which can be achieved by a comprehensive national strategy for encouraging and facilitating the export. Its main role should be to concentrate and unite the efforts of state agencies and institutions engaged with promoting Bulgarian exports as Bulgarian Small and Medium-size Enterprises Promotion Agency, Bulgarian Export Insurance Agency, Bulgarian Development Bank, Invest Bulgaria Agency and the country's trade missions abroad. Greater flexibility is needed for improving the access to European funds, as well. Strengthening the export potential, ensuring energy efficiency, providing more investments in R&D and innovations will determine the accelerated growth perspective of the economy and its international competitiveness.

Conflict of interests

The authors declare no conflict of interest.

References

1. Balogh, J. M., & Jámbor, A. (2017). The global competitiveness of European wine producers. *British Food Journal*, *119*(9), 2076-2088. https://doi.org/10.1108/BFJ-12-2016-0609
2. Bojnec, S., & Fertö, I. (2006). Comparative advantages and competitiveness of Hungarian and Slovenian agro-food trade in the EU markets. 98th EAAE Seminar *'Marketing Dynamics within the Global Trading System: New Perspectives'*, Chania, Grecce, June 29th-July 2nd 2006, 1-16. https://doi.org/10.22004/ag.econ.10069
3. Bojnec, Š., & Fertő, I. (2015). Agri-food export competitiveness in European Union countries. *JCMS: Journal of Common Market Studies*, *53*(3), 476-492. https://doi.org/10.1111/jcms.12215
4. Bojnec, Š., Majkovič, D., & Turk, J. (2006). *Prevalence of Key Developments in Trade of Agro-Food Produce in the New Member States of the European Union*, paper presented at 98th EAAE Seminar, Chania. https://doi.org/10.22004/ag.econ.10052
5. Boneva, S. (2011). Проблеми на международната конкурентоспособност на българските експорно ориентирани фирми от отрасъла хранително-вкусова промишленост, *Управление и образование*, 7(1), 77-84.
6. Boneva, S. (2012). Мястото на хранително-вкусовата промишленост на България в рамките на ЕС – състояние и перспективи, Управление и образование, том VIII (1)
7. Buturac, G. (2008). Komparativne prednosti i izvozna konkurentnost hrvatske prerađivačke industrije. *Ekonomska istraživanja*, 21(2), 47-59.
8. Buturac, G. (2009). Regionalne sličnosti i razlike strukture međunarodne trgovine u Hrvatskoj. *Zbornik Ekonomskog fakulteta u Zagrebu*, 7(1), 1-16.
9. Collignon, S., & Esposito, P. (2017). *Measuring European competitiveness at the sectoral level*. European Trade Union Institute, Brussels.
10. De Castro, T., & Hnát, P. (2017). Czech FDI Performance: Between Global Value Chains and Domestic Reforms. Szent-Iványi, Balázs (Edited by), Foreign Direct Investment in Central and Eastern Europe. Palgrave Macmillan, Cham., 51-75.
11. Dimitrovski, D., Leković, M., & Joukes, V. (2019). A bibliometric analysis of Crossref agritourism literature indexed in Web of Science. *Hotel and Tourism Management, 7*(2), 25-37. https://doi.org/10.5937/menhottur1902025D
12. EMF Foundation, IMEDE (Institute), World Economic Forum, IMD International (Institute). (1993). *World Competitiveness Report*. The Foundation. Cologny/Geneva, Switzerland.
13. Fertö, I., & Hubbard, L.J. (2002). *Revealed comparative advantage and competitiveness in Hungarian agri–food sectors*, KTK/IE Discussion Papers 2002/8, Institute of Economics, Hungarian Academy of Sciences, Budapest, 1-17.

14. FoodDrinkEurope, Retrieved from: https://www.fooddrinkeurope.eu/uploads/publications_documents/FoodDrinkEurope_Data_and_Trends_2018_FINAL.pdf (July 16, 2020).
15. Gorton, M., Davidova, S., & Ratinger, T. (2000). The competitiveness of agriculture in Bulgaria and the Czech Republic vis-à-vis the European Union (CEEC and EU Agricultural Competitiveness). *Comparative Economic Studies*, *42*(1), 59-86.
16. Grbić, M., & Jovanović, D. (2020). Comparative financial systems: Implications for economic growth. *Oditor*, *6*(1), 49-65. https://doi.org/10.5937/Oditor2001046G
17. Grubel, H., & Lloyd, P. (1975) *Intra-industry Trade: The Theory and Measurement of International Trade in Differentiated Products*, Wiley, New York.
18. Hasanov, A. (2019). Economic indicators of business and living standards of the population, as potential factors, for franchise operations in the services and trade sectors. *Oditor*, *5*(3), 6-24. https://doi.org/10.5937/Oditor1903006H
19. Ignjatijević, S. (2011). *Komparativne prednosti agrara Srbije u spoljnoj trgovini*, Doktorska disertacija. Fakultet za ekonomiju i inženjerski menadžment u Novom Sadu, Novi Sad.
20. Ignjatijević, S., & Milojević, I. (2011). Komparativna prednost izvoza poljoprivrednih proizvoda i hrane Srbije i zemalja dunavske regije. *Economics of Agriculture, 58*(1), 103-110.
21. Ignjatijević, S., Ćirić, M., & Carić, M. (2013a). International Trade Structure of Countries from the Danube Region: Comparative Advantage Analysis of Export. *Ekonomický časopis*, *61*(3), 251-269.
22. Ignjatijević, S., Ćirić, M., Djokić, M. & Kovačević, B. (2013b). Structural analisis of international trade on the Danube region countries. *TTEM-Technics Technologies Education Management*, *8*(3), 120 – 128.
23. Ignjatijević, S., Čavlin, M., & Đorđević, D. (2014). Measurement Of comparative advantages of processed food sector of Serbia in the increasing the export. *Economics of Agriculture*, *61*(3), 127-138.
24. Ignjatijević, S., Milojević, I., Cvijanović, G., & Jandrić, M. (2015). Balance of Comparative Advantages in Processed Food Sector of the Danube Countries. *Sustainability*, *7*(6), 6976-6993. https://doi.org/10.3390/su7066976
25. Ivanov, B. (2007). Problems and opportunities for the milk sector in Bulgaria. *Bulgarian Journal of Agricultural Science*, *13*(1), 85.
26. Ivanova, N., Peneva, M., Mishev, P., Golemanova, A., & Erjavec, E. (2007). Bulgarian Agriculture and EU Accession. *Post-Communist Economies*, *19*(3), 263-280, https://doi.org/10.1080/14631370701503174
27. Jaklič, A., & Svetličić, M. (2017). *Enhanced transition through outward internationalization: outward FDI by Slovenian firms*. Routledge, United Kingdom.
28. Jolović, I., & Bobera, D. (2019). Analysis of the project manager's role in the research and development projects. *Oditor*, *5*(3), 38-52. https://doi.org/10.5937/Oditor1903038J

29. Kopeva, Д., Желев, П., Благоев, Д., & Щерев Н. (2016). Експортна конкурентоспособност на хранително-вкусовата промишленост в България, Proceedings of International Scientific Conference High Technologies Business Society, *2*, 57-61.

30. Krunić, N., Matić, I., & Đukić, D. (2019). Zakon vrednosti kao osnova održivog razvoja. *Održivi razvoj*, *1*(2), 17-26. https://doi.org/10.5937/OdrRaz1902017K

31. Ministry of Economy and Energy of the Republic of Bulgaria. (2007). *Analysis of the Competitiveness of Bulgarian Industrial Companies* (*Министерство на икономиката и енергетиката на Република България, Анализ на конкурентоспособността на българските промишлени предприятия*). Retrieved from : http://old.mi.government.bg/bids.html?id=134456 (June 16, 2020).

