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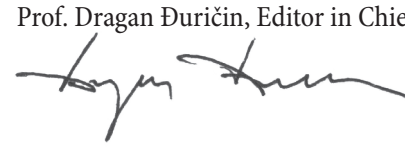
We shall introduce this edition's Word from the Editor with a remark regarding the unintentional mistake that occurred in the issue (7-8)2019 during the preparation activities for printing the paper titled Development of Green Economy and Competitiveness of EU Countries: Macrolevel Empirical Analysis, pp. 415-425, written by *O. Gavrić* and Đ. *Mitrović*. Namely, there is a discrepancy between the data presented in Annex 1 at the end of the paper and the data found in Eurostat Database that were used for the Composite Index computation. A technical error occurred while copying the data from the Excel file and the software used for the Index computation to the Word textual file, causing a mismatch of data appearing in the rows and columns of the presented Table. At the end of this edition of Ekonomika preduzeća, we publish the corrected version of the respective Table.

The first paper in this edition by *E. Jakopin* deals with economic performance of the middle-class transition in Serbia. In the *Management* section, *G. Petković, Z. Bogetić, D. Stojković* and *A. Dokić* provide a comprehensive insight into contemporary theoretical approaches to sustainable supplier governance and explore the extent of theoretical uniformity and practical applicability of the existing knowledge. In the *Economics of Organizations and Industries* section, a trio of authors, *H. Mikić, B. Radulović* and *M. Savić*, examines the relative importance of creative industries (CI) in Serbia and provides a critical review of the existing methodological approaches that may be used in order to determine the economic contribution of these industries. The second paper in this section written by *S.* Šapić, *M. Jakšić* and *D. Stojković* analyzes the possibility of developing a commodity exchange in which raspberries produced in Serbia would be traded. In the last paper in the same section, *E. Kahrović* aims to prove the role of entrepreneurial universities and intermediary entities as a success factor for small and medium enterprises.

In the *Labor Economics* section, *V. Babić* and *S. Zarić* analyze the impact of knowledge management on the business variables of large and medium-sized companies in Serbia. In the *Marketing* section, the paper produced by *A.* Đorđević, *Z. Kalinić* and *V. Marinković* provides useful practical implications, particularly in the field of using social networks in order to create promotional and educational campaigns through which citizens can learn about the characteristics, benefits and the use of mobile commerce.

In the *Finance* section, *B. Mekinjić*, together with his colleagues *M. Grujić* and *D. Vujičić Stefanović,* analyzes the connection between the credit rating of a country and the development of its financial market on one hand, and the level of technology and innovation development across countries, on the other. In the *Research and Innovations* section, *S. Adžić* compares two small academic communities to test the time discrepancies in publishing an academic discovery between the world's leading English language journals and those from peripheries. Finally, in the *Accounting* section, *B. Savić, Z. Vasiljević* and *I. Milojević* point to the importance of creating cost accounting information that goes beyond the traditionally understood operating costs in order to quantitatively encompass and offer a monetary presentation of environmental business aspects.

Prof. Dragan Đuričin, Editor in Chief



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ECONOMIC PERFORMANCE OF THE MIDDLE-CLASS TRANSITION IN SERBIA

Ekonomske performanse tranzicije srednje klase u Srbiji

"A strong middle class supports inclusive political and economic institutions, which underpin economic growth."

(Boushey, H. and Hersh, A., 2012, "The American Middle Class, Income Inequality, and the Strength of Our Economy", p. 39)

Abstract

The analytical focus in the paper has been intentionally dispersed: the paper primarily focuses on the analysis of the income and consumption of the middle class and its three subclasses in three transitional subperiods: (a) pre-crisis (2006-2008), (b) recession (2009-2014), and (c) recovery period (2015-2019), but the analysis also covers the interdependence between the economic growth and middle class and consumer basket and middle class, as well as the trend of inequality throughout the transitional period.

The middle class is the generator of growth and development of every economy. A strong middle class encourages inclusive economic growth and enhances and strengthens institutions. In the transitional period, and especially in the post-crisis period, the middle class in Serbia failed to secure the position of a stabilizing factor in society and its cohesive influence declined. The costs of property transformation were mostly borne by the middle class, above all by the working class and peasantry. The structure and position of the middle class significantly changed in the transitional period.

Because of its social, developmental, economic, institutional and political influence, the middle class in Serbia faces a number of challenges, the most important issue being the following: Will the middle class in Serbia take responsibility for the poverty, rising inequality and development of stable democratic processes in the future?

Keywords: *middle class, decile and median analysis of income and consumption, economic growth, consumer basket, inequality.*

Sažetak

Analitički fokus u radu je ciljano disperzivan; primarno je usmeren na prihodnu i potrošnu analizu srednje klase i njene tri podklase u tri tranziciona potperioda: (a) predkrizni (2006-2008), (b) recesioni (2009-2014) i (c) period oporavka (2015-2019), ali je, pored toga, analizom obuhvaćena međuzavisnost privrednog rasta i srednje klase, potrošačke korpe i srednje klase, kao i dimenzija kretanja nejednakosti tokom čitavog tranzicionog perioda.

Srednja klasa je generator rasta i razvoja svake ekonomije. Jaka srednja klasa podstiče inkluzivan ekonomski rast, unapređuje i jača institucije. Kako srednja klasa u Srbiji u tranzicionom, a posebno u postkriznom periodu, nije uspela da se pozicionira kao stabilizirajući faktor u društvu, njen kohezioni uticaj je opao. Troškove svojinske transformacije najviše je podnela srednja klasa, pre svega radnička klasa i seljaštvo. Struktura i položaj srednje klase su se značajno izmenili u tranzicionom periodu.

Zbog svog društvenog, razvojnog, ekonomskog, socijalnog, institucionalnog i političkog uticaja srednja klasa u Srbiji suočena je sa nizom izazova, od kojih je najvažnije pitanje: da li će srednja klasa u Srbiji u budućnosti preuzeti odgovornost za stepen siromaštva, rastuću nejednakost i razvoj stabilnih demokratskih procesa?

Ključne reči: *srednja klasa, decilna i medijalna analiza prihoda i potrošnje, privredni rast, potrošačka korpa, nejednakost.*

Introduction

The subject of research in this paper is the transformation of the middle class in Serbia in the transitional period from 2006 to 2018. The research is based on the results of economic analysis of the entire distribution of income (revenue) and household consumption during this period. The primary objective of researching the economic position of the middle class in Serbia in the transitional period is to analyze the sustainability of the middle class and its capacity for cohesion of the upper and lower classes in order for them all to function as a civil society. The middle class is primarily responsible both for other classes and for the functioning of the state and society.

The conducted research on the position of the Serbian middle class in transition was based on empirical, structural, partial and comparative statistical analysis of the databases of the two most meritorious surveys: 2006-2018 Household Budget Surveys (HBS) and 2013-2018 Survey on Income and Living Conditions (SILC).

The middle class is the generator of growth and development of every economy. A strong middle class encourages inclusive economic growth and enhances and strengthens institutions. "Strong middle classes can influence economic development through more active participation in the political process, expressing support for political programs and electoral platforms, in particular those that promote inclusive growth" [16].

Analytical focus has been intentionally dispersed: the paper primarily focuses on the analysis of the revenue and spending of the middle class and its three subclasses in three transitional subperiods: (a) pre-crisis (2006-2008), (b) recession (2009-2014), and (c) recovery period (2015-2019), but the analysis also covers the interdependence between the economic growth and middle class and consumer basket and middle class, as well as the trend of inequality throughout the transitional period.

Theoretical and methodological context – conceptual definitions, measurement problem, criteria and open questions

The very term "middle class" has a broad context. It should not be equated with "middle-income", either in terms of income or consumption. It is multidimensional: it has its economic, social and educational dimension. In addition to income and consumption, the term includes college education, white-collar work, economic security, property ownership, certain social and political values, and a specific "state of mind". In other words, it could be subject to self-identification [23].

Contemporary classical theories about the middle class mainly use Weber's socio-economic and sociological terms. The definitions of the middle class emphasize that it consists of an elite of professionals and managers who are largely immune to economic recessions and trends. Important determinants of the middle class ensue:

- "The large middle class has a beneficial, stabilizing influence on society: it bears neither possibly explosive (revolutionary) tendencies of the lower

Table 1: Conceptual definitions of the middle class

Routledge Encyclopedia of International Political Economy	Socio-economic and historical definitions "A class of people who mediate between upper and lower social classes or positions" "A social, economic, cultural class that has approximately average status, income, education, tastes, etc." "The class that traditionally mediates between the aristocratic class and the working class"
The Drum Major Institute for Public Policy [6]	"Individuals earning $ 25,000-100,000 per year"
Aristotle [12]	"A class of people in the middle of the social hierarchy" "The most perfect political community is one where the middle class rules and outperforms both classes"
Weber [27, p. 22]	"The middle class is the broad group of people in contemporary society who fall socio-economically between the working class and upper class"
Giddens, A [27, p. 23]	„Heterogeneous environment, the mixture of highly unstable (fluent) old middle class and somewhat more stable but less numerous, called modern middle class"
Tarkhnishvili, A., & Tarkhnishvili, L. [27, p. 23]	"The middle class is a social group of the people with the income more or less stable and sufficient for the satisfaction of a wide range of material and social requirements. The hallmark of this class is its high educational attainment."

Source: Author's selection.

class, nor absolutist (or oligarchic) tendencies of the upper class" [30];

- The middle class "holds the keys to social progress" [11], brings together the most qualified and motivated professionals with the highest potential for civic activity and the deepest civic/social knowledge. The social reputation of the middle class depends, first and foremost, on its influence on technological and economic progress in the society;
- The growth of the middle class is associated with greater entrepreneurial activity, investment in the human capital and democratic development [18, p. 219, 221]. Political transition analysts claim that the declining number of the poor and the growth of the middle class contribute to the emergence of stable democracies.

The research into inequality and the middle class highlights the importance of measurement and data quality [1, p. 95]. The establishment of international standards for comparison of households over a period of time requires continuous corrections of the purchasing power to be made, inflation to be incorporated and equivalence scale to be adjusted. For more accurate comparison of poverty and inequality across countries, purchasing power parity (PPP) [5, p. 8, 11, 16], equivalence scales, and the impact of prices on middle-income growth are of great importance [10]. For example, research shows that the size of the upper middle class changes depending on which index is used: the standard index (CPI – Consumer Price Index) or the index of personal consumption (PCE – Personal Consumption Expenditure) where the effect of inflation is lower [10]. That very research, which was done in the United States, shows that an increase in the participation of the upper middle class is by 4.5 p.p. lower when using CPI instead of PCE.

With the rise in the standards of living, recent research shows that the middle class has declined over time, while many countries have seen an increase in the upper middle and upper classes. The differences in sizes of the part of the population pertaining to the middle class across countries are huge (from 42% in South Africa to 89% in Denmark) [13]. In general, many countries have experienced a decline in their middle class in the past three decades.

Modalities of transforming members of one class into members of another in transition economies provoke numerous controversies:

- When and how do the representatives of the working class become middle class members? Is average annual income the only criterion? What is the impact of national, racial, cultural, religious and other factors? There is no single answer as to whether there are borders and margins ("marginal groups") between classes [10], [26].
- The quantitative margins of the middle class differ from country to country. The middle-class criteria of the United States cannot be applied [26, pp. 6-12] not only in the Eastern European countries, but also in the Western European countries. Paradoxically, the vast majority of former Soviet Union households had multiple reasons for identifying themselves as middle class: they had stable jobs, decent vehicles and recreation, not much impacted on housing and property (plus, free medicines and education.
- Paradoxically, there are multiple reasons to identify the vast majority of households of the former Soviet Union as middle-class: their members had a stable job, decent vehicles and recreation, (plus free medicines and education).
- In a number of developing countries, a significant part of population made progress from the class of the poor to the middle class thanks to the rapid economic growth. At the height of the Great Economic Recession (2009), more than half of the world's population belonged to the middle class which had "a reasonable amount of discretionary income, about a third of the income was discretionary, to be spent after paying the basic food and shelter" [6]. Interestingly, based on this parameter, the number of middle-class people in Asia had exceeded the number of middle-class members in the West, even before the Great Recession hit in 2009. This has also proven the following economic regularity: when most of the population crosses over into the middle class, the number of people in the middle class grows rapidly.

OECD estimates suggest that the global middle class will grow to enormous proportions until 2030 [22].

- One of the key and still unanswered socio-economic questions is: How will the new middle class behave in the future? Will it distance itself from the "poor" as much as possible rather than continue taking responsibility for combating continued poverty and inequality [14]? How will the middle class mobilize socially? Can education play a key role in raising awareness and fostering social changes? Will the focus of the middle class remain on strengthening socio-economic dimensions of citizenship, gender equality and women's empowerment, social mobilization and improving relations between different marginalized social groups (ethical, cultural, etc.) and the state? The answers to these questions are becoming increasingly more complex as the middle class intensified migration to larger cities, emigration to more developed countries, gentrification of urban areas, etc., as the reaction to the processes of globalization and privatization, marginalization of national governments, and different tax systems. The above questions are complemented by another question, very important for the underdeveloped SEE countries: How to transform brain drain into brain gain?
- In any case, understanding different patterns of middle-class behavior (both old and new) is part of the solution to development problems, primarily poverty and inequalities. In addition, numerous studies on transition conclude that the decrease in poverty and growth of the middle class contribute to the emergence of stable democracies [8].
- Whether someone belongs to the middle class depends on the relative definitions of the middle class, i.e., it is determined in relation to particular criteria which are based on average income, assets or a subjective rank and vary depending on the country and historical period. However, these various approaches do not indicate what real or material living conditions are like according to the category of income, making it difficult to compare the changes in the living standards in some countries. The problem is clear when analyzing the differences in economic prosperity between advanced and emerging economies, which are so large that most middle-income households in emerging economies would continue to be considered poor in the developed countries [25].
- Most contemporary middle-class research uses an absolute measure in relation to the middle income (median income). When defining the middle class, a number of researchers use the middle three quintiles of distribution [24], while others use different parts of the medians [2]. Variations in eminent research define the middle class relative to the median, ranging from 1/2, 2/3 and 3/4 of the median to 1.25, 1.5 and double the median [3].

The research on the economic position of the middle class in transition in Serbia was based on two economic and statistical criteria:

- Decile analysis of income and consumption, based on the 2006-2018 Household Budget Survey (HBS). The cutoff values for the lower class included I-III deciles, the middle class was divided into: lower middle class (IV-V), basic middle class (VI-VII), and upper middle class (VIII-IX), while the upper class is covered by X decile;
- Median income and consumption analysis based on the Survey on Income and Living Conditions (SILC) for 2013-2018. The cutoff values were: ≤60% of the median (for the lower class), 60-80% (lower middle class), 80-120% (middle-middle class) and 120-200% of the median (upper middle class), while the cutoff for the upper class was greater than double the median [29].

Quality of life in countries of the region

The basic findings of the quality of life survey (EQLS) for Serbia [9] show that many aspects of the quality of life are similar to the countries in the region, but also that a large number of indicators are below the EU average, in particular: high percentage of the population in the poverty zone [15, pp. 111-114], the problem of lack of balance between work and private life, health and mental well-being. Serbia has the lowest score according to the WHO-5 Well-Being

Index, assessing mental well-being. However, more than two-thirds of respondents in Serbia are optimistic about the future of the next generations, which is above the EU average and most of the countries in the region. In areas such as the perceived quality of certain public services, Serbia is still below the EU average, but it has been making progress in recent years. Serbia stands out as the country with the highest level of perceived corruption, which to a certain degree weakens citizens' confidence in democratic institutions. According to the social exclusion index, Serbia is above the EU average (2.1), but also above most countries in the region. From the perspective of research into the economic performances of the middle class, the findings that are particularly interesting can be found in the following dimensions of observation:

- The level of satisfaction with the standard of living in Serbia is far below the EU average, as compared to Romania and Hungary. According to the Deprivation Index, on average Serbia's population cannot afford 2.1 out of 6 items considered important for living standards, while in the EU countries it is only 1.1, with countries in the region having a similar result;
- The perception of corruption in various public services is an extremely important indicator of economic management. The European Commission is of the opinion that corruption "undermines the confidence of citizens in democratic institutions and processes". EQLS research singles out Serbia as the highest-ranking country when it comes to the level of perceived corruption in relation to all countries surveyed. In its report for Serbia in 2018, the European Commission warns that infrastructure projects, health, education, construction industry and privatization of public companies are particularly vulnerable to corruption;
- The social exclusion index in Serbia exceeds the levels of the EU and the countries of the region, with the exception of Albania, North Macedonia and Bulgaria. It can be said that the specifics of the transition process in Serbia and the variation of economic flows have brought the problem of social exclusion into focus.

Income and consumption analysis of the middle class in Serbia in 2006-2018

Equivalized income decile analysis

Real growth in average equivalized middle-class income in the 2006-2018 period was 0.5% per year (cumulative growth of 5.9%), which is above the average real growth of income of all consumer units (0.3). Structurally, within the middle class, the highest growth of 0.8% per year on average was recorded in the lower middle class, followed by 0.5% in the middle-middle class, while the most modest growth of 0.3% per year was registered in the upper middle class. The cumulative growth of lower-class income was 14.3%, while the cumulative equivalized income of the richest fell by -7.2% (-0.6% annually).

Table 3: Real growth/decline in average equivalized income per class in 2006-2018

	2006-2008	2009-2014	2015-2018	2006-2018
Lower class	23.1	-20.1	6.3	14.3
Lower middle class	13.0	-13.8	7.5	9.5
Middle-middle class	10.6	-12.6	6.9	6.5
Upper middle class	8.9	-12.2	6.8	4.1
Middle class	10.2	-12.8	7.0	5.9
Upper class	-7.1	-8.3	10.1	-7.2
Average of all classes	7.1	-12.8	7.6	3.4

Source: Author`s recalculation based on HBS.

Table 2: Living standards in the countries of the region and the EU in 2017 (average)

	Albania	North Macedonia	Serbia	Croatia	Bulgaria	Romania	Hungary	EU
Average satisfaction with living standard, scale of 1–10	5.1	5.2	5.7	6.0	5.6	6.7	6.6	7.0
% who make ends meet with some difficulty, with difficulty, or with great difficulty	76%	55%	69%	71%	63%	66%	61%	39%
Deprivation Index: Number out of six items household cannot afford	3.8	2.5	2.1	1.9	2.2	2.4	2.0	1.1

Source: [9].

The analysis of the dynamics of the middle-class equivalized income shows that it achieved growth in the 2006-2008 period (10.2%) and in the 2015-2018 recovery period (7.3%, 2.3% on average per year), while the decline in the 2009-2014 recession period was -12.8% (on average -2.7% annually). The drop in the equivalized income of all classes in the recession period was -12.8%, the income in the class of the poorest fell -4.4% per year, while the income of the class of the richest fell at a rate of -1.7% (-8.3% cumulatively). In the period of economic recovery from 2015 to 2018, total equivalized income growth was 7.6%, income of the poorest strata increased by 6.3 (2.1% annually), middle-class equivalized income grew at an annual rate of 2.3%, and that of the upper class at the rate of 3.3%.

The impact of exchange rate on average equivalized income per class shows a trend of increasing disparities between classes in the 2008-2018 period. Equivalized income ratios increased between the middle and lower classes from 2.28:1 in 2008 (EUR 289 versus EUR 127) to 2.36:1 in 2018 (EUR 318 versus EUR 135) and between the upper and middle classes from 2.18:1 in 2008 to 2.26:1 in 2018. Extreme ratios between the class of the richest and the class of the poorest increased from 4.96:1 to 5.33:1 in 2018 (EUR 720 versus EUR 135).

In 2018, only the upper class reached the real equivalized income it generated in 2009. While the class of the richest in 2018 really reached the real equivalized income of 2009, the backlog of the lower class was 10 index points and the backlog of the middle class was 5.8 index points. Within the middle class, the gap in relation to 2009 was at the level of the lower middle (-5.0 index points) and the upper middle classes (-5.5 index points). The largest decline in income of all classes was recorded in 2012 (average total decline of -13.5 index points).

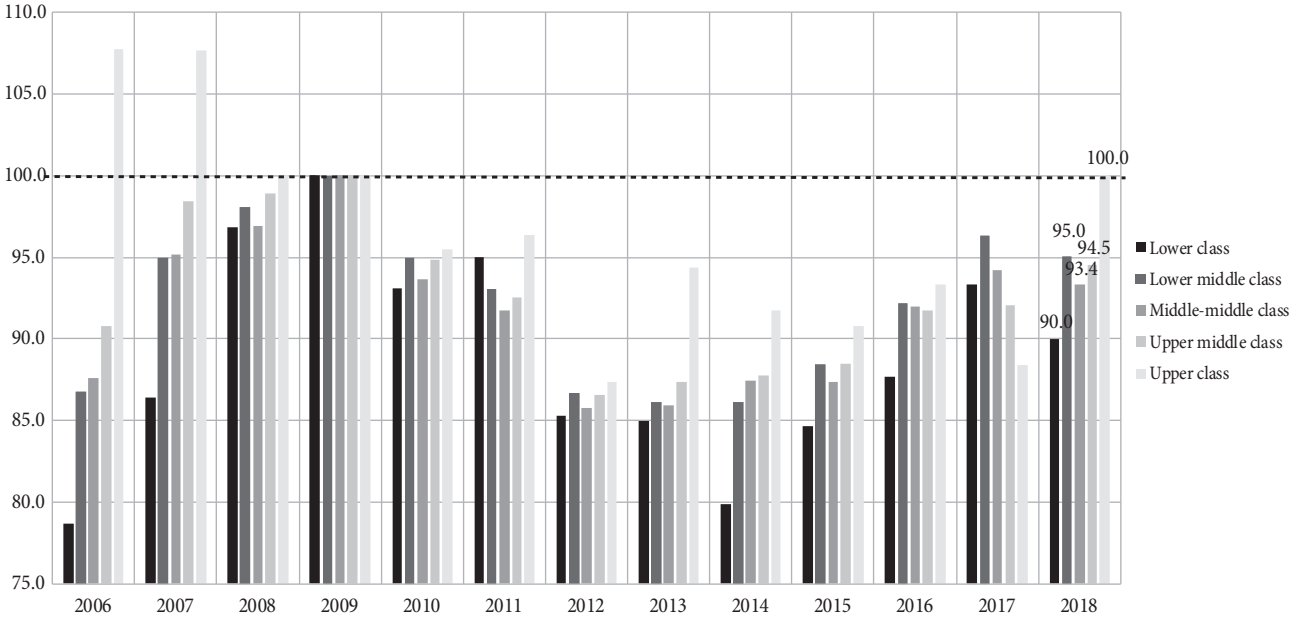
The structural disposition of income classes slightly changed during the transition: the share of middle-class income in 2018 was slightly lower (62.9%) than the share

Table 4: Transitional and structural movements of equivalized income by class in EUR

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Lower class	84	104	127	124	112	128	112	120	112	117	120	134	135
Lower middle class	151	186	210	201	186	204	185	198	196	200	206	226	233
Middle-middle class	203	247	276	268	243	267	243	262	265	262	274	293	304
Upper middle class	285	346	382	363	334	365	332	361	360	360	370	388	417
Upper class	552	618	630	592	549	622	547	637	615	603	615	608	720
Average of all classes	209	249	275	263	241	268	240	264	259	260	267	282	303

Source: Author`s recalculation based on HBS.

Figure 1: Impact of recession on equivalized income by class (2009=100)



Source: Author`s recalculation based on HBS.

in 2008 (63.2%), and the same goes for the participation of the lower class (from 13.9 % to 13.4%); in contrast, the share of the richest increased from 22.9% to 23.7%. The upper middle class participation slightly fell in the middle-class structure (-0.2%), while the other two classes retained the same share.

Equivalized consumption decile analysis

The real growth of average equivalized middle-class consumption in the 2006-2018 period was 0.8% per year (cumulative growth of 9.5%), which was equal to the average growth of equivalized consumption of all consumer units. Within the middle class, the highest growth was recorded in the upper middle class (0.9%) and the basic middle class (0.8%), while the most modest growth of 0.6% on average per year was registered in the lower middle class. The consumption of the lower class recorded the slowest growth (0.5% on average per year), while equivalized consumption of the richest grew on average by 1% per year (cumulative growth of 12.8%).

Table 5: Real growth/decline in average equivalized consumption by class in 2006-2018

	2006-2008	2009-2014	2015-2018	2006-2018
Lower class	6.6	-1.4	-0.6	6.5
Lower middle class	3.6	0.2	2.0	6.8
Middle-middle class	4.2	0.4	4.4	9.5
Upper middle class	2.3	-0.1	9.0	11.1
Middle class	3.3	0.1	5.7	9.5
Upper class	-3.0	-2.6	17.9	12.8
Average of all classes	2.3	-0.7	7.3	9.8

Source: Author`s recalculation based on HBS.

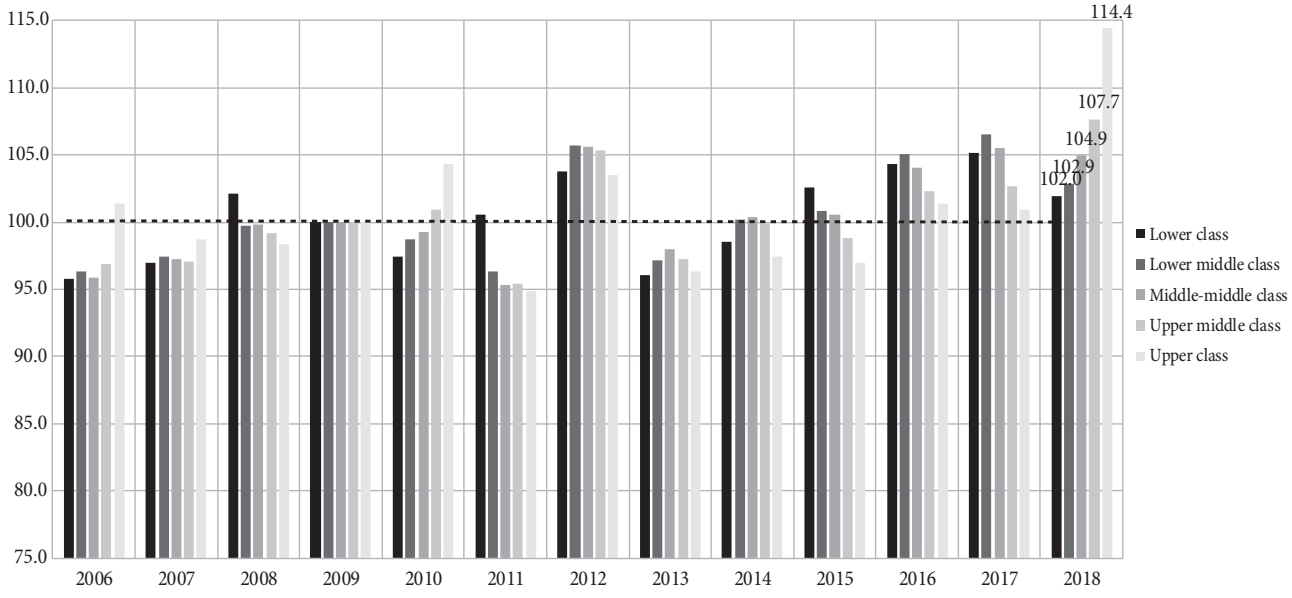
The analysis of the 2006-2018 dynamics by subperiods shows that the growth of the average middle-class consumption in the 2006-2008 period was 3.3%, it was 5.7% (on average 1.9% annually) in the recovery period from 2015 to 2018, while during the 2009-2014 recession period there was no growth of equivalized consumption of the middle class.

Table 6: Transitional and structural movements of equivalized consumption by class in EUR

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Lower class	103	117	135	124	117	136	136	136	138	142	144	151	154
Lower middle class	157	178	199	188	180	197	210	208	213	212	220	233	235
Middle-middle class	198	225	254	239	230	248	267	267	271	269	277	293	305
Upper middle class	267	300	336	319	312	331	355	354	360	353	363	380	417
Upper class	459	500	547	523	529	540	573	574	576	568	590	613	727
Average of all classes	201	226	253	239	233	250	265	264	268	266	274	288	310

Source: Author`s recalculation based on HBS.

Figure 2: Impact of recession on equivalized consumption by class (2009=100)



Source: Author`s recalculation based on HBS.

Similar to the equivalized income decile analysis, the impact of exchange rate on average equivalized consumption by class shows a trend of increasing disparities between classes in the 2008-2018 period. The equivalized consumption ratios increased between the middle and lower classes – from 1.96:1 in 2008 (EUR 263:EUR 135) to 2.08:1 in 2018 (EUR 319:EUR 154) and between the upper and middle classes – from 2.08:1 to 2.28:1. Extreme ratios between the class of the richest and the class of the poorest increased from 4.06:1 in 2008 to 4.73:1 in 2018 (EUR 727:EUR 154). In the structure of the middle class, a gradual increase in the difference between the subclasses was recorded: the largest was the gap formed between the upper middle class and the other two strata of the middle class.

In 2018, all classes had higher equivalized consumption in real terms than in 2009: by 2 index points in the lower class, by 5.6 index points in the middle class and by 14.4 index points in the wealthiest class. Within the middle class, higher spending relative to 2009 was achieved in all three subclasses.

The structural distribution of spending at the level of classes slightly changed during the transition: the share of middle-class spending in 2018 was slightly lower (61.8%) than in 2008 (62.4%), and the same goes for the participation of the lower class (from 16% to 14.9%); in contrast, the share of the richest increased from 21.6% to 23.4%. In the middle-class structure, the highest decrease was recorded in the middle-lower participation (by 0.6%), followed by the middle-middle class (by 0.3%), while the share of the upper middle class increased from 26.6% to 26.9%.

Decile analysis of income per capita

The transitional growth of the middle-class household income per capita of 10.8% in the 2006-2018 period (on average 0.9% annually) is the result of an 11.6% increase (5.6% annually) in per capita income in the 2006-2008 pre-crisis period and 8.7% (2.8% p.a.) growth over the 2015-2018 recovery period. The decline in per capita income of the middle class in the 2009-2014 recession period was 11.7%. In 2015-2018, per capita income of the poorest class grew by 9.0%, while the richest class recorded an increase of 9.9%.

Table 7: Real growth/decline of income per capita per class by subperiods

	2006-2008	2009-2014	2015-2018	2006-2018
Lower class	25.0	-14.4	9.0	20.3
Lower middle class	15.1	-12.1	9.9	14.2
Middle-middle class	11.8	-11.7	9.4	11.3
Upper middle class	9.1	-8.4	8.0	9.0
Middle class	11.6	-10.3	8.7	10.8
Upper class	-6.0	-6.7	9.9	-4.0
Average of all classes	7.6	-9.9	9.0	7.8

Source: Author`s recalculation based on HBS.

In the 2009-2018 post-crisis period, per capita income declined in all classes, except for the class of the richest. The largest decrease was registered in the lower class (-6.8%, -0.8% annually on average), while within the middle class the same decrease was recorded in per capita income in the lower middle and middle-middle classes (-3.4%).

Table 8: Post-crisis growth/decline rates of income per capita by classes in 2009-2018

Lower class	Lower middle class	Middle-middle class	Upper middle class	Upper class
-6.8	-3.4	-3.4	-1.1	2.5

Source: Author`s recalculation based on HBS.

In 2018, the real average income of the middle class per capita was 0.7% lower than in 2008. Same year, the upper class had by 2.1% higher per capita income, while the decline in real income per capita of the poorest class was -3.7%. Within the middle class, the backlog for 2008 was nearly the same for all subclasses.

Decile analysis of consumption per capita

The middle-class consumption per capita in the 2006-2018 period annually grew by 1.1% (14.1% throughout the period). All classes experienced a similar increase in per capita consumption (around 14%). In 2008-2012, the middle class recorded an increase of 8.9% in per capita consumption, the richest posted a growth of 9.4%, while per capita consumption of the lower class increased by 1.6%. Only in 2018 did the middle and upper classes reach the consumption levels from 2012.

In the 2009-2018 post-crisis period, per capita consumption of all classes increased (overall growth of 9.6%). The lowest growth of 6.4% was recorded by the lower

Table 9: Real growth/decline in per capita consumption per class by subperiods

	2006-2008	2009-2014	2015-2018	2006-2018
Lower class	9.8	-1.3	1.9	13.8
Lower middle class	4.6	0.7	4.8	12.5
Middle-middle class	3.9	1.3	7.1	13.7
Upper middle class	2.7	1.5	10.4	15.3
Middle class	3.5	1.2	7.9	14.1
Upper class	-1.6	1.0	12.4	13.4
Average of all classes	3.2	0.8	8.0	13.9

Source: Author`s recalculation based on HBS.

class, followed by 8.9% at the level of the middle class, while consumption of the richest increased the most (13.6%).

Table 10: Post-crisis per capita consumption growth rates by classes in 2009-2018

Lower class	Lower middle class	Middle-middle class	Upper middle class	Upper class
6.4	6.7	8.0	10.8	13.6

Source: Author`s recalculation based on HBS.

Income decile analysis based on SILC

The real growth of average equivalized middle-class income in 2013-2018 was 1.8% per year (cumulative growth of 9.1%), which is significantly higher than the real growth of income of all consumer units (cumulative growth of 1%). After the fall of the real income in 2014, from 2015 to 2018 the income of the poorest increased, but did not reach the level of 2013 (it was lower by 1.8%). The equivalized income of the richest in the 2013-2018 period remained at a similar level.

Table 11: Real growth/decline in annual equivalized income by class in 2013-2018 (SILC)

Lower class	Lower middle class	Middle-middle class	Upper middle class	Upper class
-0.4	1.7	1.8	1.4	0.1

Source: Author`s recalculation based on SILC.

Coefficient of variation of income and consumption

Decile analysis of the coefficient of variation in the crisis of 2009 and 2018 shows significant discrepancies in income and consumption between some deciles. The coefficients of variation of income for all deciles are higher (both HBS and SILC) than of consumption. The basic conclusion is that the gap between the extreme deciles, the poorest and the richest deciles, widened.

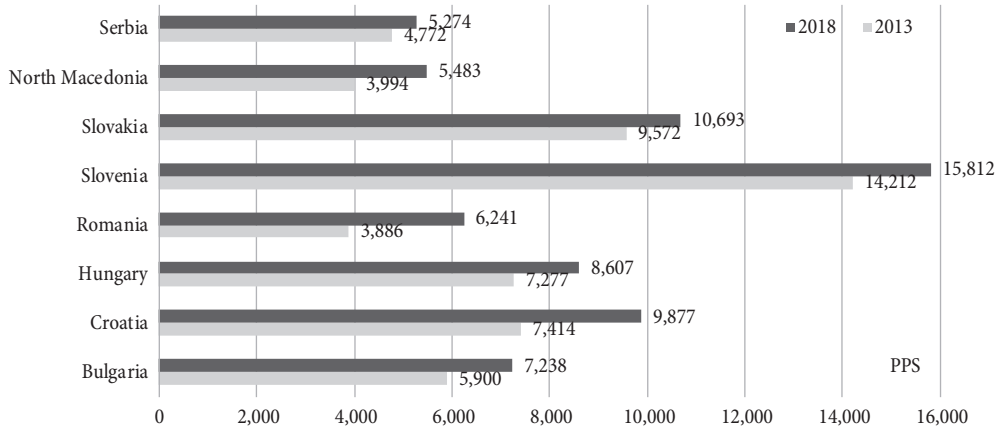
Comparative analysis of transition countries shows that Slovenia, Slovakia and Croatia recorded the highest values of the upper limit of equivalized income per decile. Analysis of the trend of changes in the upper limit of equivalized income per decile in PPS (purchasing power standard) in 2015-2018 signals a particularly high growth in Romania (growth of around 50% in all deciles). The value of income per consumer unit in Serbia recorded high growth in the first four deciles (the increase in the upper income limit of the 1st decile was the highest), while modest growth was registered in the 9th decile. The analysis of the central part of the distribution of income by decile (upper limit of the 5th decile) shows large differences between the transition countries, e.g. the Slovenian middle class recorded the highest threshold value (15,812 PPS), which is three times higher than the 5th decile threshold in Serbia.

Table 12. The coefficient of variation of income and expenditure in 2009 and 2018

Decile	HBS-income			HBS-consumption			SILC-income		
	2009	2018	The rate of average income 2009-2018	2009	2018	The rate of average consumption 2009-2018	2013	2018	The rate of average income 2013-2018
1	32.4	41.9	-19.2	22.2	19.9	2.0	70.1	504.9	-40.9
2	6.7	8.6	-8.9	5.9	6.7	1.1	13.2	13.8	8.7
3	4.9	5.6	-6.3	4.0	4.4	2.7	7.4	8.2	9.6
4	4.4	4.4	-4.3	3.8	4.0	2.3	5.4	6.3	11.6
5	3.9	3.8	-5.6	3.4	3.8	3.3	5.2	4.2	10.6
6	4.2	3.5	-6.4	3.3	3.8	4.2	4.7	4.1	8.1
7	4.0	4.2	-6.9	3.5	4.2	5.5	5.4	4.2	4.8
8	4.1	4.6	-6.2	4.8	4.5	6.7	5.3	4.6	2.0
9	6.6	6.9	-4.9	6.0	7.1	8.5	7.9	6.4	-0.4
10	28.6	44.5	0.0	29.8	29.9	14.4	43.6	39.8	-8.4

Source: Author`s recalculation based on HBS and SILC.

Figure 3: Upper limit of the 5th decile of equivalized income in transition countries (PPS)



Source: Eurostat, Distribution of income by quintiles - EU-SILC and ECHP surveys.