32. Nadoveza, B., & Pešić, H. (2020). Održivi razvoj - proizvodna snaga savremenog društva. *Održivi razvoj*, *2*(1), 31-40. https://doi.org/10.5937/OdrRaz2001031N

33. Pantić, N., Jovanović, B., & Hemed, R.I. (2019). Oporezivanje u funkciji održivog razvoja. *Održivi razvoj, 1*(2), 37-51. https://doi.org/10.5937/OdrRaz1902037P

34. Qineti, A., Rajcaniova, M., & Matejkova, E. (2009). The competitiveness and comparative advantage of the Slovak and the EU agri-food trade with Russia and Ukraine. *Agricultural Economics – Zemedelska Ekonomika*, *55*(8), 375-383.

35. Simo, D., Mura, L., & Buleca, J. (2016). Assessment of milk production competitiveness of the Slovak Republic within the EU-27 countries. *Agricultural Economics*, *62*(10), 482-492. https://doi.org/10.17221/270/2015-AGRICECON

36. Slavova, P. (2016). Conditions of productivity processes in a company of food industry in Bulgaria. *Procedia-Social and Behavioral Sciences*, 230, 367-371.

37. Slette, J., & Boshnakova, M. (2018). *Livestock and Products Annual*, GAIN Report Number: BU1827, Bulgaria Retrieved from : http://agriexchange.apeda.gov.in/marketreport/Reports/Livestock_and_Products_Annual_Sofia_Bulgaria_7-30-2018.pdf (July 26, 2020).

38. Smutka, L., Svatoš, M., & Maitah, M. (2017). *Czech agrarian foreign trade comparative advantages distribution: transformation process.* Asta Raupelienė (Edited by)., Proceedings of the 8th International Scientific Conference Rural Development 2017, 1312-1317. http://doi.org/10.15544/RD.2017.150

39. Svatoš, M., & Smutka, L. (2012). Comparative Advantages of the Czech Agrarian Foreign Trade in Relation to the EU and Third Countries. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, *38*(4), 363–378. http://doi.org/10.11118/actaun201260040363

40. Svatoš, M., & Smutka, L. (2009). Influence of the EU enlargement on the agrarian foreign trade development in Member states. *Agricultural Economics–czech*, *55*(5), 233-249. https://doi.org/10.17221/34/2009-AGRICECON

41. Terziev, V., & Arabska, E. (2015). Enhancing competitiveness and sustainability of agri-food sector through market-oriented technology development in agricultural knowledge and innovation system in Bulgaria. *Mechanization in agriculture & Conserving of the resources*, *61*(7), 19-22.
42. Török, A., & Jámbor, A. (2013). Agri-food trade of the New Member States since the EU accession. *Agricultural Economics-Zemedelska Ekonomika*, *59*(3), 101-112. https://doi.org/10.17221/110/2012-AGRICECON
43. United Nations Comtrade Database, Retrieved from : https://comtrade.un.org/db/mr/rfCommoditiesList.aspx?px=H1&cc=TOTAL (July 26, 2020).
44. Vasić, Z. (2015). Poreska kontrola uslov funkcionisanja budžetskog sistema. *Akcionarstvo*, *21*(1), 5-22.
45. Vassileva, A., Petkov, V., & Zhelev, P. (2014). International competitiveness of export-oriented industries in Bulgaria. *Chinese Business Review*, *13*(1), 1-18.
46. Vološin, J. , Smutka, L., & Selby, R. (2011). Analysis of external and internal influences on CR agrarian foreign trade. *Agric. Econ. – Czech*. *57*(9), 422–435.
47. WEF (2014). The Europe 2020 Competitiveness Report, Building a More Competitive Europe, Retrieved from : http://www3.weforum.org/docs/WEF_Europe2020_CompetitivenessReport_2014.pdf (July 6, 2020).
48. Zekić, M. (2015). Kontrola i revizije u javnom sektoru, *Akcionarstvo*, *21*(1), 23-34.
49. Zhelev, P. & Tzanov, T., (2016). Bulgaria's Export Competitiveness before and after EU Accession, *Journal of Economics and Business*, *15*(1-2), 107-128.

INSTRUMENTS OF SUPPORT IN PROMOTION OF HEALTHY FOOD AND FOOD SAFETY CULTURE

Željko Bjelajac[1], Aleksandar Filipović[2], Božidar Banović[3]

**Corresponding author E-mail: sasha.filipovic@gmail.com*

ARTICLE INFO

Review Article

Received: *05 January 2021*

Accepted: *25 January 2021*

doi:10.5937/ekoPolj2101241B

UDC 639.3.043.2-048.65

Keywords:

healthy food, healthy diet, nutrients, food safety regulations, food safety culture

JEL: *I10, I12, I19, L66, Q18*

ABSTRACT

Food is imperative for biological survival. It is a necessity and a source of health and vitality if taken with the awareness of all the correlations between food and health and development. This paper aims to research the correlation between food, health, and longevity, and the factors in the chain of food safety and healthy food and diet to determine their role and significance and offer recommendations based on results and conclusions. Since children and adolescents are more likely to be affected by an unhealthy diet in the long term, their dietary habits were also researched. The paper identified the elements of importance for this problem – individuals, family, education system, media, food producers, state and international organizations. After analysis of the roles of all the elements and stakeholders in the chain of food safety and healthy diet, recommendations for each link in that chain were given.

Introduction

Along with oxygen and water, food is a precondition of life, vitality, and proper development of all living organisms. Since the pre-historic times, even before civilization development reached the level when people started to cultivate the land and grow plants and animals for food, a hunter-gatherer society existed. In that sense, food always was an elementary human need that predates consciousness, a catalyst

1 Željko Bjelajac, Ph.D., Full Professor, University of Business Academy, Faculty of Law for Commerce and Judiciary, Geri Karolja Street no. 1, 21000 Novi Sad, Republic of Serbia, Phone: +381 64 46 28 967, E-mail: zdjbjelajac@gmail.com, ORCID ID (https://orcid.org/0000-0003-4953-8779)

2 Aleksandar Filipović, Ph.D, Assistant Professor, University of Business Academy, Faculty of Economics and Engineering Management, Cvećarska Street no. 2, 21000 Novi Sad, Republic of Serbia, Phone: +381 65 26 07 607, E-mail: sasha.filipovic@gmail.com, ORCID ID (https://orcid.org/0000-0002-1097-2079)

3 Božidar Banović, Ph.D, Full Professor, University of Belgrade, Faculty of Security Studies, Gospodara Vučića street no. 50, 11000 Belgrade, Republic of Serbia, Phone: +381 63 239 816, E-mail: banovicb@fb.bg.ac.rs, ORCID ID (https://orcid.org/0000-0001-9291-7091)

for communalization of people, as well as the impetus for further development and improvement of knowledge and techniques that helped to obtain food. Naturally, between the dawn of civilization to the contemporary age, there were so many changes that it is impossible to analyze them objectively and completely, but the essence remained the same – food is still a basic need and necessity. Like in many other segments, the domain of food also saw hyper saturation, so it looks like there is an abundance both in the sense of the amount of food and its diversity. Still, it applies only to certain parts of the world, meaning that there are regions and vast groups of people which do not have access to enough food even for meeting the elementary needs, and hunger and lack of drinking water poses one of the greatest problems of the modern society. The problem becomes even more crushing when we know that the human civilization developed so much that the research focus is pointed more to the Solar system and research of Mars than to solving existential problems on Earth, such as climate changes, pollution, and lack and improper distribution of food and drinking water. On the other side, in parts of the world where access to food and water is not a problem, there is a wide array of other issues and challenges that arise from the relationship to diet of, firstly, individuals, and then other factors. Ideally, along with an abundance of choice, proper decisions in regard to diet and food intake shall be implied, but in practice, the opposite often happens – out of that multitude, people decide on unhealthy choices for various reasons, which is particularly worrisome in children and adolescents. Such choices have different consequences, and these consequences have a price – from the individual, faced by those who endangered their health because of an unhealthy diet, to the collective, in the sense of expenses these consequences cause, whether it is for treatment of disorders caused by unhealthy diet, or foregone benefits due to impossibility of work because of health disorders caused by an unhealthy diet.