Economic growth and the middle class in Serbia

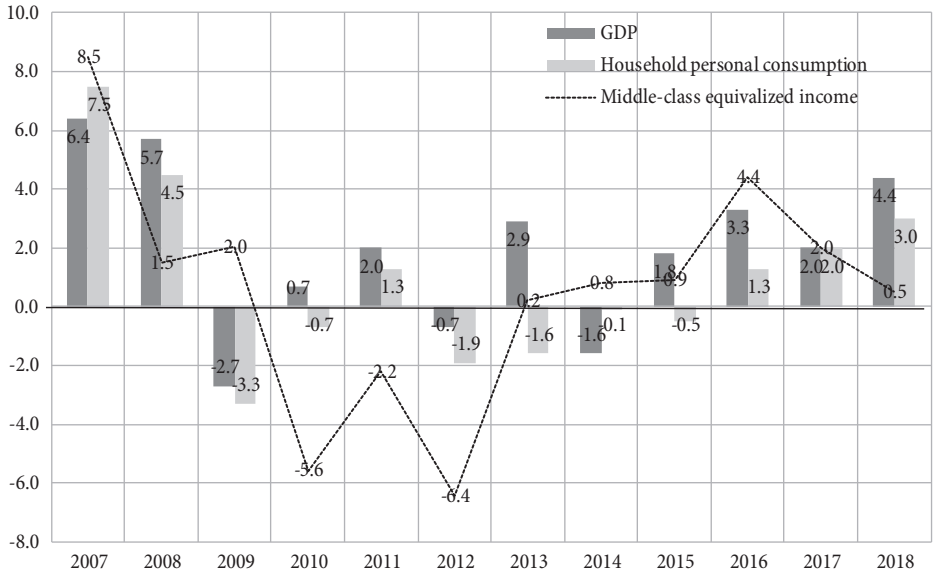
The consequences of transition, economic recession and the cyclicality of economic growth had a direct impact on the economic position of the middle class in Serbia in 2006-2018. Econometric studies show that the impact of middle-class growth on economic growth depends on initial level of GDP per capita [4]. The impact of middle-class growth on GDP growth is significantly greater if the country is at a higher level of development. Furthermore, research shows that investment growth has a positive impact on economic growth and middle-class growth. Overall, economic growth does not create middle class; on the contrary, the middle class is the generator of growth: it fosters dynamic entrepreneurship and innovation, creates a stable consumer base that generates productive investments, creates a favorable social environment for growth and, most importantly, promotes education and more efficient functioning of institutions. In the most famous economic doctrine of the last century, John Maynard Keynes explained the relationship between the middle class and economic growth: "stable consumption of the middle class encourages investment and economic growth" [19]. Neoliberal models of growth in transition have ignored economic transformation of the middle class and, primarily its positive influence on institution building. The models of growth induced by the middle class include, above all, stable consumption. Investments foster economic growth, but growth is impossible without the spending of the middle class, because the richest do not spend enough in order to stimulate economic growth (they save more). The conclusion is clear: to foster sustainable economic growth, the middle class must be able to spend, which is only possible if its incomes grow.

The interdependence of the middle-class income, personal consumption and economic growth in Serbia is legitimate to some extent only in the 2006-2008 pre-crisis period and the economic recovery period from 2015 to 2018:

- In the pre-crisis period, the growth of the middle-class equivalized income influenced the growth of personal consumption and GDP (in 2008 the growth of the middle-class equivalized income, personal consumption and GDP was 1.5%, 4.5% and 5.7%, respectively);
- The 2009-2014 crisis period is characterized by an asymptotic trend: in 2009 and 2014, there was an increase in the middle-class equivalized income, as opposed to a decline in personal consumption and GDP (in 2010 and 2011, there was a large decrease in middle-class income versus a rise in personal consumption and GDP);
- The period of economic recovery from 2015 to 2018 was also characterized by economic growth and growth of the middle-class income (in 2016 the growth of the middle-class income, GDP and personal consumption was 4.4%, 3.3% and 1.3%, respectively).

The economic position of the middle-class was hit hard by the recession in 2009, which is why in 2018 the middle-class revenue per capita was still

Figure 4: Economic growth, personal consumption and middle-class income (growth rates)



Source: Author`s recalculation based on HBS and RSO data.

significantly lagging behind that of 2008. Economic growth per capita increased by 18% in real terms, but the real growth in net earnings, after a huge decline in 2009, significantly recovered only in the 2015-2018 period. If we change the analytical perspective in comparison to 2009, the year of crisis (2009=100), GDP per capita increased by 21% in real terms, net salaries per employee increased by 2%, but the middle-class income per capita dropped by 3% in real terms.

Consumer basket and the middle class

Since 2001 the implementation of the neoliberal model of privatization, wrapping up privatization goals in an ideological cloak, has been in line with the dynamics dictated by the members of new elites (political, economic). The costs of property transformation were mostly experienced by the middle class, primarily the working class and peasantry. "Privatization served to create a new capitalist class and to efface the working class" [21, p. 102]. The structure and position of the middle class significantly changed in the transitional period. The growth of the private sector managed to partly amortize the huge influx of unemployed workers; however, due to a lack of labor regulations in the field of the protection of economic and social rights of workers, a large number of members of the middle class resorted to illegal employment, especially in the pre-crisis period. The polarization in the society was becoming more pronounced: on the one hand, a rather new, heterogeneous, powerful capitalist class emerged, while, on the other, the material status and reputation of the middle class declined (class stratification of peasantry, deterioration of middle and small estates, insecurity of employment of white-collar workers) and poverty grew. The middle class was divided, with very little capacity to absorb the shock caused by the conflict between the capitalist and the working class. The contents of the consumer basket in transition was becoming scarce. The major consequence of the applied model of ownership transformation in Serbia is an increase in inequality [14].

The standard of living in the post-crisis period had been constantly declining until 2015. The consumer basket to net earnings ratio rose from 1.34 in 2008 to 1.51 in 2015 (for an average consumer basket a household needed 1.5 average net income). In 2015-2018, living standards improved, so that the ratio of consumer basket to net earnings in 2018 was the same as in 2012 (1.44).

Table 13: Consumer basket to net earnings ratio in 2008-2018

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
1.34	1.50	1.47	1.46	1.44	1.48	1.48	1.51	1.46	1.45	1.42

Source: Author`s recalculation based on RSO data.

The general downward trend in the number of members per household influenced the annual fluctuations in the

Table 14: Consumer basket growth/decline rates and net earnings (at constant prices in RSD in 2018)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Average consumer basket per household	-0.3	-0.8	-0.2	-0.5	1.0	-1.1	-0.5	-0.4	0.1	-0.4
Average net earnings per employee	-10.6	1.0	0.2	1.1	-1.5	-1.5	-2.1	2.5	0.9	1.6

Source: Author`s recalculation based on RSO data.

consumer basket. The largest real decline in average net earnings occurred in 2010 (-10.6%), while the real increase in net earnings occurred in the 2015-2018 period.

The post-crisis decline and the increasing economic stratification of the middle class illustrate quite well the trend of income and consumption lagging behind the average consumer basket over the whole period, especially from 2012.

- Growth in the middle-class income and consumption lags behind the value of the average consumer basket. The backlog was the largest in 2013 (11% and 9%, respectively). It was significantly reduced in 2015-2018, but an upward trend was observed in the middle-class consumer spending gap in relation to the average consumer basket;
- The largest backlog of the middle-class revenue in relation to the consumer basket was in 2012-2013. (11%), only to be halved in 2018 (5%);
- The relationship between the middle-class consumption and the average consumer basket shows significant fluctuations, especially in the period from the first post-crisis years through 2013.

Inequality and the middle class

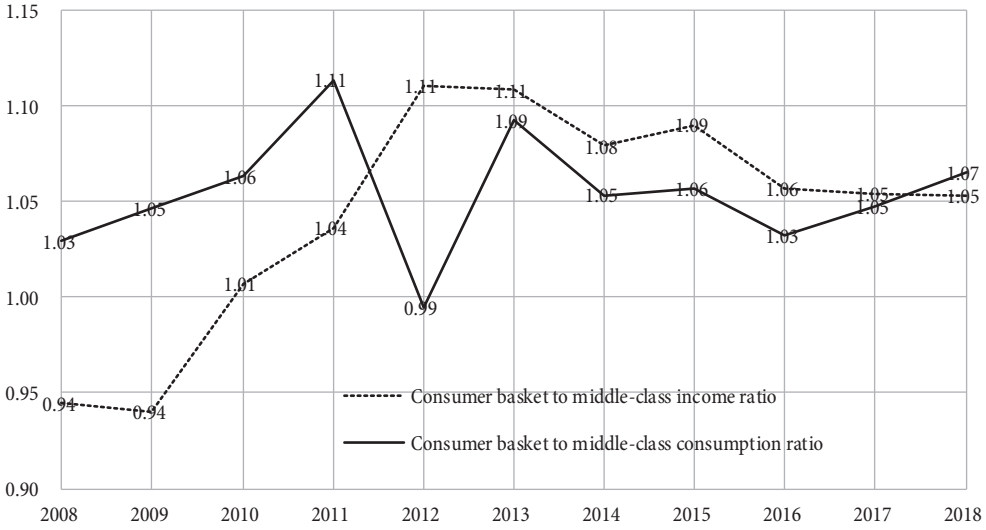
Since the graph showing the situation in Serbia in the 2009-2018 post-crisis period of transition is approximating to the famous elephant curve [17], which shows the global income distribution, we could conclude that transitional post-crisis losses were unequally distributed. The whole post-crisis transition elephant was submerged, all percentiles of income were in the negative zone and only 5% of the richest had a positive per capita income growth rate.

The post-crisis income distribution in the period of transition highlights three points in the graph: (A) the median value of total income distribution per capita (the top of the elephant's head dividing the population into richer and poorer halves); (B) members of the upper middle class (the highest point); and (C) the highest point of the richest percentile.

Analysis of the post-crisis income distribution shows:

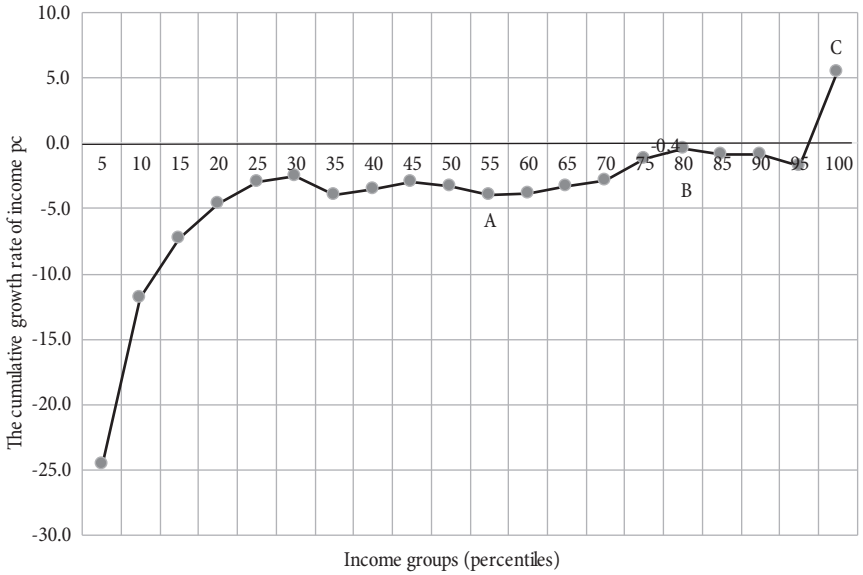
- The middle class (A) is the loser of the transition in the post-crisis decade from 2009 to 2018 (percentiles around the median (35-60) had a decade-long decline in revenue of -4%). The contribution of the

Figure 5: Consumer basket to middle-class income and consumer basket to middle-class consumption ratios in 2008-2018



Source: Author`s recalculation based on HBS and RSO data.

Figure 6: "Elephant curve" of inequality in Serbia in 2009-2018



Source: Author`s recalculation based on HBS.

decline in the middle-class income to the overall decline is -0.9%;

- The income of the members of the upper middle class (80th percentile) is at the same level as in 2009 (B);
- The percentile of the richest (X) is the only winner in the last decade. The income of this class actually increased by 5.5% during this period. While in 2009 5% of the income of the richest was the same as the income of 25% of the poorest, in 2018 it was the same as the income of 28% of the poorest;
- In 2009 a half of the poorest population accounted for 30% of total income, and a decade later this percentage dropped by 1% (29% of the total revenue).

Decile analysis of inequality faces a number of methodological pitfalls [28, pp. 21-23, 32, 44-45]. However, inequalities of both revenue and consumption models are among the largest in Europe. The analysis employed the most representative indicators of inequality: the Gini coefficient, C90/C10 decile ratio (income to consumption ratio between the richest and the poorest decile) and the C80/C20 quintile ratio (income to consumption ratio between the richest and the poorest quintile). Generally, income inequality is much larger than consumption inequality.

According to both surveys (HBS and SILC), inequalities were permanently decreasing in the 2006-2017 period. Due to a more complex methodological inclusion of the richest decile, according to HBS, inequalities significantly increased in 2018. The gap between income and spending was the narrowest in 2017 and 2018: the difference between the Gini coefficients of income and consumption in 2017 and 2018 was 2.3 p.p. and 2.0 p.p., respectively, indicating a more equal trend in income and consumption. According to SILC, since the beginning of the survey in 2013, the Gini income coefficient was at its lowest in 2018 (35.6%).

Decile analysis of inequality based on the income model shows that in the 2009-2018 post-crisis period all deciles reduced their participation or remained at the same level, with the exception of the tenth decile (the richest class) which increased its share in total revenues from 22.5% to 23.7%. The three poorest deciles reduced their share in total income.

Table 15: Gini coefficient of income (HBS and SILC) and consumption (HBS)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Income (HBS)	34.8	33.2	30.3	29.6	30.1	29.9	30.0	31.4	31.8	30.7	30.5	27.8	31.3
Consumption (HBS)	28.2	27.5	26.6	27.2	28.4	26.2	27.2	27.3	27.0	26.2	26.6	25.5	29.3
Income (SILC)								38.0	38.3	40.0	39.8	37.8	35.6

Source: Author`s recalculation based on HBS and SILC.

Figure 7: Lorenz curve of income in 2008 and 2018

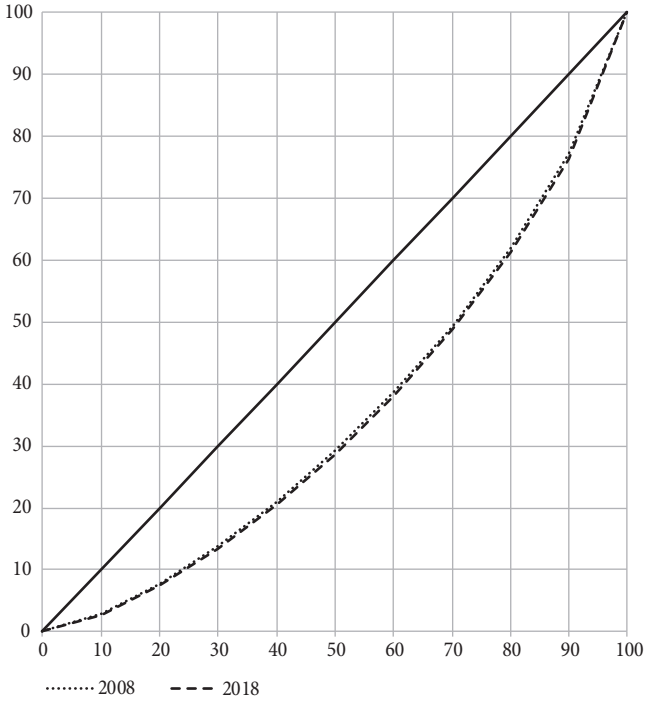
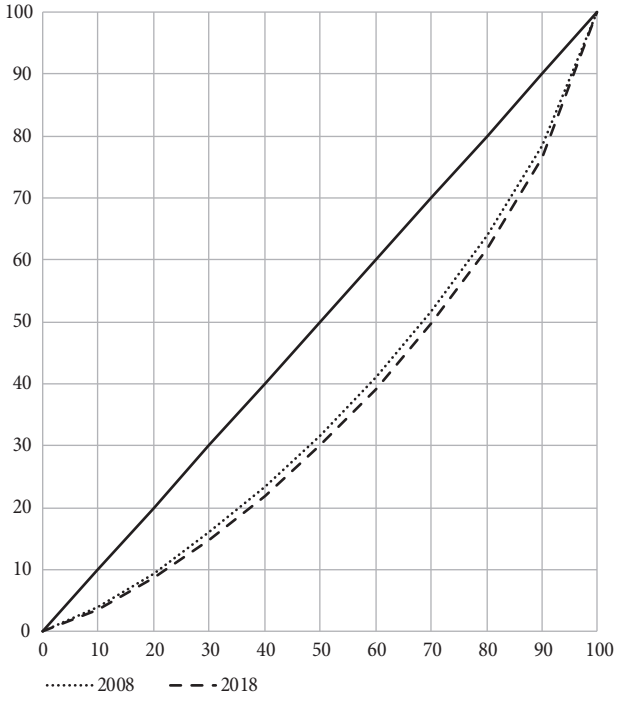


Figure 8: Lorenz curve of consumption in 2008 and 2018



Source: Author`s recalculation based on HBS

The research into the qualitative dimension of income inequality between different social groups using the Lorenz curve (curve of income/consumption distribution of different social groups) shows slight shifts (curves almost overlap) in 2008-2018. Inequality analysis based on the spending model is sharper than the analysis based on the revenue model. In the 2009-2018 post-crisis period all deciles reduced their share, except for the tenth and ninth deciles (the richest class) which together increased their share in total spending from 36.4% to 38.1%. Both the lower and middle class reduced their share in total spending.

The previous findings are complemented by an analysis of extreme inequalities: C90/C10 decile ratio (income ratio of the richest and poorest deciles) and the C80/C20 quintile ratio. The rise of extreme inequality is shown by the following data: while in 2009 10% of the richest had 7.3 times higher income than 10% of the poorest, in 2009 that ratio increased to 9:1. Quintile analysis over the same period shows that 20% of the richest in 2009 had 4.7 times higher income than 20% of the poorest. A decade later the ratio increased to 5.2:1.

Analysis of extreme inequalities in the consumption model shows that they grew at a slower rate and were at a lower level than extreme differences in the revenue model. The C90/C10 ratio increased from 5.8:1 in 2009 to 6.5:1 in 2018, while the C80/C20 quintile ratio increased from 4.0:1 to 4.4:1 in 2018.

Comparative analysis of inequalities in the countries of the region and in relation to the EU average (based on

Table 16: Indicators of income inequality

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
C90/C10	11.4	10.1	7.8	7.3	7.4	7.2	7.8	8.2	9.1	8.4	8.6	7.4	9.0
C80/C20	6.3	6.0	4.9	4.7	4.9	4.7	4.9	5.0	5.4	5.1	5.0	4.6	5.2

Source: Author`s recalculation based on HBS.

Table 17: Extreme proportions of consumption inequality

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
C90/C10	6.4	6.0	5.5	5.8	6.3	5.2	6.0	5.8	5.7	5.5	5.8	5.7	6.5
C80/C20	4.2	4.0	3.8	4.0	4.2	3.7	4.0	4.0	4.0	3.8	3.9	3.9	4.4

Source: Author`s recalculation based on HBS.

SILC survey) shows that inequalities in Serbia decreased in 2013-2018, but also that they were the highest in Europe, with the exception of Bulgaria and Romania. The Gini coefficient, as one of the key indicators of economic vulnerability [7, p. 6], is the lowest in Europe in successful transition countries, such as Slovenia and Slovakia (23%) and in Hungary and Croatia where it is below the EU average (30.6%). Serbia made a major positive shift compared to 2015 (when the Gini coefficient reached a record high of 40%), while in some neighboring countries a reverse trend was registered: inequalities increased in Bulgaria, Romania and Hungary.

Comparative analysis of the quintile ratio shows a positive trend of reducing extreme differences in Serbia, compared to the countries of the region; however, the quintile ratio is still high: 20% of the richest have an income that is 8.6 times higher than 20% of the poorest. High inequalities also exist in some of our neighboring countries like Bulgaria (7.7) and Romania (7.2), extreme differences in Hungary and Croatia are below the average of the EU-28, while Slovenia and Slovakia had the lowest S80/S20 ratio in 2018 (3.4 and 3.0, respectively).

Conclusion

In the transition period, and especially in the post-crisis period, the middle class in Serbia failed to secure the position of a stabilizing factor in society and its cohesive influence declined. This was initially caused by the consequences of applied models of social system transformation at the beginning of the new millennium, which opened the Pandora's box of structural problems of transforming the working class into the middle class and decline in the social status of the middle class (middle-class pauperization), as well as by devastating post-crisis recession effects, the most developmentally difficult of which are migration processes and brain drain. Because of its social, developmental, economic, social, institutional and political influence, the middle class in Serbia faces a number of challenges, the most important issue being: Will the middle class in Serbia take responsibility for the poverty, rising inequality and development of stable democratic processes in the future?

Overall, the main findings of the study of the economic transition of the middle class in Serbia in 2006-2018 are the following:

- Low real growth of average income per consumer unit (equivalized income) of the middle class in 2006-2018 (0.5% annually) contributed to the fact that no class in 2018 actually reached the equivalized income they generated in 2009. In the period of recession from 2009 to 2014, there was virtually no growth of revenue per middle-class consumer unit;
- On the other hand, real growth of average equivalized consumption of the middle class in the same period (0.8% annually) made it possible for all classes in 2018 to have realistically higher equivalized consumption compared to 2009. During the recession, the middle-class spending stagnated;
- The structural disposition of classes changed with regard to both income and spending: the share of income of the middle and lower classes decreased, while the share of the richest increased;
- The analysis of the middle-class per capita income shows a 0.7% decline in 2018 compared to 2008. At the same time, all classes had similar per capita consumption growth (around 14%), which is why in the middle class it was by 10.2% higher in 2018 compared to 2008. Income analysis based on SILC 2013-2018 shows that the average middle-class income in 2016 reached the levels of 2013 and saw significant growth thereafter;
- The income coefficient variations for all deciles are higher for income (both BHS and SILC) than for consumption. The highest coefficient of variation is found in the poorest and richest deciles.

Economic growth does not create the middle class; on the contrary, the middle class is the generator of growth: it encourages dynamic entrepreneurship and innovation, productive investments, creates a favorable social environment for growth and most importantly it promotes education and efficient operation of institutions. Investments are driven by economic growth [20], but they are impossible without the spending of the middle class. To foster sustainable economic growth, the middle class must

be able to spend, which is only possible if its income goes up. Interdependence of the income of the middle class, personal consumption and economic growth displays a pattern only in periods of conjuncture. The recession did not equally affect the decline in per capita income of all subclasses of the middle class in Serbia: the lower middle class was hit the most.

The costs of property transformation were mostly borne by the middle class, above all the working class and peasantry. The structure and position of the middle class significantly changed in the transitional period. Polarization in the society is increasingly pronounced: on the one hand, a new, rather heterogeneous, powerful capitalist class emerged, while, on the other, the material position and reputation of the middle class declined (class stratification of peasantry, deterioration of medium and small estates, employment insecurity of white-collar workers) and poverty grew. The middle class was divided, with very little capacity absorb the shock caused by the conflict between the capitalist and the working class. The contents of the consumer basket in transition was growing scarce. The research shows that both income and consumption of the middle class were lagging behind the average consumer basket.

The elephant curve clearly indicates the uneven distribution of the transition burden: post-crisis losses are unevenly distributed across classes. The biggest loser was the middle class, whereas the richest percentile was the only transition winner in the last decade. While in 2009 5% of the income of the richest was the same as the income of 25% of the poorest, in 2018 it was the same as the income of 28% of the poorest. The growth of inequality is confirmed by both decile and quintile analysis. Although, according to the SILC analysis, inequalities in Serbia decreased in the 2013-2018 period compared to the EU average, they were, with the exception of Bulgaria and Romania, the highest in Europe;

Globalization processes, transition models of growth and transformation of the economy and economic recession are the largest causes of the economic decline of the middle class in Serbia. Growth models did not support the recovery and strengthening of the middle class. Recession shocks only further contributed to the weakening of the economic position of the middle class. The burden of fiscal consolidation was largely borne by the middle class. The recovery period, from 2015 until now (with the average growth rate of 3.5% in the 2015-2019 period), creates a much more favorable environment for state intervention measures, primarily within the tax and social policy.

The spectrum of measures aimed at economic empowering of the middle class includes targeted measures in different fields: the application of a growth model based on high-productivity jobs, technological development, and innovations; reforming the education system; progressive taxation; raising the minimum wage; labor market policies aimed at tackling the problems of vulnerable groups (women, youth); regional policy; social policy; housing policy; family leave and union strengthening.

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SUSTAINABLE SUPPLIER EVALUATION: FROM A THEORETICAL CONCEPT TO A STRATEGIC AND OPERATIONAL ASSET IN SUSTAINABLE SUPPLY CHAIN MANAGEMENT

Održiva evaluacija dobavljača – od teorijskog koncepta do strateškog i operativnog instrumenta u održivom upravljanju lancem snabdevanja

Abstract

The topic of sustainable supplier evaluation has gained a significant research momentum in the last couple of years. This is evident from the number of papers and studies published recently. The purpose of this paper is to provide a comprehensive insight into contemporary theoretical approaches to sustainable supplier governance, as well as to determine the extent of theoretical uniformity and practical applicability of existing knowledge. Firstly, a literature review on supplier evaluation is provided, considering relevant articles from the field. After theoretically differentiating traditional from sustainable supplier evaluation, the paper identifies 4 areas of sustainability in contemporary literature and offers an analysis of existing supplier evaluation criteria from a performance and organizational perspective. In this sense, the lack of theoretical uniformity and interindustrial applicability of existing sustainable supplier evaluation approaches in modern business governance has been confirmed. Both professionals and academics could benefit from derived findings in terms of focusing future research efforts and avoiding the dangers of sustainability myopia.

Keywords: *sustainable supplier evaluation, sustainable supply chain management, sustainability myopia.*

Sažetak

Oblast održive evaluacije dobavljača je poslednjih godina dobila na značaju, naročito u pogledu naučno-istraživačkog momentuma. Ovo je evidentno iz broja nedavno objavljenih radova i studija. Svrha ovog rada jeste da obezbedi sveobuhvatni uvid u savremene teorijske pristupe održivoj evaluaciji dobavljača, kao i da odredi obim teorijske uniformnosti i praktične primenljivosti postojećeg znanja. Prvo, daje se pregled literature o održivoj evaluaciji dobavljača, razmatrajući relevantne radove iz oblasti. Nakon teorijske diferencijacije tradicionalne od održive evaluacije dobavljača, u radu se identifikuju 4 područja održivosti u savremenoj literaturi i nudi se analiza postojećih kriterijuma evaluacije iz organizacione i učinkovne perspektive. U ovom kontekstu, potvrđen je nedostatak teorijske ujednačenosti i inter-industrijske primenjivosti postojećih održivih pristupa evaluaciji dobavljača u modernom poslovnom upravljanju. Stručnjaci i akademici bi podjednako mogli imati koristi od izvedenih nalaza u smislu fokusiranja budućih istraživačkih napora, kao i izbegavanja opasnosti održive kratkovidosti.

Ključne reči: *održiva evaluacija dobavljača, održivo upravljanje lancem snabdevanja, održiva kratkovidost.*

Introduction

Complex political, social, economic, technological, legislative, and environmental challenges colored with risks and uncertainty have brought on a significant increase in business complexity and market volatility, which have forced modern companies to turn to establishing new and intensifying existing contacts and connections with market stakeholders, rather than to face these challenges individually [9], [25], [59]. Importance, prudence, and strength of these newly formed strategic networks lies in creating the value for the final consumer and ensuring his total satisfaction [28] through well-planned stakeholder communication, cooperation and collaboration [8]. Suppliers have a significant role in contributing to company's capability and potential to deliver value to its customers [45], [48]. Therefore, strategic and operational tendencies to improve overall business performance through careful supplier selection, evaluation, management and control have become common corporate occupation.

In order to address complex issues of controlling the flows and functions within distribution channels, companies have developed their own governing and managerial techniques, embodied in the supply chain management (SCM) process. For a company to successfully understand and manage its supply chain, data on suppliers' performances have to be adequately and comprehensively monitored, evaluated, interpreted and acted upon. Part of the supply chain management process tasked with assessing suppliers' performances is identified as supplier evaluation (SE) [30].

We are witnesses of a growing complexity and volatility of modern supply chains, permeated with intertwining ethical, environmental, and social challenges, conjoined as sustainability issues. This has been the driving force for establishing supply chain management practices which incorporate sustainable managerial aspect embodied in the triple bottom line (TBL) principle [26]. Lasting implication has been the shift from supply chain management to sustainable supply chain management (SSCM), and consequently supplier evaluation process to sustainable supplier evaluation (SSE) process, which is aimed at evaluating suppliers within all three domains of their business responsibility: economic, environmental, and social.

This paper was inspired by strategic and operational potential of SSE within modern SSCM practice and was driven by observed inconsistencies in theoretical considerations and research approaches to this topic. The goal of this research is to provide a comprehensive insight into contemporary approaches to SSE, and analyze the overlook concerning strategic and operational SSE significance in SSCM context. To adequately achieve this objective, the paper was written following a defined pair of research questions:

RQ1: How can SSE be theoretically located?

This research question is aimed at understanding the position of SSE in the contemporary scientific literature, mainly differentiating SSE from SE and understanding intracategorical differences in SSE approaches. This implies delayering various partially sustainable supplier evaluation models, such as green, socio-economic and socio-environmental SSE models from the complete, comprehensive and "true" SSE models, which provide undivided consideration to all three sustainability dimensions [56], [67].

RQ2: How do contemporary SSE approaches overcome modern scientific and practical challenges in SSCM context?

This research question is aimed at determining how contemporary SSE approaches respond to challenges facing modern corporate governance techniques. These challenges imply theoretical uniformity and practical applicability. Theoretical uniformity means that the analyzed approach must respect scientific principles and that multiple iterative methodological applications do not compromise theoretical basis and research scope. Practical applicability denotes the overall "value" and contribution of the SSE model [60]. This is predominantly determined by the interindustrial applicability potential and model's soundness in terms of a wider corporate acceptance [22], [67].

Literature review method is systematically and precisely defined in the following section. Research efforts aimed at understanding the evolution and the overall process of supplier evaluation in the context of sustainability are described in the second section. Findings related to theoretical uniformity and practical

applicability of contemporary SSE approaches are explained in the third section. Thoughts on future applications and development directions of SSE as a part of the overall SSCM process are presented in the discussion part. Concluding remarks and research limitations are provided at the end of this paper.

Research methodology

Theoretical foundation of this paper was determined through a thorough literature review process. Research tendencies were primarily focused on providing a profound insight into the current state of knowledge regarding SE and developing answers to listed research questions through a systematic analysis of data from secondary sources. The main success determinant of any literature review process is to provide clear, specific and topic-related research boundaries [56], [67]. With respect to this, following limitations were imposed on the material collection process:

(1) Only peer-reviewed publications in scientific journals and conference proceedings written in English were reviewed;
(2) Both original and review articles with a clear orientation on analyzing supplier performances or explaining supplier evaluation process were reviewed;
(3) Analyzed articles had to possess both wider supply chain management context and a strong corporate governance context with potential practical implications, as well as a comprehensive theoretical background of SE topic;
(4) Only papers published between 2002 and 2019 were analyzed.

Material collection is a lengthy, complex process which requires contextual analytical skills and multiple angles in research approach. In order to systematically approach the research topic, a research approach, combining a keyword-based analysis of electronic databases, an analysis of topic-related contemporary literature reviews, thematic research in specific, topic-oriented journals, as well as cross-referencing was implemented [67].

The main research effort was focused on keyword-based analysis of the following electronic databases: Springer, ScienceDirect, Wiley Online Library, Emerald Insight, IEEE Xplore Digital Library, MIT Press Journals, Public Library of Science, Oxford Academic Journals, and Google Scholar. All used search words were divided into four main keyword groups, according to the thesis research topic. The first group contained terms "sustainable", "green", "social", "environmental", and "ecological". The second group contained terms "supplier", "vendor", "supply-chain", and "procurement partner". The third group contained terms "evaluation", "selection", "performance", "measurement", "ranking" and "assessment". The fourth group contained terms "model", "approach", "decision making", "modelling technique" and "framework". It is important to note that various search word combinations were used, and that terms from all four categories were not always used simultaneously. Using this approach, 42 relevant publications were identified, 7 of which were review papers. Through the analysis of the references of these papers, material pool was expanded by additional 9 papers, amounting to the total of 51 scientific papers, which were then categorized and analyzed.

Chosen literature categorization methods were formulated in a manner which provides a directional, clear answer to aforementioned research questions. Consequently, the following literature categorization was performed in two phases. The first phase provides an insight into the transition from SE to SSE. The second phase explains specific intracategorical differentiation of contemporary SSE approaches in the context of theoretical uniformity and practical applicability.

Transition from traditional to sustainable supplier evaluation

First literature categorization phase is aimed at determining whether there are any differences between SE and SSE. The focus in this stage was to determine the research scope of the analyzed publications, focusing on the industries from which the data were gathered and determining whether the publications are related to SE or SSE processes, as well as which of the three sustainability dimensions [26] were taken into account. The results of this phase are shown in Table 1.

Table 1: Depiction of analyzed publications, with regards to their research nature, methodological application, research scope, and sustainability dimension coverage

Author(s) (publication year)	Nature	Research scope	Dimensions		
			Economic	Environmental	Social
Akamp and Müller (2013)	SSE	Multi-industrial	*	*	*
Akman (2015)	SSE	Automotive industry	*	*	
Amin and Razmi (2009)	SE	Digital service industry	*		
Azadegan (2011)	SE	Multi-industrial	*		
Azadnia et al. (2012)	SSE	Automotive industry	*	*	*
Banaeian et al. (2015)	SSE	Food industry	*	*	
Bilişik et al. (2012)	SE	Multi-industrial	*		
Boutkhoum et al. (2016)	SSE	Chemical industry	*	*	
Brandenburg and Rebs (2015)	SSE	Multi-industrial	*	*	*
Bruno et al. (2013)	SE	Railway system manufacturing industry	*		
Carter (2005)	SSE	Multi-industrial	*	*	*
Carter and Liane Easton (2011)	SSE	Multi-industrial	*	*	*
Carter and Rogers (2008)	SSE	Multi-industrial	*	*	*
Chan and Chan (2010)	SSE	Fashion industry	*	*	
Chung et al. (2016)	SSE	Bicycle manufacturing industry	*	*	
Cormican and Cunningham (2007)	SE	Power supply production and services	*		
De Felice et al. (2015)	SE	Multi-industrial	*		
Diba and Xie (2019)	SSE	Dairy-products industry	*	*	*
Ghadimi et al. (2019)	SSE	Electronics industry	*	*	*
Gimenez and Sierra (2013)	SSE	Multi-industrial	*	*	
Govindan et al. (2016)	SSE	Food industry	*	*	
Govindan et al (2015)	SSE	Multi-industrial	*	*	
Grimm et al. (2014)	SSE	Food industry	*	*	*
Ho and Nguyen (2007)	SE	Construction industry	*		
Jain and Singh (2014)	SE	Metal processing industry	*		
Kannan et al. (2014)	SSE	Electronics industry		*	
Karsak and Dursun (2014)	SE	Healthcare industry	*		
Khan et al. (2018)	SSE	Automotive industry	*	*	*
Kusi-Sarpong et al. (2016)	SSE	Mining industry	*	*	
Laosirihongthong et al. (2019)	SSE	Cement manufacturing industry	*	*	*
Lima-Junior and Carpinetti (2016a)	SE	Automotive industry	*		
Lima-Junior and Carpinetti (2016b)	SE	Automotive industry	*		
Luthra et al. (2017)	SSE	Automotive industry	*	*	*
Morali and Searcy (2013)	SSE	Multi-industrial	*	*	*
Pi and Low (2006)	SE	Multi-industrial	*		
Prahinski and Benton (2004)	SE	Automotive industry	*		
Qin et al. (2017)	SSE	Multi-industrial		*	
Rajesh and Malliga (2013)	SE	Metal processing industry	*		
Secundo et al. (2017)	SE	Aerospace industry	*		
Sen et al. (2018)	SSE	Single industry (not disclosed)	*	*	*
Seuring and Müller (2008)	SSE	Multi-industrial	*	*	*
Shih et al. (2009)	SE	Computer auditing industry	*		
Simpson et al. (2002)	SE	Multi-industrial	*		
Sundtoft Hald and Ellegaard (2011)	SSE	Electronics industry	*	*	
Wang Chen et al. (2016)	SSE	Luminance enhancement film industry	*	*	
Winter and Lasch (2016)	SSE	Fashion industry		*	*
Xu et al. (2013)	SSE	Multi-industrial		*	*
Yazdani et al. (2017)	SSE	Dairy-products industry	*	*	
Yu et al. (2018)	SSE	Home appliances industry	*	*	*
Żak (2015)	SE	Multi-industrial	*		
Zimmer et al. (2016)	SSE	Multi-industrial	*	*	*

Supplier evaluation has been present in a certain intuitive, rudimentary form throughout the centuries. The origins of the first systematic theoretical conceptualization of SE topic can be traced to the 1960s to the works of Dickson and Weber, who referred to the overall process as vendor selection and evaluation (cited in [23]). Since then the topic has gained in scientific momentum and the number of scientific papers written has grown exponentially, following the advances and evolution of prevailing contemporary management and marketing paradigms. In the 1990s this field experienced a notable shift towards acknowledgement of the importance of supplier flexibility, whereas nowadays product and service quality hold supreme position [19] using total customer satisfaction as a guiding strategic beacon. In the last 20 years predominant focus of research efforts has been on establishing a supplier evaluation model with multiple assessment criteria which could be implemented in a specific business environment setting [3], [4], [6], [14], [21], [23], [35], [37], [42], [43], [49], [51], [54], [57]. Only a few SE publications offer a broad industrial research focus [10], [47], [58], [66]. Literature review pointed out some significant shortcomings of the analyzed SE approaches. Firstly, predominant assessment criteria are almost exclusively related to delivery, flexibility, reliability, quality and costs [19], [57]. Secondly, these approaches either neglect or unduly oversimplify the role of sustainability in SCM, and consequently, SE [17]. Lastly, without a sound theoretical uniformity, which intertwines sustainability principles within all the domains of SE general interindustrial applicability of derived solutions cannot be achieved.

In the wake of intensified ecological and social challenges related to micro and macro corporate environments, companies have realized the necessity of integrating sustainability into their SCM practices in order to attain and sustain their competitiveness [13]. Thus, in recent years SSCM has gained in importance [25] and, consequently, companies are now shifting towards SSE trying to ensure that their corporate sustainability goals are understood and met throughout their entire supply chain [17].