From that context, we arrive at the research problem of this paper. With complete respect and recognition of the problem of lack of food and water in general, the focus of this paper is pointed to parts of human society that enjoy the abundance of food, but for different reasons they make poor choices that consequentially bring harmful consequences both to individual and public health. The goals of this paper are to define the significance and elements of a healthy and unhealthy diet, to research causality between unhealthy food and increased risk of developing serious illnesses, to identify the dominant perception and habits of adolescents in regard to healthy and unhealthy dietary choices, as well as to research the true state and potential of useful activity of states and international organizations in control and labeling of safe food, and the role of mass media as the most powerful means of communication and consciousness-shaping in promotion of the culture of healthy diet and food safety culture. Additionally, one of the goals of this paper is to define specific recommendations for various stakeholders in this chain according to results and conclusions, and in the sense of the current and the desired state.

Methodology

In writing of this paper, the following methods were used: structural and functional analysis, in determining the effects of certain foods have on human health, to define healthy diet, to define carcinogenic contaminants, to define the other terms related to food safety and food security, to define the roles of international organizations for food safety control, and other stakeholders in the chain of food safety control; the descriptive method was used for describing the metabolic processes, the effects of certain foods on human health; the survey was used in collecting data about the perception of adolescents in regard of dietary choices, personal street-intercept survey, to be particular; deduction was used in defining the recommendations for the stakeholders; the normative method was used to describe current regulations and legislation in the domain of food safety.

Healthy food as the source of vitality

Food intake is a biological imperative for the growth, development, functioning, and survival of the human organism and represents a source of energy necessary for various biological and metabolic processes. Humans convert the chemical energy stored in the macronutrient constituents of food into energy. Dietary energy intake from food must balance energy expenditure due to metabolic functions and physical activity, plus extra energy costs such as growth during childhood (Roser et al., 2013). Within certain limits, humans can adapt to transient or enduring changes in energy intake through possible physiological and behavioural responses related to energy expenditure and/or changes in growth. Energy balance is maintained, and a new steady state is then achieved. However, adjustments to low or high energy intakes may sometimes entail biological and behavioural penalties, such as reduced growth velocity, loss of lean body mass, excessive accumulation of body fat, increased risk of disease, forced rest periods, and physical or social limitations in performing certain activities and tasks (Food and Agriculture Organization, 2004). In other words, the role of food is not only to satisfy hunger, but it allows the existence of the energy balance in the human organism, and by that, allows the functioning of the organism. Nonetheless, an adequate, healthy diet must satisfy human needs for energy and all essential nutrients. Furthermore, dietary energy needs and recommendations cannot be considered in isolation of other nutrients in the diet, as the lack of one will influence the others (Food and Agriculture Organization, 2004). This brings us to one of the theses of this paper that mass-consumed food and drinks that are considered unhealthy most often meet (and often surpass) the amount of energy necessary for metabolic processes and physical activity but do not meet far more complex needs related to adequate presence and amount of various nutrients that bring optimal biochemical and bioelectrical functioning of an organism.

Food safety in the narrow sense can be defined as the absence of risk in food, while in the broader sense, it can include nutritional characteristics and information about the unknown properties of food such as possible genetically modified food and the like (Bjelajac et al., 2017). This paper is focused on the broader sense of the previous definition since we primarily discuss food considered unhealthy without being

contaminated, meaning it is unhealthy due to the disbalance of energy and nutrients. Unsafe food in the sense of chemical, bacteriological or any other contamination is a separate problem, and it certainly helps the development of the most serious disorders and illnesses in human organisms. Therefore, in this paper, we will observe three categories of food: healthy food (uncontaminated food that contains adequate amounts of energy and nutrients), unhealthy food (uncontaminated food that contains inadequate amounts of energy and/or nutrients), and contaminated food (food exposed to chemical, biological, radioactive of physical contaminants).

Food is the most important source of vitality, and in certain geographical regions, like Japan or some Mediterranean islands, we can observe how the combination of a balanced diet and geographical attributes positively affects life expectancy, and despite not being the only one, it certainly is a very important factor in that. On the other side, parts of the world with insufficient food and water face not only shorter life expectancy but insufficient and improper development of children and adolescents, which is a direct consequence of undernourishment and shortage of food. On the third side, we have the most developed countries in the world, where poor choices in diet practically created an epidemic of obesity, which is also a public health problem, as obesity is often followed by other disorders and diseases, such as diabetes or increased risk of coronary diseases. In total, the problem of diet, meaning availability and choice of food, water, and beverages, is extraordinarily complex and shall be analyzed from specific angles with a proper focus, adapted to the concrete aspect of the problem.

Unhealthy food as one of the most significant risk factor for the development of malignant and other serious diseases

Food is a source of vitality, but it can be a factor causing the development of the most serious diseases. It has been estimated that 30-40 percent of all cancers can be prevented by lifestyle and dietary measures alone. Obesity, nutrient sparse foods such as concentrated sugars and refined flour products that contribute to impaired glucose metabolism (which leads to diabetes), low fiber intake, consumption of red meat, and imbalance of omega 3 and omega 6 fats all contribute to excess cancer risk (Donaldson, 2004). Protective elements in a cancer-preventive diet include selenium, folic acid, vitamin B12, vitamin D, chlorophyll and antioxidants such as carotenoids (alpha-carotene, beta-carotene, lycopene, lutein, cryptoxanthin) (Divisi et al., 2006). According to Donaldson (2004), a cancer-preventative diet would have: adequate, but not excessive calories, 10 or more servings of vegetables a day, including cruciferous and allium vegetables; vegetable juice could meet part of this goal, 4 or more servings of fruits a day, high in fiber, no refined sugar, no refined flour, low in total fat, but containing necessary essential fatty acids, no red meat, a balanced ratio of omega 3 and omega 6 fats and would include DHA, flax seed as a source of phytoestrogens, supplemented with ~200 μg/day selenium, supplemented with 1,000 μg/day methylcobalamin (B-12), very rich in folic acid (from dark green vegetables), adequate sunshine to get vitamin D, or use 1,000 IU/day supplement, very rich in antioxidants and phytochemicals from

fruits and vegetables, including α-carotene, β-carotene, β-cryptoxanthin, vitamin C (from foods), vitamin E (from foods), very rich in chlorophyll, supplemented with beneficial probiotics, and supplemented with oral enzymes. Such a diet would likely bring at least a 60–70 percent decrease in breast, colorectal, and prostate cancers, and even a 40–50 percent decrease in lung cancer, along with similar reductions in cancers at other sites (Donaldson, 2004). Said recommendations would bring a positive effect on risk decrease and prevention from other diseases, like coronary diseases and diabetes, and help better general health. There are many other disorders and diseases caused by an unhealthy diet, such as obesity, diabetes, cardiovascular diseases, and others. A healthy population is a basis and the most important resource of a healthy society, and the current pandemic of COVID-19 shown that good general health was the reason for survival in certain cases since nearly all the health disorders and diseases mentioned in this paper represented a strongly increased risk factor from serious development of COVID-19 – from obesity to cancer.