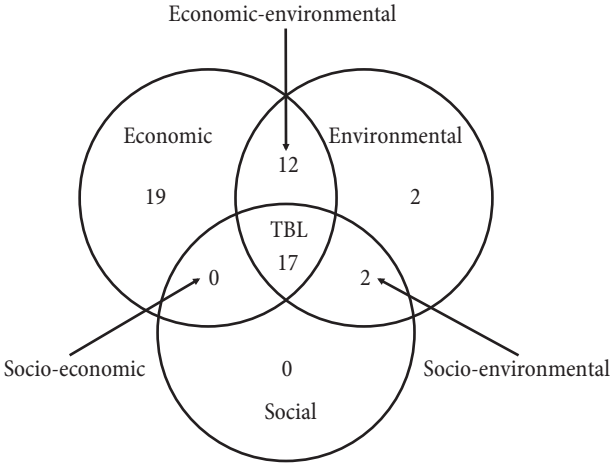
Although both SE and SSE approaches are based on the same guiding principle of improving corporate performances using careful supplier evaluation and selection, theoretical and practical implications differ greatly. The most significant difference is that SE is based purely on traditional economic theory, focusing solely on economic aspect of supplier performances, whereas SSE is constructed around the notion of introducing TBL principles to corporate governance through sustainable analysis of supplier overall performances [59]decision makers value improvements in supplier cost savings and injury reduction equally, which was somewhat unexpected. Further, both improvements in supplier cost savings and injury reduction were valued over supplier emissions performance. Because we measure individual tradeoff preferences, multi-level regression analysis was used to better understand the impact of respondent value structure regarding sustainably developing suppliers. Our findings suggest a hierarchy of tradeoff preferences for decision makers as they pertain to sustainable supplier development. As the pressure to ensure supply chain sustainability increases, more firms will engage in sustainable supplier development. The outcomes of the choices they make when choosing between initiatives, and how managers make these choices, will be of increasing interest in both industry and academia. This research answers previous calls for further examination of decision maker tradeoff preferences in sustainable supply chain development.",",container-title":"Journal of Purchasing and Supply Management",",DOI":"10.1016/j.pursup.2019.100574",",ISSN":"14784092",",issue":"5",",journalAbbreviation":"Journal of Purchasing and Supply Management",",language":"en",",page":"100574",",source":"DOI.org (Crossref. Therefore, when determining whether any significant differences exist between SE and SSE processes, the following proposition can be derived:

P1: There are significant differences between SE and SSE processes.

It is important to note that within the broad category of SSE, significant variations exist, mainly related to the selectiveness in the choice of supplier assessment criteria. Analyzed papers were categorized according to their sustainability dimensions' orientation, as shown in the last three columns in Table 1, and graphically presented in Figure 1. This resulted in the identification of three partially sustainable SSE approaches: economic-environmental, socio-environmental and socio-economic, alongside the

approach based on TBL sustainability. These areas can be seen in Figure 1, as areas where two or more circles representing three sustainability dimensions overlap.

Figure 1: Distribution of the coverage of economic, environmental and social dimensions of analyzed articles (adapted from Brandenburg and Rebs (2015))



From Table 2, it can be seen that literature dedicated to SSE is abundant and provides a wide diapason of insights into the manners in which sustainability could be incorporated into main supplier evaluation activities. Nevertheless, contemporary literature is often single-directional, focusing on the specific aspect of sustainability, neglecting the interdimensional relations, synergetic interactions and economic soundness of the other remaining aspects [13], [16], [17], [56].

Table 2: Categorization of SSE publications, according to their sustainability dimensions' coverage

Sustainability category	Number of papers
Triple bottom line (TBL)	17 (54.8%)
Economic-environmental (Green)	12 (38.7%)
Socio-economic	0 (0.0%)
Socio-environmental (CSR)	2 (6.4%)
Total	31 (100.0%)

Economic-environmental approach to sustainability

In the performed literature analysis 38.7% of all analyzed SSE papers focused on the economic and environmental component of sustainability, often referred to as green supplier evaluation models [2], [6], [11], [19], [20], [30], [31], [32], [40], [60], [61], [64]. These models focus on evaluating the environmental aspects of supplier activities, but in doing so neglect or underestimate social dimension, whilst often proposing measures and changes which are without strategic connotation and not economically justified in modern supply chain management, and thus not acceptable for the majority of companies [56]. Similar problem occurs when only environmental aspect is taken into account [36], [50], also leading to a certain sustainability myopia.

Socio-environmental approach to sustainability

In contemporary supply chain management practices, environmental and social business aspects are often, at best, subordinated compared to economic considerations. This kind of business conduct brought about significant, often global, environmental and social concerns, issues and conflicts. Legislation in modern countries, like those of EU-28, is slowly moving towards raising requirements for certain companies regarding non-financial reporting. This initiative is aimed at introducing corporate social responsibility (CSR) in modern business and strategic management. In this context, two out of all analyzed SSE articles (6.4%) focused on evaluating environmental and social performances of suppliers in the procurement phase of sustainable supply chain management process [62], [63]. These approaches, although with a clear research focus based on CSR philosophy, still lack the necessary economic focus essential for providing the "catchy" appeal to supply chain managers [56].

Socio-economic approach to sustainability

The approach focused on analyzing combined social and economic supplier performances is not a common occurrence in contemporary SSE researches. None of the analyzed papers implemented this approach. This can be explained by the fact that social considerations still represent a subordinated focus, compared to two other remaining sustainability dimensions. Although not present in this study, socio-economic supplier evaluation can be appealing for companies with strong and lasting ties to the local communities, often operating in transitional economies. As an example, many large corporate entities from former Socialist Federative Republic of Yugoslavia still

persevere until this day, and in the context of transitional adaptation to modern business environment, supply chain procurement management which focuses on economic supplier performances, but with a notable localized societal secondary orientation. One of potential explanations for the apparent lack of environmental assessment dimension could be the lack of financial means and legislative pressure in developing countries. Furthermore, national market specificities [46], a relatively short period of scientific consideration of social criteria, as well as quantification efforts encountered by researchers [67].

Triple bottom line approach to sustainability

The only strategically acceptable, long-term orientated supplier evaluation phase of the supply chain management is the one acknowledging all three dimensions of sustainability equally. From the managerial perspective this kind of comprehensive sustainability coverage ensures the fulfilment of economic requirements, alongside adequate assessment of, control, guiding and solving emerging environmental and social issues, with both short-term procurement and long-term strategic implications on the entire SCM process ensuring the avoidance of sustainability myopia. In the conducted literature review the largest portion of analyzed SSE publications (54.8%) adhered to the triple bottom line sustainability principle, by covering economic, environmental and social aspect of supplier assessment process. Although the majority of these papers focus on a particular set of industry-specific challenges, the approaches developed provide a clear illustration of how a comprehensive sustainability philosophy can be directly implemented in solving a practical managerial problem. It is important to note that TBL philosophy is slowly gaining an implementational advantage compared to other approaches, especially in the last few years [24], [29], [38], [41], [55], [65]. Another denoting characteristic of modern TBL SSE papers is that they evolve and grow in terms of research complexity and comprehensiveness, through ever increasing number of evaluation criteria and its hierarchical levels.

Theoretical and practical differentiation of contemporary sustainable supplier evaluation approaches

In order to identify the differences between analyzed SSE approaches, a deeper understanding of their research focuses and used supplier evaluation criteria (research comprehensiveness) is needed. The research focus of an SSE approach denotes the perspective of the process determining whether the context is operational or strategic. On the other hand, research comprehensiveness shows whether the scope of the evaluation covers only specific supplier activities or a wider array of supply chain activities. Implemented supplier evaluation criteria are closely related to the aforementioned research focus and represent a practical manifestation of theoretical background, sustainability considerations and research scope. Summarized findings in this respect are presented in Table 3.

Table 3: Summary of SSE publications, with regards to their sustainability category, research focus and used supplier evaluation criteria

Author(s) (publication year)	Category	Research focus	Criteria
1. Akamp and Müller (2013)	TBL	Supplier evaluation, selection, monitoring and development process in developing countries.	(1) Environmental criteria compliance (2) Social criteria compliance (3) Suppliers' factory inspection (4) Political stability of supplier's country of operations (5) Transport connections
2. Akman (2015)	Green	Development of a green supplier evaluation model, with a case study of automobile industry	(1) Delivery (2) Quality (3) Cost (4) Service (5) Green design (6) Pollution prevention (7) Green image (8) Green capability (9) Environm. management system

Author(s) (publication year)	Category	Research focus	Criteria
3. Azadnia et al. (2012)	TBL	Theoretical and practical development of a new methodological approach to supplier evaluation (FAST)	(1) Cost (2) Quality (3) Delivery (4) Health and safety (5) Stakeholder rights (6) Pollution (7) Eco-friendly product design (8) Environm. management system
4. Banaeian et al. (2015)	Green	Comparison of three main MCDM techniques for supplier evaluation and selection in food industry sector	(1) Qualitative (2) Financial (3) Management and organization (4) Services (5) Production technology (6) Environm. management system (7) Green image (8) Design for environment (9) Environmental improvement costs (10) Green competencies
5. Boutkhoum et al. (2016)	Green	Establishing a green supply chain management in chemical industry, based on sustainable supplier evaluation	(1) Productivity (2) Costs of material purchasing and energy consumption (3) Firm's competitiveness (4) Profitability (5) Human resources (6) Technological infrastructure and technical expertise (7) Organizational structure (8) Environmental quality of products/processes (9) Emissions and waste (10) Use of harmful/hazardous materials/components
6. Brandenburg and Rebs (2015)	TBL	In-depth literature review of sustainable supplier evaluation practices, and provision of guidelines for conducting SSE	None
7. Carter (2005)	TBL	Implementation of CSR practices into supply chain management, and linking suppliers' extended performance monitoring with overall corporate success	(1) Quality (2) Efficiency (3) Lead time (4) Diversity (5) Environment (6) Human Rights (7) Philanthropy (8) Safety
8. Carter and Liane Easton (2011)	TBL	Systematic literature analysis regarding sustainability implementation and potency in supplier evaluation process	None
9. Carter and Rogers (2008)	TBL	Large-scale literature review to introduce the concept of sustainability to the field of supply chain management, and demonstrate the relationships among environmental, social, and economic performance within a supplier evaluation and selection process	None
10. Chan and Chan (2010)	Green	Supplier evaluation modelling in fashion industry, using AHP methodology	(1) Delivery (2) Quality (3) Assurance of supply (4) Flexibility (5) Cost (6) Organizational strategic issues and reliability (7) Perceived risks (8) Technological issues (9) Environmental issues
11. Chung et al. (2016)	Green	Combined methodological approach to determining green supplier evaluation approach	(1) Operation management (2) Production management (3) Customer management (4) Green management

Author(s) (publication year)	Category	Research focus	Criteria
12. Diba and Xie (2019)	TBL	Development of a specialized sustainable supplier evaluation model using grey relational analysis	(1) Cost (2) Logistics and quantity (3) Technology (4) Environm. management system (5) Standard quality (6) Management commitment
13. Ghadimi et al. (2019)	TBL	Implementation of multi-agent system in a fuzzy inference model for sustainable supplier evaluation	(1) Green image (2) Pollution control (3) Green competences (4) Quality (5) Service/Delivery (6) Cost (7) Technical capability
14. Gimenez and Sierra (2013)	Green	Establishing the link between environmental suppliers` performances, and its impact on the overall performance	(1) Supplier assessment (2) Collaboration with suppliers (3) Environmental performance
15. Govindan et al. (2016)	Green	Implementation of PROMETHEE method on supplier evaluation process in food industry sector	(1) Cost (2) Quality (3) Delivery (4) Environmental impacts (5) Technology capability
16. Govindan et al (2015)	Green	Overview of MCDM techniques, and their applicability in green supplier evaluation models	None
17. Grimm et al. (2014)	TBL	Development and implementation of a broad, sustainable supplier evaluation approach in food industry	(1) Trust (2) Buyer-power (3) Committed long-term relationship (4) Supply-know-how (5) Willingness to disclose suppliers (6) Involvement of suppliers (7) Perceived value for suppliers (8) Risk of supplier-by-passing (9) Suppliers' capability to comply with sustainability standards (10) Geographical distance (11) Cultural distance
18. Khan et al. (2018)	TBL	Proposition of supplier performance evaluation framework based on fuzzy-Shannon Entropy model	(1) Cost (2) Quality (3) Delivery (4) Service reliability (5) Flexibility (6) Financial capability (7) Emission (8) Resource consumption (9) Environm. management system (10) Environment friendly materials (11) Cleaner technology (12) Recycled material (13) Employment practice (14) Health and safety (15) Employer rights (16) Information disclosure (17) Social commitment
19. Kusi-Sarpong et al. (2016)	Green	Development of green supplier evaluation method adapted to ANP and DEMATEL methodologies	(1) Green information technology and systems (2) Strategic supplier partnership (3) Operations and logistics integration (4) Internal environmental management (5) Eco-innovation practices (6) End-of-life practices

Author(s) (publication year)	Category	Research focus	Criteria
20. Laosirihongthong et al. (2019)	TBL	Introduction of a holistic FAHP framework for sustainable supplier evaluation and purchasing order allocation	(1) Quality (2) Price (3) Delivery (4) Production facilities and capacity (5) Financial situation (6) Pollution controls (7) Pollution prevention (8) Environm. management system (9) Energy consumption (10) Employment practices (11) Health and safety
21. Luthra et al. (2017)	TBL	Providing a triple bottom line supplier evaluation model, based on combined AHP - VIKOR methodology	(1) Price of product (2) Profit on product (3) Quality of product (4) Flexibility (5) Technological and financial capability (6) Production facilities and capacity (7) Delivery and service (8) Lead time required (9) Transportation cost (10) Environm. management system (11) Green design (12) Green manufacturing (13) Green packaging and labelling (14) Waste management (15) Environmental costs (16) Environmental competencies (17) Green R&D and innovation (18) Health and safety (19) Employee rights and interests (20) Stakeholder rights (21) Information disclosure
22. Morali and Searcy (2013)	TBL	Review of sustainability practices in supplier evaluation in Canadian companies	None
23. Sen et al. (2018)	TBL	Complex MCDM sustainable supplier evaluation using methodological hybrid combination	(1) Price (2) On time delivery (3) Service and relationship (4) Flexibility (5) Quality (6) Financial capability (7) Production facilities (8) Organization (9) Stakeholder rights (10) Work safety (11) Information disclosure (12) Respect for policy (13) Recycling (14) Waste equipment (15) Ozone depleting chemicals (16) Green R&D (17) Green design (18) Environm. management system (19) Environmental competencies (20) Innovation (21) Resource consumption (22) Green product (23) Pollution control
24. Seuring and Müller (2008)	TBL	Comprehensive literature review of sustainable supplier evaluation practices, and recommendations for future developments	None

Author(s) (publication year)	Category	Research focus	Criteria
25. Sundtoft Hald and Ellegaard (2011)	Green	The paper investigates how performance information travelling between the evaluating buyer and the evaluated suppliers is shaped and reshaped in the evaluation process	(1) Relationship (2) Management (3) Technology (4) Delivery (5) Quality
26. Wang Chen et al. (2016)	Green	Comprehensive study relating superior supplier environmental performance to the success in the overall green supplier evaluation model	(1) Cost (2) Quality (3) Delivery (4) Technology (5) Flexibility (6) Financial capability (7) Culture (8) Innovativeness (9) Relationship (10) Pollution production (11) Pollution control (12) Resource consumption (13) Eco-design (14) Environm. management system (15) Green image (16) Green competencies (17) Green product (18) Staff environmental training (19) Management commitment (20) Green technology
27. Winter and Lasch (2016)	CSR	Development of environmental and social criteria in the complex environment of modern fashion industry	(1) Child labor (2) Forced labor (3) Discrimination (4) Disciplinary and security practices (5) Freedom of association (6) Working hours (7) Employment compensation (8) Health and safety (9) Housing conditions (10) Home worker conditions (11) Employment contracting (12) End-of-pipe control (13) Use of eco-friendly materials (14) Carbon and hazardous substance management
28. Xu et al. (2013)	CSR	Finding evaluation criteria for CSR-based supplier evaluation process	(1) Human rights issue (2) Under age labor (3) Long working hours (4) Pollution (5) Safeguarding mechanism in CSR (6) Feminist labor issue (7) Organizational legal responsibilities
29. Yazdani et al. (2017)	Green	Implementation of a complex set of decision-making techniques on a green supplier selection problem	(1) Financial stability (2) Environm. management system (3) Waste disposal program (4) Management commitment (5) Quality control systems (6) Manufacturing (7) Facility (8) Reverse logistics (9) Quality adaptation (10) Price (11) Energy and resource consumption (12) Delivery speed (13) Green design (14) Reuse and recycle rate (15) Production planning

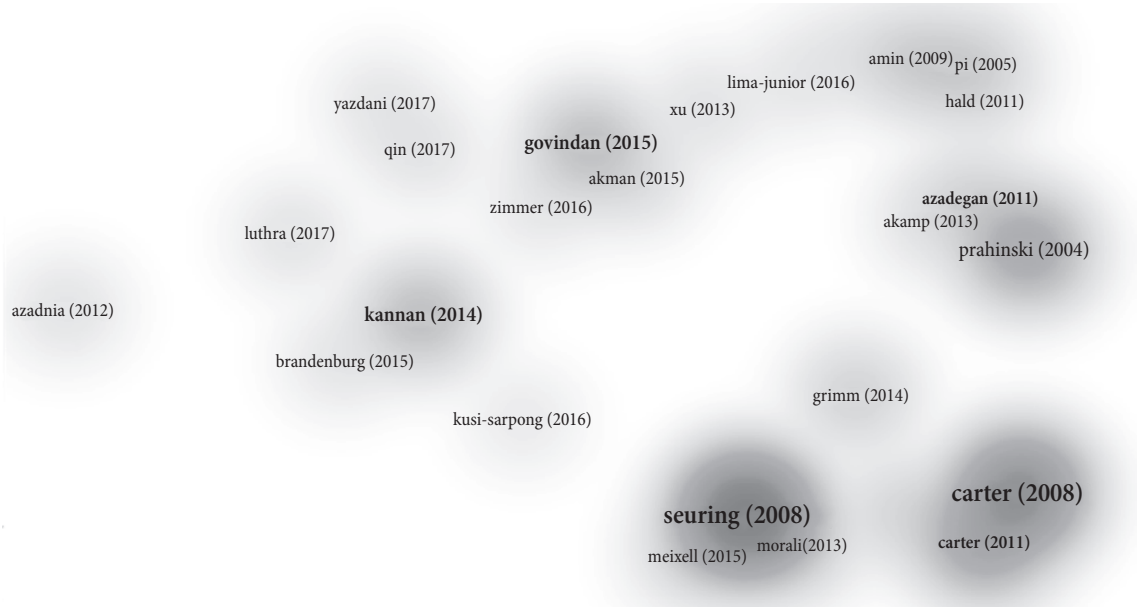
Author(s) (publication year)	Category	Research focus	Criteria
30. Yu et al. (2018)	TBL	Development of a hybrid decision-making framework for sustainable supplier evaluation based on both compensatory and non-compensatory decision rules	(1) Cost (2) Quality (3) Delivery (4) Service (5) Flexibility (6) Technology capability (7) Environm. management system (8) Resource consumption (9) Eco-design (10) Reduce, reuse and recycle (11) Health and safety (12) Employee right and welfare (13) Information disclosure
31. Zimmer et al. (2016)	TBL	A comprehensive review of models used for sustainable supplier selection, monitoring and development	(1) Management and organization (2) Financial performance (3) Capabilities (4) External perception (5) Environmental practices (6) Environmental performance (7) Internal social practices (8) Social performance (9) External social practices

Table 3 shows significant variations regarding the research focus of analyzed SSE papers. The majority of authors concentrate on finding sustainable solutions to supplier evaluation problem within a specific industry [2], [6], [11], [19], [24], [29], [31], [33], [38], [41], [65]. Bearing this in mind, these research approaches still have their merit, especially in pointing out industrial specificities and unique challenges in SSE by bringing up new evaluation criteria, as well as providing innovative means of performance measurement, control and improvement.

Literature review has also shown that many contemporary papers utilized certain modelling, mathematical or statistical techniques to approach, depict or attempt to solve SSE problem [5], [6], [19], [24], [29], [31], [32], [38], [40], [41], [44], [50], [64], [65]. Successful implementation of a specific decision-making technique is vital for increasing viability, accuracy and comparability of supplier assessment, as well as providing necessary automatization of the SSE process as a strategic and operational step in the entire supply chain. Predominant approach in this sense is modelling using multi-criteria decision making (MCDM), such as ANP/AHP [5], [6], [11], [14], [19], [20], [23], [35], [40], [44], [47], [51], [54], [63], [66], TOPSIS [5] , [6], [11], [36], [43], [50], VIKOR [2], [44] and DEMATEL [40], [64], which are recently very often combined with techniques modelling artificial intelligence, predominantly fuzzy theory [5], [6], [11], [24], [38], [41], [55], [65] and grey system analysis [6], [24]. When conducting a research, it is necessary to have a profound knowledge of available methodological approaches in order to prevent the research focus becoming a function of implemented methodology. Conceptual papers that provide an in-depth analysis of contemporary SSE approaches and their corporate strategic relevance are also of great theoretical importance [1], [13], [15], [16], [17], [30], [46], [56], [60]. These articles provide significant scientific contribution in terms of relating supplier performances to the overall supply chain performances, as well as confirming the correlation between successful SSE process implementation and an overall corporate performance improvement. Figure 2 confirms this by showing that within analyzed literature theoretical foundations laid in certain conceptual papers [16], [17], [56] are most commonly referenced in contemporary literature.

Supplier assessment parameters determine the overall outlook of the research, as well as the strategic disposition of SSE within the entire sustainable supply chain management. Summarized supplier evaluation criteria implemented in the analyzed studies were shown previously in Table 3. Presented papers implemented a wide variety of differing supplier evaluation criteria, and although deriving a unanimous systematic approach to SSE may initially seem impossible, certain common views on assessing specific segments of sustainable supplier performances can be detected amongst the authors.

Figure 2: Density visualization depicting the referencing frequency of analyzed papers (only papers which have been referenced ten or more times are shown)



Certain approaches inspect how suppliers behave and interact on an organizational level [15], [20], [63], some focus on suppliers' performance related to performing certain specific activities [55], [64], whilst the majority of authors consider both aspects. Following this line of thought, supplier evaluation aspects of contemporary SSE publications were analyzed from two angles – performance and organizational. Categorization findings are summarized in Table 4.

We can see that traditional economic criteria such as financial aspect, delivery, quality and technology still present the basis of modern sustainable supplier performance assessment criteria. When analyzing financial matters, authors mainly focused on costs [2], [5], [6], [11], [19], [24], [31], [38], [44], [61], [65], [67], prices [41], [44], [55], [64], financial capability/stability [55], [61], [64], [67] and profitability [11], [44]. Contrary to the presented classification, certain authors observed specific organizational characteristics as evaluation criteria [6], [11], [19], [55], [63], [67], rather than as an observational perspective.

Another identified trend is the increasing presence of newly emerging environmental and social evaluation areas regarding supplier capacity to meet ever-increasing sustainable supply chain management demands. Table 4 depicts the emphasis on the importance of environmental innovations in contemporary SSE literature, manifested through green products and design [2], [5], [44], [55], [61], [64], [65] and green business activities [2], [6], [29], [38], [40], [44], [55], [61]. Macro environmental managerial concepts, such as environmental impact assessment and total product life cycle management are gaining momentum in scientific application, although inherent difficulties related to modelling applications of these complex criteria are still being overcome, such as criteria quantification, comprehensive estimation, etc. [12], [27], [39]which may require redesigning the product, is often considerable. Thus, prudent product design necessitates the selection of electronic components and product architecture, considering the cost of mitigating an obsolete design and other costs related to the design and manufacture of a product. Accordingly, we develop and analyze a model that shows how a product design can be effectively tailored to a particular product's life cycle.","container-title":"Production and Operations Management","DOI":"10.3401/poms.1080.0056","ISSN":"1059-1478","issue":"5","journalAbbreviation":"Prod. Oper. Manag.","language":"English","note":"WOS:000259794000002","page":"497-512","source":"Web of Science","title":"Product design for life-cycle mismatch","volume":"17","author":[{"family":"Bradley","given":"James R."},{"family":"Guerrero","given":"Hector H."}],"issued":{"date-parts":[["2008",1

Table 4: Summary of analyzed SSE literature, with a detailed overview of supplier performance and organizational aspect criteria

Supplier evaluation aspect	Supplier evaluation criteria	Author(s)
Performance aspect	Financial considerations	Akman, 2015; Azadnia et al., 2012; Banaeian et al., 2015; Boutkhoum et al., 2016; Chan and Chan, 2010; Diba and Xie, 2019; Ghadimi et al., 2019; Govindan et al., 2016; Grimm et al., 2014; Khan et al., 2018; Laosirihongthong et al., 2019; Luthra et al., 2017; Qin et al., 2017; Sen et al., 2018; Yazdani et al., 2017; Yu et al., 2018; Zimmer et al., 2016
	Delivery	Akamp and Müller, 2013; Akman, 2015; Azadnia et al., 2012; Chan and Chan, 2010; Diba and Xie, 2019; Ghadimi et al., 2019; Govindan et al., 2016; Khan et al., 2018; Kusi-Sarpong et al., 2016; Laosirihongthong et al., 2019; Sen et al., 2018; Yu et al., 2018
	Environmental innovations	Akman, 2015; Azadnia et al., 2012; Banaeian et al., 2015; Boutkhoum et al., 2016; Ghadimi et al., 2019; Grimm et al., 2014; Kannan et al., 2014; Khan et al., 2018; Kusi-Sarpong et al., 2016; Luthra et al., 2017; Qin et al., 2017; Yu et al., 2018
	Quality	Akman, 2015; Azadnia et al., 2012; Banaeian et al., 2015; Carter, 2005; Chan and Chan, 2010; Ghadimi et al., 2019; Govindan et al., 2016; Kannan et al., 2014; Khan et al., 2018; Laosirihongthong et al., 2019; Luthra et al., 2017; Qin et al., 2017; Sen et al., 2018; Sundtoft Hald and Ellegaard, 2011; Yu et al., 2018; Zimmer et al., 2016
	Technological and technical considerations	Banaeian et al., 2015; Boutkhoum et al., 2016; Chan and Chan, 2010; Diba and Xie, 2019; Ghadimi et al., 2019; Govindan et al., 2016; Khan et al., 2018; Kusi-Sarpong et al., 2016; Laosirihongthong et al., 2019; Luthra et al., 2017; Sen et al., 2018; Sundtoft Hald and Ellegaard, 2011; Yazdani et al., 2017; Yu et al., 2018; Zimmer et al., 2016
Organizational aspect	CSR considerations	Carter, 2005; Grimm et al., 2014; Kannan et al., 2014; Khan et al., 2018; Luthra et al., 2017; Sen et al., 2018; Xu et al., 2013; Yu et al., 2018; Zimmer et al., 2016
	Environmental management system	Akman, 2015; Azadnia et al., 2012; Banaeian et al., 2015; Boutkhoum et al., 2016; Chung et al., 2016; Diba and Xie, 2019; Ghadimi et al., 2019; Kannan et al., 2014; Khan et al., 2018; Kusi-Sarpong et al., 2016; Laosirihongthong et al., 2019; Luthra et al., 2017; Sen et al., 2018; Qin et al., 2017; Winter and Lasch, 2016; Yu et al., 2018; Zimmer et al., 2016
	Human resources management	Azadnia et al., 2012; Boutkhoum et al., 2016; Carter, 2005; Grimm et al., 2014; Kannan et al., 2014; Khan et al., 2018; Laosirihongthong et al., 2019; Luthra et al., 2017; Sen et al., 2018; Qin et al., 2017; Xu et al., 2013; Yu et al., 2018; Zimmer et al., 2016
	Legal considerations	Azadnia et al., 2012; Carter, 2005; Kannan et al., 2014; Khan et al., 2018; Laosirihongthong et al., 2019; Luthra et al., 2017; Sen et al., 2018; Xu et al., 2013; Yu et al., 2018
	Pollution control and environmental impact assessment	Azadnia et al., 2012; Boutkhoum et al., 2016; Ghadimi et al., 2019; Govindan et al., 2016; Kannan et al., 2014; Kusi-Sarpong et al., 2016; Laosirihongthong et al., 2019; Qin et al., 2017; Sen et al., 2018
	Total product life cycle management	Boutkhoum et al., 2016; Kannan et al., 2014; Kusi-Sarpong et al., 2016; Qin et al., 2017; Winter and Lasch, 2016

0]]}}},{"id":1588,"uris":["http://zotero.org/users/2792031/items/FM2VWXPI"],"uri":["http://zotero.org/users/2792031/items/FM2VWXPI"],"itemData":{"id":1588,"type":"article-journal","abstract":"As the sustainability improvement becomes an essential business task of industry, a number of companies are adopting IT-based environmental information systems (EIS.

Regarding the organizational SSE aspect, philosophy of sustainability has had a deeper, more comprehensive impact on strategic decision-making process, rather than on operational managerial level. CSR policy and managerial implications, environmental management, human resource management and legal adherence are identified as dominant corporate strategic managerial areas with significant influence on the SSE process, and ultimately sustainable supply chain management. This is confirmed by increasing presence of sustainable practices in developed markets, such as increasing market share of fair-trade products, sweat shop awareness and social housing projects. It is also important to mention certain authors who, although did not focus on analyzing specific supplier performance aspects, still provided a macro-strategic overview of the SSE process [44], [61].

Having analyzed contemporary approaches towards SSE, in order to provide a comprehensive conclusion, an insight into the successfulness of these studies in tackling modern scientific and practical challenges, mainly theoretical uniformity and practical applicability is required.

Theoretical uniformity in contemporary literature

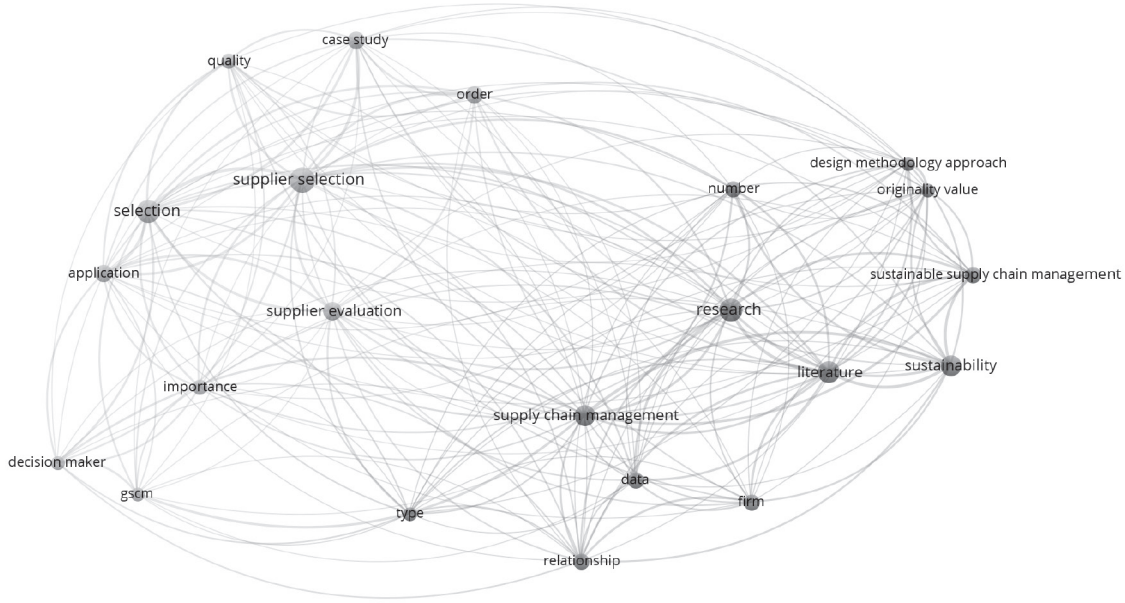
Certain analyzed papers emphasized some significant conclusions regarding SSE, such as the positive link between sustainability, corporate competitiveness and performance [17]; supplier performance and supplier evaluation [1]; and the overall profitability of environmental awareness explained by Hoffman and Bazerman in 2005 (cited in [17]). Despite these findings, the lack of a uniform approach to SSE, based on TBL sustainability principle is quite apparent. This study showed that only 33.3% of all analyzed papers can be regarded as SSE studies which implemented TBL sustainability framework. When implemented evaluation criteria are also taken into account, the theoretical concept of sustainability is diluted even further. Additionally, analysis and clustering of most commonly occurring words in titles and abstracts of analyzed literature was performed and its results are shown in Figure 3.

Depicted analysis confirmed three important points identified in contemporary literature. Firstly, the fact that no single term possesses an outstanding presence suggests a wide dispersion of research focuses and methodological approaches, characteristic of newly emerging, expanding scientific topics. Secondly, a relatively mediocre presence of terms such as 'supply chain management', 'sustainable supply chain and 'green supply chain' shows a distinctive lack of a wider scientific and managerial context. Lastly, relatively low presence of the term 'sustainability' suggests a still existing methodological gap in SSE topic researches. From this perspective, the following proposition can be derived:

P2: Contemporary literature does not possess a consensus on a theoretically uniform SSE model.

Evaluation criteria used in analyzed papers are either too broadly defined, with vague, often overlapping classification boundaries [2], [5], [6], [19], [30], [31], [60], [61], [62], [64], or too specific, problem-orientated, without a broad interindustrial applicability [1], [11], [24], [29], [36], [38], [40], [41], [50], [63], [65]. All these approaches lack a single-directional anchorage in TBL philosophy of sustainability and are too often adapted to implemented modelling techniques [13], which undermines the effectiveness and accuracy of derived results, increasing the research biasedness. Sustainability is not an operational coverage issue, but rather a strategic, long-term, development-orientated business philosophy [7], [52]. Theoretical uniformity in sustainable supplier evaluation process is achieved not through conceptualizing sustainability as a collection of three independent dimensions with contextual cohesion, but rather as a basic principle and a guiding mindset for supply chain decision-making processes on all hierarchical business levels [13], [56]. This line of reasoning

Figure 3: Network visualization depicting most commonly occurring terms in analyzed literature (only terms with occurrence frequency higher than 5 are shown, representational significance is 60%)



consequently applies to standardization of solutions regarding evaluation criteria of different suppliers on all hierarchical decision-making levels, regardless of the industry in which the evaluation is being performed [13], [67]. The lack of sustainable philosophical understanding is most obvious when observing relatively subordinated roles of environmental and social criteria, reflected in the lack of a comprehensive categorization method, as well as the neglect of synergetic corporate value-creation potential of these business aspects [13], [56], [67], often manifested as a form of corporate sustainability myopia.

Practical applicability in contemporary literature

Of all the analyzed publications (both SE and SSE) shown in Table 1, 18 (35.3%) were categorized as multi-industrial in their nature. Of those, 12 (23.5%) can be considered SSE papers. It is important to note that of these papers 7 are literature review papers which approached the topic of SSE from a critical standpoint, emphasizing significant drawbacks of contemporary literature, such as the lack of macro applicability of SSE solutions for whole industries [13], and of remaining 5 research articles only 2 (3.9%) implemented TBL principle in SSE, although either in the context of purchasing social responsibility [15] or specificities of SSE conduct in developing countries [1]. It is apparent that original research efforts aimed at tackling SSE problem on both operational and strategic interindustrial level based on TBL sustainability principle are still lacking in volume and consistency. Although research diversity provides the necessary "richness" of academic thought and a wide diapason of specific SSE solutions which can be implemented in the adequate situations, adhering to contextual problem-oriented limitations, it can be concluded that contemporary literature does not provide an SSE model which can be implemented broadly in different industries, without having to undergo significant alterations. With this in mind, the following proposition can be derived:

P3: Existing SSE models are not adapted to a wide interindustrial application.

The reason for this is a wide dispersion of research focuses in different studies, shown in Table 3. Most analyzed SSE papers are orientated at solving individual problems related to specific companies, countries or industries, rather than providing a general evaluation framework with incorporated flexibility to respond to industry-specific challenges. Another issue is that implemented SSE models are developed in such a way as to ensure the "best fit" to the preferred research and assessment methodology [5], [20], [31], [40], [64], sometimes leading to a methodological research myopia.

Discussion

Witnessing significant managerial and business disruptions, an adequate, comprehensive, efficient and effective supplier evaluation system is needed, one that provides both operational reasoning and strategic long-term outlook. In the wake of the last couple of years, inspired by the Paris Agreement of 2015, the world is slowly moving towards sustainability. Sustainability is a hereditary requirement which we are obliged to introduce to current corporate governing techniques. In this respect, the decision on whom to partner with has become essential. Therefore, we can conclude that supplier evaluation has become a topic which no longer has the luxury of evolution. Revolutionary steps, mainly in the domain of theoretical contextuality and practical uniformity are necessary in order to ensure that the new approach to SSE is able to cope with upcoming challenges of our modern, global society.

Research efforts which are not soundly based in theoretical knowledge often fall short of the goal of furthering the knowledge base in the field of SSCM, and are usually confided within the short scope of their specific problem-oriented perspective [56]. Theoretical uniformity of developed models within the topic of SSE will be denoted by the equally dispersed scientific footing based in TBL philosophy [13], [67]. This does complicate the overall research itself and requires certain "leaps of faith" in terms of methodological innovations but in turn provides the only viable long-term strategic solution in the context of SSCM. Academic efforts in this domain will undoubtedly progress in this direction but will be additionally accelerated from the corporate perspective as more and more companies start introducing principles of sustainability in their corporate governance. A scientific

topic with a strong anchorage in the corporate world usually gains in research momentum. With the further development of SSE models, an academic consensus on SSE methodological uniformity will be required in order to introduce theoretical and practical standardization to this topic.

Future researches on sustainable supplier evaluation should be outlined and guided by practical applicability of its findings in different industries. Every company has its network of suppliers, which implies that adequate supplier assessment and selection is the "bane" of all industries. SSE models must be implementable interindustrially with comparable end results based on theoretical uniformity. As seen from this paper, the field of SSE still presents "uncharted waters" in modern business decision-making activities, with a huge potential for improving corporate performance, productivity and market success. There are many ways in which SSE can be made a viable strategic tool through intraindustrial supplier evaluation standardizations, allowing for comparison and ranking of closely related competitors and the increase in intraindustrial communications regarding the results of conducted corporate SSEs. This would increase awareness and transparency within specific industry sectors and lead to future implementations of much detailed SSE approaches, with multi-level performance indicators and standardized supplier performance measurement instruments.