Food that is generally healthy can be carcinogenic if it contains carcinogenic contaminants in the amount that surpasses the recommended ones. Numerous food contaminant concerns exist, and several food contaminants have been confirmed as carcinogenic to humans. Possibly the clearest example is the finding that aflatoxin is a major cause of liver cancer, especially in lower resource countries and in populations where infection with hepatitis B is common (Abnet, 2007). In addition to aflatoxin, which was brought to the focus of the public in our country due to its content in milk, which far surpassed the allowed amount, the other contaminants that are proven to be carcinogenic in humans are alcoholic beverages and dioxin (2,3,7,8-tetracholordibenzo-*p*-dioxin) (Abnet, 2007). The National Toxicology Program of the US Department of Health and Human Services publishes the Report on Carcinogens. The current edition lists more than 50 substances as known to be human carcinogens, many of which are a product of environmental, industrial, or radioactive pollution (see more: National Toxicology Program, 2016). Although the debate is ongoing about the carcinogenicity of depleted uranium that contaminated soil and water by the usage of ammunition that contained this substance during the NATO bombing campaign of the Federal Republic of Yugoslavia in 1999, it is undisputed that one of the military targets of the NATO were oil refineries and storages. The environmental catastrophe was caused by fire of oil tanks in Pancevo, Novi Sad, and Čukarica in Belgrade. Oil burning releases various cyclic compounds, which are also very harmful, and under the influence of sunlight and other factors, dioxins are released, too (Bjelajac et al., 2013). Dioxin is extremely stable, both to environmental and biological breakdown, leading to its persistence in the environment and its bioaccumulation in the food chain. Because of its high lipophilicity and water insolubility, dioxin concentrates in sediments and is incorporated into the fatty tissue of fish, birds, reptiles, and mammals. Much of its presence in plants is due to atmospheric transport on particles, resulting in settling on the leafy tissues of plants (Birnbaum, 1994). Therefore, food is a very important factor both in the prevention and in the risk-increase of development of malignant and other

serious diseases by their properties, and their presence in a diet is most often a choice of individuals. Nonetheless, with food contaminated with carcinogenic contaminants through the soil, water, and air, transparency, consciousness, and communication about the existing contamination or ecological risk are key preventative factors.

Perception of adolescents regarding healthy and unhealthy food

Adolescents have a distorted perception of the significance of a healthy diet. Food safety is one of the most important elements of security culture, and ignorance of principles of security culture in the domain of food safety is particularly harmful precisely in that age when the process of mental and physical development is still ongoing. We shall stress that with adolescents, the creation of habits and perception lays of four foundations – family, school, peers, and media. All four factors are very influential, and they amplify or soften the effect other factors helped created, whether it is a positive or a negative effect. The authors of this paper conducted research with the goal of determining the perception of dietary choices in adolescents. The research[4] was conducted with students of eight elementary schools and high schools in Belgrade and Novi Sad in period from September 1st, 2019 to December 20th, 2019. The research was conducted by the authors with associates. The type and size of the sample was a random, representative sample of 814 students of higher grades of elementary schools and high schools, which simultaneously represent the sample frame. Sample selection was made by street-intercept random sampling in the vicinity of said elementary and high schools. The selection of the respondents was made by random sampling on the day of the survey. The research technique was a personal, face-to-face technique, while the research instrument was the questionnaire. Based on the methodology established during the conducting of this research, the following categories of respondents were enveloped: gender structure – 52% females and 48% males; age structure – 47% aged 11-15 and 53% aged 16-19. In regard to education/profession, the sample consisted of: 11% - 5th graders, 10% - 6th graders, 14% - 7th graders, 12% - 8th graders, 13% - high school 1st graders, 14% - high school 2nd graders, 15% - high school 3rd graders, and 11% - high school 4th graders. The questionnaire included questions regarding the number and type of daily meals, the consummation of certain ingredients and food, consummation of carbonated and non-carbonated juices and soft drinks, consummation of energy drinks, as well as to certain aspects of daily activities relevant to the creation and release of certain nutrients necessary for the balanced diet, such as habits in spending their free time and extracurricular activities.

4 This research was conducted for inclusion in the second, amended edition of the monography "Security Culture – The Art of Living" by author Željko Bjelajac, which will be published at some time after this paper is published. Only a portion of the data gathered by the research is presented in this paper, and it is previously unpublished.

Table 1. Frequency of intake of certain food and beverages on a weekly basis in students of elementary and high schools in Serbia

Food/Beverage	Never	%	1-2 times	%	3-4 times	%	Every day	%
Pastries	49	6%	163	20%	488	60%	114	14%
Fast food (barbecue, sandwich, pizza	98	12%	358	44%	293	36%	65	8%
Juices and soft drinks (carbonated and non-carbonated)	90	11%	122	15%	228	28%	374	46%
Energy drinks	423	52%	204	25%	163	20%	24	3%
Sweets	41	5%	114	14%	179	22%	480	59%
Vegetables	24	3%	57	7 %	212	26%	521	64%
Fruits	16	2%	41	5 %	155	19%	602	74%
Milk	16	2%	49	6 %	163	20%	586	72%
Dairy products	16	2%	57	7 %	171	21%	570	70%

Source: Authors' research

Results shown in Table 1 include both foods brought from home and food purchased during school time, as that fact was irrelevant for frequency analysis of weekly intake of certain food and beverages. What is concerning is that around 2% of school-age children do not consume milk or dairy products on a weekly basis and that sweets are consumed daily by nearly 60% of the children. Results of this research are comparable to results of other studies of dietary habits of children conducted on the territory of the Republic of Serbia recently (see more: Institute for Public Health of Serbia, 2014; Švonja-Parezanović, Perić-Prkosovački, 2014).

The necessity of the proactive role of international organizations for food safety control

The Food and Agriculture Organization (FAO) is a specialized agency of the United Nations that leads international efforts to defeat hunger. Their declared goal is to achieve food security for all and make sure that people have regular access to high-quality food to lead active and healthy lives. FAO works in 130 countries worldwide and has 194 member states. It was founded in 1945 and is headquartered in Rome, Italy (see more: Food and Agriculture Organization, 2020). Together with the WHO, they created the Codex Alimentarius, or "Food Code," which is a collection of standards, guidelines and, codes of practice adopted by the Codex Alimentarius Commission. The Commission, also known as CAC, is the central part of the Joint FAO/WHO Food Standards Programme and was established by FAO and WHO to protect consumer health and promote fair practices in food trade. The Commission held its first meeting in 1963 and adopted numerous standards, principles, and guidelines, among which the most important ones are General Principles on Food Hygiene from 1969, General Standard for the Labelling of Prepackaged Foods from 1985, General Standard for Contaminants and Toxins in

Food and Feed on 1995, General Standard for Food Additives from 1995, etc. Some of the main areas of their concern are animal feed, contaminants, antimicrobial resistance, nutrition and labeling, biotechnology, and pesticides. But, as with many other international organizations, their standards and related texts are voluntary and have to be translated into national legislation or regulations to be mandatory and enforceable. Still, these standards are applied in the international food trade, and are in the international food trade between its 188 member countries (see more: Food and Agriculture Organization, World Health Organization, 2020).

The World Food Programme (WFP) is the leading humanitarian organization delivering food assistance in emergencies and working with communities to improve nutrition and build resilience. For its efforts to combat hunger, for its contribution to bettering conditions for peace in conflict-affected areas, and for acting as a driving force in efforts to prevent the use of hunger as a weapon of war and conflict, WFP was awarded the Nobel Peace Prize in 2020**.** In 2019, WFP assisted 97 million people – the largest number since 2012 – in 88 countries. On any given day, WFP has 5,600 trucks, 30 ships, and nearly 100 planes on the move, delivering food and other assistance to those in most need (World Food Programme, 2020). The WFP was first established in 1961 after the 1960 Food and Agricultural Organization (FAO) Conference. WFP formally started its work in 1963 with a mandate from the FAO and the United Nations General Assembly on a three-year experimental basis. In 1965, the programme was extended to a continuing basis (Zalite, 2013). As humanitarian food assistance and emergency relief organization, their focus is more on food security than food safety, but they nonetheless have an important role in increasing the level of food safety in countries they provide relief.

The World Health Organization (WHO) is a specialized agency of the United Nations, financially subordinate to the United Nations Economic and Social Council. It has around 7,000 employees in 150 countries and regions and an annual budget of around $4.2 billion. As an umbrella organization for care about global health and making recommendations and decisions about procedures in health crises (Bjelajac, Filipović, 2020a). Although it is not its main task, the WHO is involved in the betterment of food safety standards and control through the prism of public health. As we've mentioned, they work jointly with the FAO on Codex Alimentarius, and they are partnering with numerous international and local organizations through their Department of Food Safety and Zoonoses (FOS). The WHO has declared food safety as a public health priority, and through FOS, helps its member states to develop food safety policies and implement risk-based foodborne disease surveillance, prevention, and control programs (see more: WHO, 2020).