SSE process must also possess the capacity to respond to specific industry-related challenges. Every industry is unique in its specific challenges and requirements. When coupled with national market environment factors the outcome is a very complex business conjecture [67]. These complexities should be answered in all segments of business conduct, including supplier evaluation. To respond to contextual peculiarities, developed SSE approach will have to be flexible enough to adhere to specific intraindustrial challenges and to incorporate these considerations into the evaluation framework, without compromising the accuracy and comparability of derived results.

The final aspect of SSE process is the potential to adapt to requirements from both multinational corporations (MNCs) and small and medium enterprises (SMEs). The difference between MNCs and SMEs is a very complex, multi-dimensional matter. It includes many strategic, organizational, legislative, financial, ethical and technological considerations which influence all business segments and activities, including supplier evaluation process. One of the main differences is the fact that MNCs operate on a global scale, while SMEs often operate locally or on a national level, but this is also changing due to rapid advances and developments in information technologies [34]. MNCs have international supply chains which increase the complexity of logistic and procurement activities. This is reflected in a more detailed and comprehensive approach to supplier evaluation [18]. MNCs are expected to have a higher relevance priority of environmental and social considerations when evaluating their suppliers. Also, their overall evaluation process is usually more complex with a higher number of precise, measurable and quantifiable performance indicators, more transparent activities, as well as certain considerations and requirements, such as specific supplier certificates and practices. However, this cannot be taken as a rule of thumb because certain SMEs have important ties to local communities, which can result in high environmental and social corporate awareness [67]. Another related issue is whether the company in question operates in a developed or developing country.

Every corporate market entry requires a comprehensive external situational analysis in order to adequately understand and respond to specific political, economic, social, technological, legislative and environmental challenges [1]. MNC operating in an international environment with a highly differentiated market portfolio in terms of the national development level must incorporate many local specificities in its business decision-making process, which have a significant effect on the outlook of implemented SSE model. Another important point is a much more complex internal structure of MNCs in comparison to their SMEs counterparts. Large organizations with big employee pools rely on standardized and transparent procedures and formal communication channels. This is also reflected on a corporate SSE model in terms of number, complexity and structure of observed supplier performance indicators, which tend to be more numerous, detailed, precise, numerically expressed, and comparable, than in the majority of SMEs.

Conclusion

This research pointed out certain conclusions regarding theoretical foundations of contemporary papers on the topic of supplier evaluation and selection. Although the main functioning principles of both traditional and sustainable supplier evaluation processes are the same, the differing point is the inclusion of sustainability principles in the supplier assessment process. Modern supply chain challenges require comprehensive decision-making process which takes into account economic, environmental and social opportunities and threats [32]. This has significant implications on the rising importance of supplier assessment aimed at determining suppliers' capacity to deliver sustainable performances. Only through comprehensive acknowledgment of issues from all three sustainability dimensions can efficient and effective strategic and operational decisions be derived. In this sense, a necessary step in establishing a successful long-term SSCM is the corporate introduction of an SSE model based on TBL philosophy [17]. Partial consideration of only one or two sustainability aspects leads to potential sustainability myopia, which could in the long run endanger corporate performance [13], [16], and even existence in ever more sustainability-orientated modern business environment. The research also pointed out that higher hierarchical SSE decision-making levels are somewhat easier to standardize than the lower, more operational criteria levels, mainly due to specific problem-solving orientation [56].

Future applications and development of SSE will be in the direction of solving two most significant challenges – theoretical uniformity and practical applicability. This implies that the scientific consensus on the necessity of incorporating TBL philosophy in corporate governance is required. In the context of SSCM. this implies adhering to sustainability requirements in a comprehensive manner, respecting all three dimensions equally and basing strategic and operational decision-making process on these considerations. In terms of supplier evaluation, business processes and activities should be assessed through their overall contribution to the sustainability of the entire strategic value network. In this respect, papers focusing on reviewing methodological approaches in SSE will gain in momentum and importance, since profound knowledge and understanding of applicable modelling techniques and their combinations is required in order to avoid "methodological myopia" in which the research focus and goal is subordinated to implemented methodology. MCDM methodologies are becoming a dominant go-to solution for tackling SSE topic, and are oftentimes coupled with artificial intelligence techniques, mainly fuzzy theory.

Concluding thoughts go to the fact that all modern business processes are influenced by internal and external factors. Large corporations are slowly adapting their organizations to respond to these new challenges, whereas the newly emerging companies are basing their existence on opportunities found in accelerating sustainability momentum. Modern supply chains must forego traditional beliefs and turn towards equal acknowledgment of economic, environmental and social aspects. A vital part of this change will be adequate evaluation, control and development of existing and potential suppliers, who are an inevitable link in the modern corporate supply chain value networks.

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CREATIVE INDUSTRIES IN SERBIA: METHODOLOGICAL APPROACHES AND ECONOMIC CONTRIBUTION*

Kreativne industrije u Srbiji – metodološki pristupi i ekonomski doprinos

Abstract

This paper examines the relative importance of creative industries (CI) in Serbia and provides a critical review of the existing methodological approaches that may be used in order to determine the economic contribution of these industries. We also present the results for the period from 2014 to 2017. To show the relative contribution of creative industries, we used the narrow DCMS approach that focuses only on core creative industries. We also provide additional results for what we refer to as the "broad approach". In 2017, narrowly defined CIs contributed 3.9 percent to the total GVA and 3.7 percent to the total GDP, while the broadly defined CIs contributed 7.8 percent and 7.5 percent, respectively. Other indicators provide additional support regarding the importance of CIs in Serbia. The average annual growth rate of the number of narrowly defined CI entities amounts to 5.6 percent (8.4 percent for broadly defined CIs which is 6 percentage points higher than the average growth rate in the national economy – 2.01 percent). Employees engaged in narrowly defined CIs represent 3.3 percent of the total number of employees in Serbia (5.6 percent in the broadly defined CIs). IT, software and computer services subsector contributes the most of all CIs to the economy. In 2017, this subsector contributed more than 60 percent to the total narrowly defined CI GVA, (more than 55 percent to broadly defined CI GVA).

Keywords: *creative industries, Serbia, gross value added, methodological approaches, economic contribution.*

Sažetak

Rad razmatra relativni značaj kreativnih industrija u Srbiji i pruža kritički pregled postojećih metodoloških pristupa koji mogu biti korišćeni radi određivanja doprinosa ovih industrija. Takođe, prikazujemo rezultate doprinosa kreativnih industrija u Srbiji u periodu od 2014. do 2017. godine korišćenjem „užeg" DCMS pristupa ograničenog samo na osnovne kreativne industrije (uži pristup). U radu prikazujemo i dodatna merenja doprinosa kreativnih industrija na osnovu pristupa koji definišemo kao „širi pristup". U 2017. godini uže definisane kreativne industrije doprinele su 3,9 procenata ukupne BDV i 3,7 procenata ukupnog BDP-a, a šire definisane industrije 7,8 procenata i 7,5 procenata, respektivno. Drugi indikatori takođe ukazuju na značaj kreativnih industrija u Srbiji. Prosečna godišnja stopa rasta broja privrednih subjekata u okviru užeg pristupa merenju kreativnih industrija iznosi 5,6 procenata (8,4 procenta za širi pristup, što je za 6 procentnih poena više od prosečne stope rasta u celoj ekonomiji - 2,01 procenat). Lica zaposlena u uže definisanim kreativnim industrijama čine 3,3 procenta ukupnog broja zaposlenih lica u Srbiji (šire definisne kreativne industrije doprinose ukupnom nivou zaposlenosti sa 5,6 procenata). Podsektor IT, softverskih i računarskih usluga ima najveći udeo kada je u pitanju doprinos pojedinačnih sektora kreativnih industrija srpskoj privredi. U 2017. godini, ovaj podsektor generisao je više od 60 procenata ukupne BDV uže definisanih kreativnih industrija (više od 55 procenata kada je u pitanju širi pristup klasifikaciji).

Ključne reči: *kreativne industrije, Srbija, bruto dodata vrednost, metodološki pristupi, ekonomski doprinos.*

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Introduction

Recent years have witnessed a growing interest in the economic literature on creative industries (CIs) as an important contributor to the economic growth and development [1], [3]. This was accompanied by increasing economic evidence on the size and relative importance of creative industries, as well as discussions on CI impact and spillovers to the rest of economy. In Serbia, as in other countries, creative industries have raised increasing interest in academia. The economic significance of CIs in Serbia has been extensively researched by Jovičić and Mikić [13], Mikić [16], [17], [18] and Radulović et al. [20]. These studies applied different concepts, methodologies and measures to assess and compare Serbia to other countries. This paper critically reviews the existing literature and methodological approaches and provides new results regarding the economic contribution of creative industries in Serbia for the period from 2014 to 2017. Having in mind the lack of a unified approach to the analysis of CIs, one of the main goals of this paper is to provide a better understanding of the existing methodological nuances.

Methodological approaches

The definition of creative industries is the subject of much debate [21]. The term "creative industries" originated from the Australian Government's adoption of the national strategy "Creative Nation" in 1990s, yet it gained attention after it was popularized by the British Department for Digital, Culture, Media and Sport (DCMS). DCMS defines CIs as "industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property" [25, p. 4], [26]. The DCMS approach emphasizes the importance of technological CIs (in contrast to industries that may be viewed as traditional cultural industries) [1, p. 21]. Though most commonly used in literature, the definition was the subject of extensive academic debate, primarily having in mind its potential practical and theoretical limitations, including but not limited to the problems of accurate measurement, the conflation of culture and cultural policy with economy and the coherence of the umbrella term and category itself [14, pp. 4-5].

Several other institutions also provided their perspective on how creative industries may be defined. The EU definition is more comprehensive having in mind that it includes both cultural and creative industries (CCIs). They are defined as "industries that are based on cultural values, cultural diversity, individual and/or collective creativity, skills and talent with the potential to generate innovation, wealth and jobs through the creation of social and economic value, in particular from intellectual property" [9]. Previously, several documents adopted a prescriptive definition of cultural and creative industries with the list of activities included in this concept. In other EU policy documents, CCIs are mostly defined as "industries which use culture as an input and have a cultural dimension, although their outputs are mainly functional" [6, p. 6], [5], [7], [8]. UNCTAD defines creative industries as cycles of creation, production and distribution of goods and services that use creativity and intellectual capital as their primary inputs. They constitute a set of knowledge-based activities and are focused on, but are necessarily not limited to, arts, and they potentially generate revenues from trade and IPR. These industries comprise tangible products and intangible intellectual or artistic services with creative content, economic value and market objectives, they are at the crossroad among the artisan, services and industrial sectors and constitute a new dynamic sector in the world trade [27, p. 13].

Substantial effort has been made to classify and categorize creative industries in literature. However, there are several closely related concepts. While both cultural and copyright-based industries are often (and mistakenly) used as synonyms to creative industries, there are subtle differences that should be taken into account [24], [30]. Multiple supranational organizations as well as several national bodies have recognized different activities as "cultural and/or creative industries". For example, there are studies done by UNESCO [28] and Mikić [18] that were focused on the classification of creative and cultural industries. The term "cultural industries" may be defined as a set of activities that produce and distribute cultural goods

or services and embody or convey cultural expressions, irrespective of their potential commercial value [18, p. 8].

Similar distinction exists between creative and copyright-based industries. WIPO approach regarding conceptualizing and measuring the economic contribution of CIs comes from the perspective of copyright value. The WIPO model is based on the copyright chain that covers creation of content that represents intellectual property and distinguishes between core and non-core copyright industries (interdependent, partial and non-dedicated industries) [29], [30].

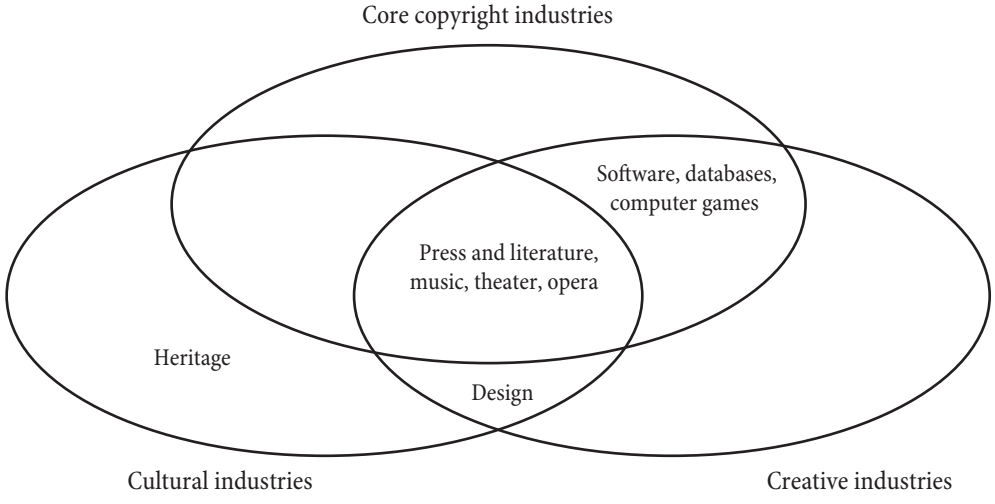
During the last decade, great effort has been made to resolve these methodological issues and define specific activities to be treated as creative (or cultural or copyright-based) industries [24], [30]. While some authors merge cultural and creative industries and perceive them as a single phenomenon [19], it is now well recognized that cultural, creative and copyright-based industries cover similar but somewhat different domains. Figure 1 shows those different concepts and their intersections [30, p. 44]. Industries related to national heritage are not considered to be creative, yet cultural industries. Similarly, industries related to design are considered both creative and cultural, but not core copyright industries.

The differences arising from the usage of different concepts may not necessarily be moderate. Single approach does not fit all countries. For example, the concept of cultural industries is much more suitable for countries where the state has a key role in the promotion and governance of diversity of cultural expressions, while creative industries are more appropriate to the countries focused on interrelation between IT and cultural content. Comparative research studies on this topic show that there is no unique approach to the measurement of CIs and that each new study has brought a new way of measuring [16, p. 61].

There are three methodological approaches regarding the measurement of CIs. The first, industry-based approach determines industries that use creativity as a major input in the production process [4, pp. 2-3]. The second, occupational-based approach determines occupations that can be categorized as creative [10], [11]. The third, combined approach represents a combination of the first two approaches, adding economic contribution of creative occupations from non-creative industries to the industry-based approach [12], [22].

In this paper, we will apply the narrow industry-based DCMS approach that focuses only on core CIs. To show the impact of broader interpretation of CIs and for the sake of comparison with several EU countries, we will also provide a measurement based on what we refer to as the "broad" approach. This approach is partially based on the methodology adopted by TERA for selected EU member states and expands the list of CIs as industries that "produce and distribute creative products aimed at mass reproduction, mass dissemination and exports" [23, p. 14]. Hence, it also considers industries such as printing, retail

Figure 1: Mapping of the core copyright (WIPO, 2015), cultural (UNESCO, 2009) and creative (DCMS, 2001) industries



Source: The chart is adapted from [30, p. 44].

trade of specific goods and telecommunication activities to be creative industries. However, when using the broad approach our estimates are limited only to the core segment of CIs and exclude economic contribution of non–core creative industries (interdependent industries and non-dedicated support industries). TERA study mimics the WIPO methodology that also provides estimates of the economic contribution of non–core creative industries. These non-core creative industries are to a lesser extent related to copyright-protected materials. Interdependent industries are industries engaged in the production and sale of equipment whose function is to facilitate the creation, production or consumption of cultural products, while non-dedicated support industries are industries engaged in the broadcast, communication, distribution or sales of the cultural products. The inclusion of non-core industries creates substantial methodological difficulties with respect to attribution, decisions on selection of industries that are defined as non-core industries, data availability, etc. As a consequence, adding the non-core CIs may be a rather vague exercise that heavily relies on imputations and approximations. Their inclusion may bias the results and inflate the impact of core creative industries [2]. Hence, the broad approach of core CIs in our paper provides for estimates that are only directly attributable to creative industries. Even these estimates, based on the broad approach by including borderline industries, inflate the contribution of CIs.

Data and methodology

To measure the economic contribution of CIs in Serbia, we have used the data from the Serbian Business Registers Agency (SBRA) obtained from financial statements of registered entities (companies and entrepreneurs) in creative industries for the 2014-2017 period. The calculation of economic indicators for public entities (that are not registered in SBRA) was based on budget users' reports collected by the Statistical Office of the Republic of Serbia (SORS). The baseline data from 2010 were extrapolated by yearly change of the number of employees in those activities. For specific industries, corrections were made by including partial financial records for the entities registered under a business activity code that is not covered by our classification, but are nevertheless operating and providing services in creative industries. The most common example may be found in media industries. For example, very often the core registered activity of media companies may be cable communication or telecommunications services and cable distribution, even though they conduct main business activities in the field of broadcasting. Table 1

Table 1: Baseline economic indicators for measuring the economic contribution of CIs

Indicator	Description	Source of data
Business activity	No. of businesses in CIs by size	SBRA
	No. of businesses in CI subsectors by size	SBRA
	No. of new businesses in CIs	SBRA
GVA	GVA of CIs or CI subsectors in absolute terms	SBRA; SORS
	Share of CI value added in the GVA of total economy (%)	SBRA; SORS
	Share of CI subsectors in total GVA of CIs in absolute and relative terms	SBRA; SORS
GDP	GDP of CIs in absolute terms	SBRA; SORS
	Share of CI GDP in the GDP of total economy (%)	SBRA; SORS
Employment	Share of CI employees in total employment (%)	SBRA; SORS
	Share of CI subsectors' employment in total employment in CIs in absolute and relative terms	SBRA; SORS
Export value	Value of export of creative goods in absolute terms	UNCTAD data on international trade
	Share of CI export in total country/regional export (%)	UNCTAD data on international trade
	Increase of export value of CIs (%)	UNCTAD data on international trade
Business performance indicators	Productivity (in EUR)	SBRA
	Total R&D expenses (in EUR million)	SBRA
	Total R&D expenses (in EUR) as % of total business revenues	SBRA
	Export revenue in total business revenue (%)	SBRA
	Value of intangible assets (in EUR)	SBRA

Source: Adapted from [18, p. 19].

provides an overview of indicators for measuring the economic contribution of CIs in Serbia.

Gross value added (GVA) is calculated at current prices by using the income approach. Export value of creative goods is calculated based on the international trade data. This approach was chosen due to the possibility of precise identification of creative goods by sub-analytical product codes.

Narrowly defined CIs include 30, while broadly defined CIs include 51 SIC industry codes (based on the KD 2010 classification). Following the UK DCMS approach, the narrowly defined industries are classified in nine CI groups: 1) advertising and marketing, 2) architecture, 3) crafts, 4) design, 5) film, TV, video, radio and photography, 6) IT, software and computer services, 7) publishing, 8) museums, galleries and libraries and 9) music, performing and visual arts. Based on the classification adopted by TERA, in addition to including most (though not all) SIC codes of the narrow approach, the broader approach comprises codes that are related to printing and related services, retail sale of CI-related products, and most importantly telecommunications services. Table 2 provides an overview of groups and industries that constitute both the narrowly and broadly defined CI sector.