The European Food Safety Authority (EFSA) is the agency of the European Union, established in 2002, with headquarters in Parma, Italy. EFSA provides independent scientific advice on food-related risks and issues advice on existing and emerging food risks. This advice informs European laws, rules, and policymaking – and so helps protect consumers from risks in the food chain. Its remit covers: food and feed safety, nutrition, animal health and welfare, plant protection, plant health. EFSA's

work involves: gathering scientific data and expertise, providing independent, up-to-date scientific advice on food safety issues, communicating its scientific work to the public, cooperating with EU countries, international bodies, and other stakeholders, boosting trust in the EU's food safety system by providing dependable advice (see more: European Union, 2020). Its work overlaps in some sections with the FAO and the CAC, but it also adds an additional layer of protection and communication to the European consumers, allowing their choices to be better-informed and informing them of the risks.

In Serbia, with the adoption of the Law on Amendments to the Law on Food Safety, our legislation is fully harmonized with the international standards in regard to food safety. In Article 14, paragraph 1 of the Law, it is written that "International obligations in the field of food safety are performed in accordance to standards, guidelines, guides, and recommendations of the relevant international organization, including the Codex Alimentarius Commission, Agreement on sanitary and phytosanitary measures of the WTO (SPS Agreement), international conventions and other applicable international agreements, and the information is exchanged with other national organizations responsible for food safety" (The Official Gazette of the Republic of Serbia, 2009). Article 25, which regulates prohibition of trading of unsafe food, prescribes that the food is unsafe if it contains: plant protection products, biocides or contaminants, or their metabolites and decomposition products above maximum allowed concentrations; plant protection products, meaning biocides whose use is not approved or allowed, substances with pharmacological effect or their metabolites that must not be given to animals used for food production, or they surpass maximum allowed amounts of residue or are not approved or registered for application on animals used for food production, or are not allowed as additives in feed for animals used for food production; substances with pharmacological effect or their metabolites in animals that were treated, without compliance to prescribed withholding period; microorganisms, viruses, parasites and their developmental forms that pose a danger to health of people: substances (physical, chemical, radioactive) that in itself or together with other substances surpass maximum allowed values and pose a danger to human health (The Official Gazette of the Republic of Serbia, 2019). The development of agriculture and the provision of health-safe food are common concerns of the international community (Jurjević et al., 2019). The process of legislative harmonization within to process of the accession to the European Union shows positive aspects in the domain of food safety, and the hope remains that the institutions of our country will regulate aspects of certain food and beverages that do not classify them as unsafe, but make them unhealthy, such as the amount of sugar per unit of mass or volume. Still, there is an impression that both on the national and international level, much more can be done – like strict control and implementation of standards "from farm to table" on the national level, while on the international level by creating mechanisms and instruments that would not be just on voluntary and non-binding recommendations level, but much more strict approach, where adoption and application of recommendation and standards would be binding

for member-states of international organizations that prescribed them, together with the right to direct control of the application of these standards in the member-states. The field where the standards and regulations of food safety are most often met is the food trade, particularly international, as the specificity of trade in the agro-industry stems from the importance of these products for the health and life of the population (Prdić, Kuzman, 2019). Therefore, the same level of following protocols and meeting standards has to be secured in the food trade at every level.

The crucial role of mass media in the development of collective consciousness in the domain of healthy food

Mass media play a key role in the process of information dissemination, as well as in the process of creation of the collective consciousness, and one of the key techniques in these processes is propaganda. From a modern perspective, propaganda seems inseparable from media of mass communication, which have the ultimate potential for dissemination of information, as well as for engineering of consciousness and public opinion manipulation because of their efficacy, availability, and constant presence (Filipović, Spaić, 2020). When discussing propaganda, it is generally perceived as a negative phenomenon, mostly because of manipulation, which is its consisting part, and in itself has a negative connotation. But *per se*, propaganda is neither a good nor a bad thing, and it can be used both for good and bad. In the context of this paper, we discuss the influence and potential of mass media in the creation of positive collective consciousness about the importance of healthy and safe food, and propaganda is one of the communications techniques that mass media regularly use, and every program/content the media broadcast or distribute contain elements of propaganda. Here we think mostly about economic propaganda, meaning advertising, which is the main source of income of mass media. On one side there are companies that try to improve sales of their products or services in every possible way, and their readiness to pay large sums of money for advertising in media of mass communication, and on the other side there are media, for which the advertising money is also crucial, so any other interest and motive disappears in such constellation. Naturally, there are laws and regulations that separately regulate both the domain of media and the domain of advertising, so there are large improvements when compared to earlier periods. Before, tobacco manufacturers and ad agencies were unscrupulous in finding ways to improve the sales by advertisements, so the ads for cigarettes often included the depiction of children who smoke. By strict regulation of tobacco products, not only their advertisement was forbidden, but brand names and packaging of tobacco products were changed, with a clear warning of their harmfulness, which in certain countries include graphic depictions of diseases smoking can cause (Bjelajac, Filipović, 2020b). Naturally, the media will always advertise any product whose advertising is not prohibited, so it shall not be expected that the media will behave differently than the individuals whose consciousness they affect in the process of forming the collective consciousness about the importance of healthy food and balanced diet – both will choose the simplest and fastest solutions at their disposal,

whether it is about diet or program creation. Therefore, cohesion and joint activity of international organizations, countries, and their media partners are necessary to reach the potential of mass media in this domain. Such a far-reaching joint project should be permanent, and its results would be measurable only after a certain passage of time.

In the meantime, the media should not disregard performing their own functions. As mass media, in principle, have their roots in journalism, the performing of informative function is the reason for their existence, and it is exactly what individuals and society expect from them. Through mass media, the public regularly receives its daily amount of reliable information, which in the end help the individuals to realize their position in the society, and wider, in the global community (Bjelajac, Filipović, 2018). In that sense, education function is a certain superstructure, but media can achieve the education function in a satisfactory manner if they perform their informative function in a desirable way. Simply, if the citizens can obtain enough clear information through the media so they can make an informed choice on every topic, then we can say that the media performed its primary function. The influence of media on the affirmation of food safety can be divided into two categories: influence through basic media content (articles, shows, reports, audio, and video clips, etc.) and influence through advertising content (Bjelajac, Filipović, 2020b). If media broadcasts content that promotes the culture of a healthy diet in one hour of their program, the positive effect created by such program can be negated if in one of the next hours of the program there is product placement of, i.e., an energy drink which contains vast amounts of sugar. In that, and in similar examples, confusion appears in consumers of media content, which can lead to faulty conclusions, but what practically is inevitable in such cases is that previously achieved positive educational effect is annulled. Therefore, the media must take a more proactive role, in accordance with their role in the society and functions they must perform so they would have a legitimate right to occupy and use the media space, which has to be perceived as public property.

Results and Discussion

The value of human life is above any other interest. The quality of human life most directly depends on human health, and food has an extremely important effect on health, as well as on the process of growth and development of children and adolescents. We have stressed that the topic of safe food shall be looked at as two separate topics – food safety and food security. With that in mind, we can see a dramatic difference between poor and rich parts of the world – in poor countries, food security is a much bigger problem because if there is not enough food, its nutritional value is not the most important, but nevertheless, it has to be safe for consumption. On the other side, the question of food safety in the broader sense of its definition is one of the largest problems of the richer part of the world. We have stated the correlation between the diet and the increased risk of developing serious disorders and diseases, which are a burden for the affected individual, their family, but also the economy, society, and state. The good general health of individuals is a precondition for sustainability and development

of healthy states and societies, even if we disregard the financial burden created by the diseases caused or worsened by unhealthy dietary choices.

One of the limitations both in the research of this phenomenon and the application of the conclusion lies in the fact that even healthy food, or even organic food, can become unhealthy during storage or preparation, particularly during heat treating. Therefore, the role of every individual is extremely important, and in order for individuals to perform their role in an adequate manner, they must be conscious and well-informed. It is one of the reasons for insisting on increasing the level of security culture, whose very important part is food safety culture. Food operators must ensure food safety at all stages of handling food, substances, raw materials, semi-finished products. The direct responsibility of the operator for the safety of food is emphasized – the operator must be able to demonstrate the awareness of potential risks (Burešova et al., 2020). Existence and presence of food safety culture at every level consequentially guarantee the presence of consciousness and knowledge of each parameter related to a healthy diet, which significantly increases the probability of respecting those parameters, and provides the problem solving from its starting, most basic level, which is the individual and their family.

We have concluded that the creation of perception and habits in children and adolescents is based on four foundations – family, school, peers, and media. Unfortunately, one of the negative aspects of the contemporary society is that, in a way, agriculture disappeared from culture, in the sense that the majority of children living in cities develop without consciousness of the basic natural causality, from seed to fruit, and everything that is necessary before, during and after that process in order for it to be successful. Oversimplified, fruits do not grow in supermarkets, despite often being the only place where children can see fruits and vegetables, not to mention seeing living farm animals they can hardly see in cities. That complex correlation between an individual, culture, nature, and knowledge and awareness of natural processes is worthy of further wide multidisciplinary studies.

Simultaneously with the food chain, we can say there is a chain of responsibility for a healthy diet and food safety in general. Its links are individuals, family, education system, media, food producers (distributors and retailers have their responsibility in this chain, but since it's significantly lesser compared to other links, we will not explore them in more detail here), state and state institutions, and international organizations. The dysfunction exists in every link of the chain, and it is one of the obstacles and challenges that must be overcome, so the process of solving the problem of unhealthy dietary habits can begin. In that sense, and in accordance with the results and conclusions we arrived at in this paper, we can define certain recommendations for every link of this chain:

- Individuals shall raise the level of their awareness and knowledge of aspects of a healthy diet, of benefits and consequences of the long-term intake of a certain food, and be a positive influence on other individuals in their social circle;
- The family shall take care of a healthy and balanced diet at home as one of the most important factors both for health and proper development of children and adolescents;

- Education system shall introduce studying of security culture as a separate class in their syllabuses since food safety, and a healthy diet are basic elements of security culture;
- Media shall raise the level of their programming responsibility to a healthy diet and food safety culture as an extremely important factor of human health, to promote healthy food as much as possible in their content, both basic and advertising, and to not promote unhealthy food and beverages before 22h, meaning during the time when it is probable that the children are watching their program;
- Food manufacturers shall follow the standards of food safety or reduce the amount of potentially harmful nutrients in their products as much as possible, such as various sugars;
- State and its institutions shall secure the application of food safety standards with mechanisms at its disposal, such as inspections and frequent analysis of food already on the market, in order to provide sustainability of following the standards. Similar to the existing mandatory distance of certain establishments from schools, fast food objects shall be removed from schools at least 150 meters. Additionally, it would be greatly beneficial to introduce the system of color-coding of food and beverages in accordance with the nutritional contents of the product. In such a way, food and beverages that are unhealthy due to the disbalance of nutrients and energy shall be marked with a red rectangle on the label on the packaging, while food and beverages that are healthy would be marked with a green rectangle. In cases of unhealthy food, a warning about the potential harmfulness of the products and the reasons for harmfulness shall be written inside the red rectangle, in addition to the list of ingredients, energy, and nutritional values of the product, which shall be written inside the rectangles in both instances;
- International organizations shall, as a first step towards adopting mandatory recommendations, prescribe sanctions for countries that do not follow the standards of these organizations, to which they are obligated by their membership status, as well as to perform unannounced control of the manufacturers and distributors of food in regard of following standards. Sanctions for not following standards and regulations could range from suspension or exclusion from membership to recommendations to other international organizations to penalize the countries breaching the standards, for example, to the World Trade Organization, among others.

Conclusions

There is a large disbalance between the normative and the real in domains of food safety, healthy food, and healthy diet. While these domains are well-regulated, the reality of the situation is that many of these regulations and standards are on paper only. Food safety, in the narrow sense of the definition, is generally good and in accordance with international standards, but in the broader sense, which is of capital importance in domains of healthy food and healthy diet, it is often subjugated to other interests, mostly financial in nature. In a situation where environmental pollution and climate changes can create unseen and unpredictable consequences, it is ever more important to develop and maintain awareness

and knowledge of the correlation between food and health and to act accordingly, and that is the only sustainable way to achieve health through diet and food safety.

Conflict of interests

The authors declare no conflict of interest.

References

1. Abnet C.C. (2007). Carcinogenic food contaminants. *Cancer investigation*, *25*(3), 189–196. https://doi.org/10.1080/07357900701208733
2. Birnbaum, L.S. (1994). The mechanism of dioxin toxicity: relationship to risk assessment. *Environmental Health Perspectives, 102*(9), 157-167. https://doi.org/10.1289/ehp.94102s9157
3. Bjelajac, Z., Pocuca, M., & Dukic-Mijatovic, M. (2013). Uranium and Dioxin Consequences of Bombing of Yugoslavia in 1999 and Its Impact on the Ecosystem and Human Health. *Journal of Environmental Protection and Ecology, 14*(2), 480-492.
4. Bjelajac, Ž., Dukić-Mijatović, M., Dragojlović, J. (2017). Food safety as one of the main preoccupations of a modern man. *Economics of agriculture, 64*(1), 191-204. https://doi.org/10.5937/ekoPolj1701191B
5. Bjelajac, Ž., Filipović, A. (2018). Influence of mass media on degradation of contemporary society. *The Culture of Polis, 15*(Special issue), 9-21. [in Serbian: Bjelajac, Ž., Filipović, A. (2018). Uticaj masovnih medija na degradaciju savremenog društva. *Kultura polisa, 15*(posebno izdanje), 9-21].
6. Bjelajac, Ž., Filipović, A. (2020a). Lack of Security Culture in Facing the COVID-19 Pandemic. *The Culture of Polis, 17*(42), 383-399.
7. Bjelajac, Ž., Filipović, A. (2020b). The role of the media in the affirmation of the culture of food safety. *Economics of agriculture, 67*(2), 609-622, https://doi.org/10.5937/ekoPolj2002609B
8. Burešova, P., Mrkvova, K., & Dudić, B. (2020). Changes in gastronomy. *Hotel and Tourism Management*, *8*(1), 79-88. https://doi.org/10.5937/menhottur2001079B
9. Divisi, D., Di Tommaso, S., Salvemini, S., Garramone, M., & Crisci, R. (2006). Diet and cancer. *Acta bio-medica: Atenei Parmensis*, *77*(2), 118-123.
10. Donaldson, M.S. (2004). Nutrition and cancer: a review of the evidence for an anti-cancer diet. *Nutrition journal*, *3*(1), 19-28. https://doi.org/10.1186/1475-2891-3-19
11. European Union (2020). European Food Safety Authority. Retrieved from https://europa.eu/european-union/about-eu/agencies/efsa_en (May 8, 2020).
12. Filipović, A., & Spaić, I. (2020). Propaganda in a function of a systemic instrumentalization of media for ultra-nationalist purposes. *LAW - Theory and Practice*, *37*(3), 61–75. https://doi.org/10.5937/ptp2003061F

13. Food and Agriculture Organization of the United Nations (FAO). Retrieved from http://www.fao.org/about/en/ (December 1, 2020).
14. Food and Agriculture Organization, The World Health Organization. (2020). *Codex Alimentarius*. Retrieved from http://www.fao.org/fao-who-codexalimentarius/en/ (May 8, 2020).
15. Food and Agriculture Organization. (2004). Human energy requirements. Retrieved from http://www.fao.org/3/Y5686E/y5686e04.htm (May 9, 2020).
16. Institute for Public Health of Serbia, (2015). Evaluation of the program "Let's Grow Healthy" -2014. [in Serbian: Institut za javno zdravlje Srbije, (2015). Evaluacija programa "Zdravo rastimo "– 2014].
17. Jurjević, Ž., Bogićević, I., Đokić, D., & Matkovski, B. (2019). Information Technology as a Factor of Sustainable Development of Serbian Agriculture. *Strategic Management*, *24*(1), 41-46, https://doi.org/10.5937/StraMan1901041J
18. Law on Amendments of the Law on Food Safety, The Official Gazette of the Republic of Serbia, 17(2019) [in Serbian: Zakon o izmenama i dopunama Zakona o bezbednosti hrane, Službeni glasnik RS, 17(2019)].
19. Law on Food Safety, The Official Gazette of the Republic of Serbia, 41(2009) [in Serbian: *Zakon o bezbednosti hrane*, Službeni glasnik RS, 41(2009)].
20. National Toxicology Program. (2016). Report on Carcinogens, Fourteenth Edition.; Research Triangle Park, NC: US Department of Health and Human Services, Public Health Services. Retrieved from https://ntp.niehs.nih.gov/go/roc14 (May 13, 2020).
21. Prdić, N., Kuzman, B. (2019). The Importance of Auctions for Agroindustrial products trade. *Ekonomika*, *65*(1), 107-116. https://doi.org/10.5937/ekonomika1901107P
22. Roser, M., Appel, C., Ritchie, H. (2013). Human Height. Published online at OurWorldInData.org. Retrieved from: https://ourworldindata.org/human-height (November 30, 2020).
23. Švonja-Parezanović, G., Perić-Prkosovački, B. (2014). Nutritional Status and Dietary Habits of Young People. *PONS Medical Journal*, *11*(2), 48-52, https://doi.org/10.5937/pons11-7222
24. World Food Programe (WFP). Retrieved from https://www.wfp.org/overview (December 3, 2020).
25. World Health Organization. (2017). Food Safety and Zoonoses. Retrieved from https://www.who.int/foodsafety/about/FOSSP-En.pdf?ua=1 (December 1, 2020).
26. Zalite, E. (2013). World Food Programme – An Overview. *Stanford University Library.* Retrieved from https://library.stanford.edu/sites/default/files/widget/file/zalite_wfp_unday2013_0.pdf (November 12, 2020).

PAPER TITLE – USE CAPITAL LETTERS, CENTER, BOLD, TIMES NEW ROMAN, SIZE 12

First Author Name (10pt italic, center align)[1], First Co-Author Name (10pt italic, center align)[2], Second Co-Author Name (10pt italic, center align)[3]

**Corresponding author E-mail: (10pt italic, center align)*

A R T I C L E I N F O

Original/Review Article

Received: *xx May 2018*

Accepted: *xx September 2018*

doi:xxx

UDC xxx

Keywords:

should include 4-6 key words that summarize the contents of the paper /Times New Roman, Italic, 10/

JEL:(www.aeaweb.org/jel/jel_class_system.php) */Times New Roman, Italic, 10/*

A B S T R A C T

The abstract should contain a maximum of 150 words. The abstracts should avoid any abbreviations and mathematical formulas.
The abstract is a summarization of the full report, written in one paragraph, and should include next elements:

1. Purpose
2. Methodology
3. Results
4. Conclusions
5. Recommendations
6. Additional data

/Times New Roman, 10/

Introduction

Page setup: Paper size: width 170 mm x height 240 mm; Margins: top/bottom 20 mm, left/right 18 mm; Layout: header 1,25cm, footer 1,25cm; Orientation: Portrait.

Articles should be written only in English. It is advisable to write the article in the third-person singular or plural with the use of active form. Before paper submission, please check grammatical and spelling mistakes by the spellchecker for the English language.

Paper volume up to 30.000 characters (without spaces) or 15 full pages including the text, figures, tables, references list and appendices. Articles should not be shorter than 10 pages. Depending on papers' quality, Editorial Board could also accept longer articles. Article has to be prepared electronically (on computer), in program MS Word 2003 or some later version of this program.

1 Name, academic position,institution, address, phone number, e-mail, ORCID ID (https://orcid.org/)

2 Name, academic position,institution, address, phone number, e-mail, ORCID ID (https://orcid.org/)

3 Name, academic position,institution, address, phone number, e-mail, ORCID ID (https://orcid.org/)

Introduction is the first section of an IMRAD paper. It purposes is to state clearly the problem investigated and to provide the reader with relevant background information. State the objectives of the work and provide an adequate background, avoiding a detailed literature survey or a summary of the results.

The purpose of the Introduction should be to supply sufficient background information to allow the reader to understand and evaluate the results of the present study without needing to refer to previous publications on the topic. Much of the Introduction should be written in the present tense. /Times New Roman, 11/

Please define abbreviations and acronyms during their first occurrence within the text, even in case that they were previously defined in article summary. Do not use abbreviations in article title, unless they can not be avoided.

Sub-headings should be written by font **Times New Roman**, **font size 11**, **bold**, **centred**, only first letter capital, interspace between sub-heading and paragraph above 6 pt (**before 6 pt**), and interspace between sub-heading and paragraph below 6 pt (**after 6 pt**). Please use the writing style presented in this template.

Materials and methods

Materials and methods are the second section of an IMRAD paper. Its purpose is to describe the experiment in such retail that a competent colleague could repeat the experiment and obtain the some or equivalent results. Provide sufficient detail to allow the work to be reproduced. Methods already published should be indicated by a reference: only relevant modifications should be described.

For equations and formulas use the Microsoft Equation Editor or addition for equations writing MathType (www.mathtype.com). Use of built-in equation editor within the program Word 2007 is not recommended. Please check if all symbols within the equations/formulas are defined (forthwith after equation/formula). The equations are written using Microsoft Word (MathType); they are consecutively numbered and centered.

Results

Results are the third section of an IMRAD paper. Its purpose is to present the new information gained in the study being reported. It should be clear and concise. The Results are core of the paper. You shouldn`t start the Results section by describing methods that you inadvertently omitted from the Materials and Methods section. The Results must be writing in past tense.

Discussions

The final section of an IMRAD paper. Its purpose is to fit the results from the current study into the preexisting fabric of knowledge. The important points will be expressed as conclusions. This should explore the significance of the results of the work, not repeat them. A combined *Results and Discussion* section is often appropriate. Avoid extensive citations and discussion of published literature.

Many papers are rejected by journal editors because of a fault Discussion.

Conclusions

The main conclusions of the study may be presented in a short Conclusions section, which may stand alone or form a subsection of a *Discussion* or *Results and Discussion* section. Conclusions should provide a summary of important findings and their implicants to the area of research that is the forms of the article.

Acknowledgements

Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.). They should be brief.

Conflict of interests

The authors declare no conflict of interest.

References

All manuscripts should be formatted using the American Psychological Association (**APA**) citation style. For additional examples, consult the most recent edition of the Publication Manual of the American Psychological Association.

Reference (author(s) of quotes) has to be entered directly in the text of article in next form (Petrović, 2012; or Petrović, Marković, 2012; or Mirković et al., 2012). Please do not write them as indexes in square brackets [3] or in footnote. Try to use a footnote only in the case of closer explanation of certain terms, or clarification of real and hypothetic situations. ***Do not numerate the pages.***

Reference list should only include works that have been published or accepted for publication. Unpublished works should be only mentioned in the text. Reference list should be with the bibliographic details of the cited books, book chapters, or journal articles.

References in not-English languages should be translated in English, and the English language has to be mentioned in brackets, for example: Максимовић, Г., Секулић, Д., Петровић, А., & Драгичевић, Д. (2017), Савремени трендови и нове стратегије конкурентности у хотелијерству, *Менаџмент у хотелијерству и туризму,* 5(2), 27-35. [in English: Maksimović, G., Sekulić, D., Petrović, A., & Dragičević, D. (2017). Contemporary trends and new competitiveness strategies in hotel industry. Hotel and Tourism Management, 5(2), 27-35.].

Literature units have to be written in font TNR, font size 11, alignment Justified, with mutual interspace of 3 pt - before/after. In all literature units only surnames are written as a whole, while all authors' names has to be shorten on to initial (initials have to

be set after surnames). Please, write surnames of all authors (do not use the style Petrović et al.). Do not combine literature units (under each ordinal number can be only one literature unit) and always write complete titles of used literature units. If used/cited literature was taken over from the internet publication, after adequate writing of literature unit, in brackets has to be note complete link from which material was taken over (available at: www.fao.org).

Citation of Books

Author's surname Initial(s) of the given name(s). (Year of Publication) *Title of Book*, Volume number (if relevant), edition (if relevant). Publisher, Place of Publication

Citation of Articles

Author's surname Initial(s) of the given name(s). (Year of publication) Title of article. *Journal Volume number* (and issue number if issues within a volume number are not consecutively paginated): Number of first and last page of article, DOI

If the cited paper is given a DOI number, it should also be included.

Citation of Websites

Author's surname Initial(s) of the given name(s). (if known) title, type of document (if relevant), date of issue (if available), web address and date of access, if the document or the website may be subject to change.

Citing a journal article found online

Author, A. (Publication Year). Article title. Periodical Title, Volume(Issue), pp.-pp. DOI:XX.XXXXX or Retrieved from journal URL

Example:

1. Cvijanović, D., Trandafilović, S., & Imamović, N. (2013). Marketing concept in terms of agricultural enterprises development in transitional countries. *Economics of Agriculture, 60*(1), 113-122.
2. Hjalager, A. M., & Richards, G. (Eds.). (2003). *Tourism and gastronomy*. Routledge, London.
3. Mićović, A. (2017). Tourism Development and Evolution of Tourism Related Rules, *2nd International Scientific Conference – Thematic Proceedings II*, Faculty of Hotel Management and Tourism, Vrnjačka Banja, 181-202. Retrieved from http://www.hit-vb.kg.ac.rs/conference/images/thematic_proceedings/2017_II.pdf
4. Stošić, L., & Stošić, I. (2013). Diffusion of innovation in modern school. *International Journal Of Cognitive Research In Science, Engineering And Education (IJCRSEE),* 1(1), 12-24.

5. Domanović, V., Vujičić, M., & Ristić, L. (2018), Profitability of food industry companies in the Republic of Serbia, *Economic of Agriculture*, 65(1), 11-32. doi:10.5937/ekoPolj1801011D
6. The Food and Agriculture Organization of the United Nations (FAO), Retrieved from http://www.fao.org (July 31, 2018)

TABLES AND FIGURES

All tables are to be numbered using Arabic numerals.

Tables have to be created within the text of article, not taken in the form of images from other documents. Tables should be numerated according to order of their appearance. Titles of the tables have to be given immediately above the table to which they relate. Please use following style during their formatting. Title of the table should be set with the interspace 6 pt - before and 3pt - after, in font TNR, font **size 10**, alignment **Centered**. Text within the table should be written in the font TNR, font size 9. Bold the text in the heading. Start with next paragraph at the interspace of 6 pt from the table source or note (after). During the article writing please mark in the main text all calls to a certain table (*Table 5*.). Try to fit all tables in article within the specified format of the page (Table properties – preferred width – max 97% - alignment: center). Complete text within the table cells has to be entered in next form (paragraph - spacing: before/ after 0 pt, line spacing: single). In case when table breaks on next page, broken part of the table on next page has to be accompanied by a table header.

Identify any previously published material by giving the original source in the form of a reference at the end of the table caption.

Footnotes to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data) and included beneath the table body.

For the best quality final product, it is highly recommended that you submit all of your artwork – photographs, line drawings, etc. – in an electronic format.

Example:

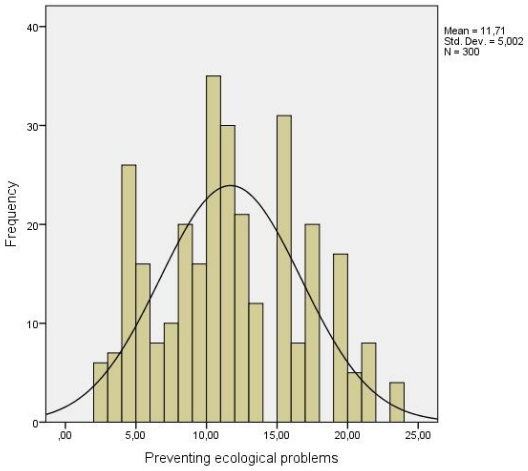
Table 1. The distribution cost of packaged goods from Subotica to retail-store objects

Indicators	Period			Total
	Month 1	Month 2	Month 3	
Distance crossed (km)	12.926	11.295	13.208	37.429
Fuel consumption (litre)	3.231	2.823	3.302	9.356
Value of fuel consumption (RSD)	242.378	211.790	247.653	701.821
Total time spend on touring (hour)	314	266	417	997
Value of total time spend on touring (RSD)	47.048	39.890	62.570	149.508
Number of tours	98	77	102	277
Toll value (RSD)	0	0	0	0
Number of pallets transported (piece)	1.179	976	1358	3.513
Total weight transported (kg)	602.600	429.225	711.116	1.742.941
Vehicle maintenance costs (RSD)	203.858	164.970	224.806	593.634
Lease costs (RSD)	480.938	454.214	565.784	1.500.936
Total sum (RSD)	974.222	870.864	1.100.813	2.945.899

Source: Petrović, 2012

All illustrations whether diagrams, photographs or charts are referred to as Figures. The name and number of figures should be centered on the line above a figure.

Figure 1. Agriculture, value added (% of GDP)



Source: Authors' calculations

Technical preparation, prepress and printing:
DIS PUBLIC D.O.O., Braće Jerković 111-25, Belgrade, phone/fax: 011/39-79-789

Number of copies:
300 copies

The Balkan Scientific Association of Agrarian Economists, Belgrade, Serbia, Institute of Agricultural Economics, Belgrade, Serbia and Academy of Economic Studies, Bucharest, Romania is pleased to announce that journal **ECONOMICS OF AGRICULTURE** has been accepted for indexing in the ***Emerging Sources Citation Index (ESCI),*** a new edition of Web of Science.

Content in ESCI is under consideration by Clarivate Analytics, the owner of Web of Science, for additional indexing on the platform, including for the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index.

The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of **ECONOMICS OF AGRICULTURE** in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential **economics of agriculture** content to our community.

You may find necessary information on the following link:
http://mjl.clarivate.com/cgi-bin/jrnlst/jlresults.cgi?PC=MASTER&ISSN=0352-3462

Published quarterly
Journal is registered in major scientific databases:
- Web of Science (Clarivate Analytics) – Emerging Sources Citation Index (ESCI)
- EBSCO
- DOAJ
- ERIH PLUS
- AgEcon Search
- Social Science Research Network (SSRN)
- ProQuest
- Library of Congress E-Resources Online Catalog
- Ingenta Connect
- Ulrich's Periodicals Directory
- CABI
- J-Gate
- The World Wide Web Virtual Library for European Integration
- SCIndeks
- The digital repository of the National Library of Serbia
- doiSerbia
- EconLit
- WorldCat
- Mendeley
- CyberLeninka
- Google Scholar
- CNKI (China National Knowledge Infrastructure)

EconLit Journal is indexed in major scientific databases:
- Index Copernicus Journals Master List (ICV2013: 5,22).

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

33:63(497.11)

ЕКОНОМИКА пољопривреде = Economics of Agriculture / editor-in-chief Drago Cvijanović. - Год. 26, бр. 5 (1979)- . - Београд : Научно друштво аграрних економиста Балкана : Институт за економику пољопривреде ; Букурешт : Академија економских наука, 1979- (Belgrade : Dis Public). - 24 cm

Тромесечно. - Је наставак: Економика производње хране = ISSN 0352-3454. - Друго издање на другом медијуму: Економика пољопривреде (Online) = ISSN 2334-8453
ISSN 0352-3462 = Економика пољопривреде (1979)
COBISS.SR-ID 27671

The Ministry of Education, Science and Technological Development of the Republic of Serbia provides financial support for publishing of the quarterly journal
ECONOMICS OF AGRICULTURE