Economic contribution of creative industries in Serbia

The share of CI businesses in Serbian economy may be considered relatively significant. Narrowly defined CI estimates in 2017 are based on 24,089 registered business entities (enterprises and entrepreneurs), including 8,001 enterprises, 16,088 entrepreneurs and 362 public institutions. Broadly defined CI estimates in Serbia are based on 32,908 registered business entities (enterprises and entrepreneurs), including 10,832 active enterprises (approximately 10.1 percent of total number of enterprises), 22,076 entrepreneurs (approximately 9.93 percent of total number of entrepreneurs) and 541 public institutions. The number of CI businesses demonstrates a rising tendency during the 2014-2017 period compared to the rest of Serbian economy. The average annual growth rate of the number of CI enterprises and entrepreneurs was 5.6 percent (broadly defined CIs – 8.4 percent, 6 percentage points higher than the average growth rate of business formation in the national economy – 2.01 percent).

Broadly defined CI sector is predominantly composed of small and microenterprises (23.8 percent of the total number) and entrepreneurs (67.5 percent). The analysis shows that CIs are characterized by a large number of micro organizations with less than 3 employees. There is a high level of sectoral fragmentation in CIs compared to the national economy. However, these overall indicators hide a strong heterogeneity within different subgroups. There is a rather low number of registered enterprises and entrepreneurs in certain branches of CI, which demonstrates underdeveloped value chains, major barriers to entry (human resources, financial, technical, etc.) and non-profitability or instability of particular CI markets (e.g. video gaming, trade in music records and video, renting music and video records, printing newspapers, museum, galleries and libraries).

Almost 14.1 percent of total start-ups in the last 4 years in Republic of Serbia belonged to the creative industries domain. New enterprises in creative industries achieved an average annual growth rate of 3.25 percent, while the same indicator for the whole economy was 2.1 percent. With respect to sectoral distribution of new entrepreneurs, the leading domain is design and creative services, such as graphic design, followed by film and video production. Those activities comprise approximately 50 percent of the total number of new CI entrepreneurial start-ups. New entrepreneurs in creative industries had an average yearly growth rate of 22 percent, while the same indicator for the whole economy was 5.8 percent.

Gross value added (GVA) of the narrowly defined CIs in total GVA was 3.91 percent in 2017, while the broadly defined CI GVA contribution in total GVA was significantly higher, at 7.83 percent. However, in the beginning of the analyzed period, the GVA contribution of the broadly defined CIs was 6.7 percent. Therefore, the increase of the CI share in the total GVA in the economy was about 1.17 percentage points in a short period of only three years. Table 3 provides an assessment of GVA and GDP for the 2014-2017 period, using both narrow and broad approaches.

Table 2: CIs (narrow and broad definition) – division and classification according to SIC 2010 (NACE Rev. 2)

Creative industries group	Activity	SIC code	Narrow	Broad
Advertising and marketing	Public relations and communication activities	70.21	+	
	Advertising agencies	73.11	+	+
	Media representation	73.12	+	+
	Market research and public opinion polling	73.20		+
	Other information service activities n.e.c.	63.99		+
Architecture	Architectural activities	71.11	+	+
	Engineering activities and related technical consultancy	71.12		+
	Technical testing and analysis	71.20		+
Crafts	Manufacturing of jewelry and related articles	32.12	+	
Design	Specialized design activities	74.10	+	+
Film, TV, video, radio and photography	Retail sale of telecommunications equipment in specialized stores	47.42		+
	Motion picture, video and television programme production activities	59.11	+	+
	Motion picture, video and television programme post-production activities	59.12	+	+
	Motion picture, video and television programme distribution activities	59.13	+	+
	Motion picture projection activities	59.14	+	+
	Radio broadcasting	60.10	+	+
	Television programming and broadcasting activities	60.20	+	+
	Wired telecommunications activities	61.20		+
	Wireless telecommunications activities	61.30		+
	Satellite telecommunications activities	61.90		+
	Photographic activities	74.20	+	+
IT, software and computer services	Publishing of computer games	58.21	+	+
	Other software publishing	58.29	+	+
	Other telecommunications activities	62.01		+
	Computer programming activities	62.02	+	+
	Computer consultancy activities	62.03	+	+
	Other information technology and computer service activities	62.09		+
	Data processing, hosting and related activities	63.11		+
	Web portals	63.12		+
	Retail sale of computers, peripheral units and software in specialized stores	47.41		+
	Repair of computers and peripheral equipment	95.11		+
Publishing and printing	Printing of newspapers	18.11		+
	Other printing	18.12		+
	Pre-press and pre-media services	18.13		+
	Binding and related services	18.14		+
	Retail sale of books in specialized stores	47.61		+
	Retail sale of newspapers and stationery in specialized stores	47.62		+
	Book publishing	58.11	+	+
	Publishing of directories and mailing lists	58.12	+	+
	Publishing of newspapers	58.13	+	+
	Publishing of journals and periodicals	58.14	+	+
	Other publishing activities	58.19	+	+
	News agency activities	63.91		+
	Translation and interpretation activities	74.30	+	+
Museums, galleries and libraries	Library and archive activities	91.01	+	+
	Museum activities	91.02	+	+
	Operation of historical sites and buildings and similar visitor attractions	91.03		+
Music, performing and visual arts	Reproduction of recorded media	18.20		+
	Sound recording and music publishing activities	59.20	+	+
	Performing arts	90.01	+	+
	Support activities to performing arts	90.02	+	+
	Artistic creation	90.03	+	+
	Operation of art facilities	90.04	+	+

Table 3: GVA and GDP – total, narrowly and broadly defined CIs, 2014-2017

	2014	2015	2016	2017
Total GVA (current price, bn RSD)	3,257.177	3,346.183	3,749.021	3,946.351
CI GVA (current price, bn RSD) (narrow)	82.4	88.4	119.3	156.5
CI GVA (current price, bn RSD) (broad)	216.8	237.5	266.1	309.2
CI GVA (current price, bn EUR) (narrow)	0.7	0.7	0.9	1.2
CI GVA (current price, bn EUR) (broad)	1,8	2.0	2.1	2.5
Exchange rate EUR	117.31	120.73	123.67	120.80
Contribution of GVA in total GVA - % (narrow)	2.53%	2.64%	3.18%	3.91%
Contribution of GVA in total GVA - % (broad)	6.66%	7.10%	7.09%	7.83%
Total GDP (current price, bn RSD)	3,908.469	4,043.467	4,521.264	4,754.368
CI GDP (current price, bn RSD) (narrow)	98.1	105.3	142.1	178.7
CI GDP (current price, bn RSD) (broad)	258.1	282.5	304.3	358.7
% of total GDP (narrow)	2.51%	2.61%	3.14%	3.76%
% of total GDP (broad)	6.60%	6.99%	6.73%	7.53%

Source: Authors' calculations.

Table 4: Structure of CIs (narrow concept) by distribution of GVA, 2014-2017

	2014		2015		2016		2017	
	Current prices, bn RSD	As a % of total CI GVA	Current prices, bn RSD	As a % of total CI GVA	Current prices, bn RSD	As a % of total CI GVA	Current prices, bn RSD	As a % of total CI GVA
Advertising and marketing	10.5	12.7%	10.3	11.6%	11.1	9.3%	9.03	5.77%
Architecture	2.9	3.6%	3.5	4.0%	4.7	4.0%	2.7	1.73%
Crafts	0.58	0.7%	0.42	0.5%	0.43	0.4%	0.49	0.31%
Film, TV, video, radio, photography	11.3	13.8%	16.1	18.1%	16.4	13.7%	19.6	12.55%
Design	1.7	2.1%	1.3	1.5%	0.89	0.7%	1.03	0.66%
IT, software and computer services	30.2	36.7%	31.6	35.7%	60.5	50.7%	98.2	62.75%
Publishing	14.4	17.5%	14.6	16.5%	14.1	11.8%	13.9	8.87%
Museums, galleries and libraries	4.04	4.9%	4.5	5.1%	4.4	3.7%	5.6	3.57%
Music, performing and visual arts	6.6	8.0%	6.2	7.0%	6.7	5.6%	5.9	3.78%

Source: Authors' calculation.

Using the narrow approach, advertising and marketing, publishing, film, TV, video, radio and photography and IT, software and computer services subsectors have the largest share of total CI GVA in the 2014-2017 period. However, the dynamics of the aforementioned subsectors is significantly different. In 2014, at the beginning of the analyzed period, the shares of the total CI GVA of the first two subsectors were 12.7 percent and 17.5 percent, respectively. Both of these subsectors recorded a significant decline of their share of the total CI GVA in 2017. Namely, in 2017, that share declined by more than 50 percent, amounting to 5.77 percent and 8.87 percent, respectively. The third subsector retained its share in the total CI GVA in 2017 and also recorded a small uptick. On the other hand, IT, software and computer services subsector captured approximately 37 percent of the total CI GVA in 2014, but showed a significant increase in the meantime and more than doubled its share in 2017, reaching 62.75 percent of the total CI GVA. This is consistent with the findings from other studies that also conclude that the ICT sector has become one of the most propulsive sectors of the economy, with high growth rate of operations which came from outsourcing and entering into license agreements with international partners [31, p. 227]. Table 4 provides a detailed assessment of the structure of CIs by distribution of GVA during the period from 2014 to 2017, using the narrow concept.

Table 5 provides the same sort of analysis, but focuses on the broad approach, thus allowing more businesses to qualify as part of the CI. Using this approach, the advertising and marketing subsector recorded a significantly smaller share in the total CI GVA. Other subsectors labeled as

significant in the narrow approach exhibited similar results, with the exception of the IT, software and computer services subsector which had a dominant share of the total CI GVA in 2014 (50.9 percent) and consequently showed a significantly smaller increase in share in 2017 (57.37 percent). Table 5 provides a detailed assessment of the structure of CIs by distribution of GVA during the 2014-2017 period using the broad concept.

Importance of the CI sector for employment

In 2017, a total of 69,139 persons were employed in narrowly defined CIs, while in broadly defined CIs there were 115,899 employees in total. This represents 3.3 percent of the total number of employees in Serbia (broadly defined CIs contributed to the total employment with 5.6 percent). However, CI employment is mostly flexible and project-oriented (preformed under outsourcing, service or copyright agreement), hence "invisible" in registered employment data. Temporary employment accounts for about 11 percent of total employment, as opposed to the economy average where this form of employment accounts for 5.8 percent. The need for permanent hiring of employees in CIs is comparatively small as CIs often hire freelancers or resort to outsourcing to creative entrepreneurs. Nevertheless, the total increase in CI employment is 14.17 percent from the aspect of narrow approach, and 12.7 percent from the aspect of broad approach. Table 6 presents the comparison of employment figures in narrowly and broadly defined CIs from 2014 to 2017.

Employment in CIs is quite specific and this sector mainly employs highly educated temporary workers (about 15 percent of total employment). More than half of the employees are highly educated people, which indicates strong cultural capital within these industries. Also noteworthy is the fact that less than 1 percent of the total employees in CIs represent unqualified and low-skilled workforce. Again, this is in contrast to the economy average where their share is approximately 20 percent.

The IT and software and film and video subsectors represent the most important employment group with about one third of the total number of employees in CIs

Table 5: Structure of CIs (broad concept) by distribution of GVA, 2014-2017

	2014		2015		2016		2017	
	In current price, bn RSD	As a % of total CI GVA	In current price, bn RSD	As a % of total CI GVA	In current price, bn RSD	As a % of total CI GVA	In current price, bn RSD	As a % of total CI GVA
Advertising and marketing	12.1	5.6%	11.9	5.3%	13.1	4.9%	12.5	4.05%
Architecture	19.8	9.1%	24.4	10.9%	28.9	10.9%	32,1	10.37%
Film, TV, video, radio, photography	33.5	15.5%	37.7	16.8%	38.5	14.5%	47.9	15.45%
Design	1.7	0.8%	1.3	0.6%	0.89	0.3%	1.03	0.33%
IT, software and computer services	110.1	50.9%	111.1	49.4%	144.2	54.3%	177.8	57.37%
Publishing and printing	28.1	13.0%	27.4	12.2%	28.4	10.7%	25.9	8.35%
Museums, galleries and libraries	4.3	2.0%	4.6	2.0%	4.6	1.7%	6.5	2.10%
Music, performing and visual arts	6.6	3.1%	6.3	2.8%	6.8	2.6%	6.2	2.00%

Source: Authors' calculation.

Table 6: Employment in CIs, 2014-2017

	2014	2015	2016	2017
Total employment	1,698,000	1,896,295	1,920,679	2,062,588
CI employment (narrow)	60,557	63,889	65,314	69,139
CI employment (broad)	102,839	106,768	110,574	115,899
% of total employment (narrow)	3.57	3.37	3.40	3.35
% of total employment (broad)	6.06	5.63	5.71	5.61
Growth rate of CI employment (narrow)	1.5%	5.50%	2.23%	5.85%
Growth rate of CI employment (broad)	4.23%	3.82%	3.56%	4.81%

Source: Authors' calculation based on administrative employment data from SBRA and the Statistical Office of the Republic of Serbia.

(narrow definition). The crafts and architecture subsectors have the smallest number of employees and those sectors only represent approximately 1.2 percent and 3.2 percent of the total number of employees in CIs, respectively. The shares of different domains of CIs between 2014 and 2017 remained quite stable, with the notable exception of the IT sector whose share nearly doubled during this period, which corresponds with the rise in its share of the total CI GVA. The public sector accounts for about 42 percent of total employees in narrowly defined CIs (about 33 percent for broadly defined CIs). More than 65 percent of personnel in all public CIs were employed in museums, galleries and libraries, music, performing and visual arts and television programming and broadcasting. Tables 7 and 8 show the comparison of employment figures between narrowly and broadly defined CIs during the 2014-2017 period.

The average annual growth of employment in the narrowly defined CI sectors was 4.7 percent in the observed period, while the annual growth in the broadly defined sectors was 4.23 percent. This growth could have been even higher had it not been for the decline in the levels of employment in the film, TV, video, radio and photography subsector. The reduction of employment in radio and TV activities was mainly caused by the transformation of state-owned broadcasting services since they employ more than 45 percent of the total number of employees in this subsector.

The concentration of employment is proportional to the market share of leading companies in several branches. For instance, the top-ranking media companies employ approximately 55.6 percent of employees in the branch; in the film industry, the three biggest telecommunications companies (Telekom, SBB and VIP) absorb approximately 75 percent of employees in the branch, etc.

Exports of the CI sectors

The creative goods are defined as goods conveying ideas, symbols, ways of life, different cultural values and other creative expressions and whose production requires a reasonably significant level of creativity. UNCTAD classification of creative goods covers 6 creative goods

Table 7: Employment distribution by CI groups, narrow approach (number of persons vs. share %)

Creative industries group	2014	2015	2016	2017	2014	2015	2016	2017
Narrow CI concept	No. of persons				% of total			
Architecture	1,437	1,543	2,105	2,235	2.37	2.42	3.22	3.23
Advertising and marketing	5,228	5,222	5,340	5,590	8.63	8.17	8.18	8.08
Design	1,773	1,876	1,959	2,167	2.93	2.94	3.00	3.13
Crafts	1,037	1,020	800	830	1.71	1.60	1.22	1.20
Film, TV, video, radio, and photography	12,587	12,597	11,897	11,934	20.79	19.72	18.22	17.25
IT, software	18,944	20,571	22,149	24,567	31.28	32.20	33.91	35.52
Publishing	7,496	8,484	8,216	8,345	12.38	13.28	12.58	12.06
Museums, galleries and libraries	6,344	6,616	6,711	6,970	10.48	10.36	10.27	10.08
Music, performing arts and visual arts	5,711	5,960	6,137	6,530	9.43	9.33	9.40	9.44
TOTAL	**60,557**	**63,889**	**65,314**	**69,168**	**100**	**100**	**100**	**100**

Source: Authors' calculation based on administrative employment data from SBRA and the Statistical Office of the Republic of Serbia.

Table 8: Employment distribution by CI groups, broad approach (number of persons vs. share %)

Creative industries group	2014	2015	2016	2017	2014	2015	2016	2017
Broad CI concept	No. of persons				% of total			
Architecture	15,065	16,381	17,625	21,670	14.65	15.34	15.94	18.70
Advertising and marketing	5,766	5,929	4,902	4,860	5.61	5.55	4.43	4.19
Design	1,773	1,876	1,959	2,167	1.72	1.76	1.77	1.69
Film, TV, video, radio, and photography	28,339	28,886	30,142	25,579	27.56	27.05	27.26	22.38
IT, software	31,926	32223	34437	41,075	31.04	30.18	31.14	35.44
Publishing	7,529	8,484	8,216	6,838	7.32	7.95	7.43	5.90
Museums, galleries and libraries	6,694	6,986	7109	7133	6.51	6.54	6.43	6.15
Music, performing arts and visual arts	5,747	6,003	6,184	6,577	5.59	5.62	5.59	5.54
TOTAL	**102,839**	**106,768**	**110,574**	**115,899**	**100**	**100**	**100**	**100**

Source: Authors' calculation based on administrative employment data from SBRA and the Statistical Office of the Republic Serbia.

groups: 1) cultural and natural heritage, 2) performance and celebration, 3) visual arts and crafts, 4) books and press, 5) audiovisual and interactive media and 6) design and creative services.

One-seventh of all revenues of CI business comes from abroad. Exports accounted for about 12 percent of all revenues of Serbian CI businesses in 2017. An average company operating in this sector in Serbia earned about EUR 45,000 from exports, which is 15 percent more than the average for the Serbian economy overall. The annual growth rate of CI export revenue was 8.7 percent over the 2014-2017 period. The main exporting CI sectors (that generated more than 70 percent of total CI export revenues) are printing services, telecommunications, programming, and advertising. The average growth rate of Serbian creative goods export was 8.9 percent per year, but there were differences across subsectors. The most dynamic average annual export growth occurred in the area of new media and crafts and publishing. Despite high average value of export growth rates, as well as rapid market penetration of certain CI subsectors, Serbia is still a net importer of creative goods.

For SEE countries, creative goods represent approximately 3.02 percent of the overall export. During the observed period, Croatia participated with 2.74 percent in the regional export of creative goods, Serbia with 2.1 percent, Bosnia and Herzegovina with 1.45 percent, Albania with 0.39 percent and Montenegro with 0.15 percent. Serbian CI businesses mainly export their goods and services to the former Yugoslav republics. Key markets vary for specific CIs. In case of film, TV, video, i.e. audiovisual services, the key markets are Italy, France and the UK, while for publishing activities these are the former Yugoslav republics. Exports of creative goods (covered by UNCTAD classification) in SEE and selected countries are presented in Table 9 bellow.

International comparisons

Making comparisons with global champions can be inspirational. Narrowly defined CIs can only be compared with the UK. The UK is one of the global leaders in providing CI goods and services and it is useful to see how large this sector can be. The table below summarizes some of the main information and provides comparison between Serbia and the UK for the year 2016. As expected, Serbia significantly lagged behind the UK.

Table 10: Contribution of CI GVA and employment in Serbia and the UK (narrow CI definition) in 2016

Countries	CI employment		Creative occupation		GVA	
	No. of persons	%	No. of persons	%	In M EUR	% of total economy
Serbia	65,314	3.4	74,272	3.9	965	3.4
UK	1,808,000	5.8	1,915,000	6.1	66,648	5.2

Note: CI data for the UK are extracted from [26].

Interestingly, when the broad approach is used, the results show that in Serbia CIs are more important than in other countries for which results are available. CIs have the highest share in Serbia both in terms of employment and creation of value added. Compared to France, Germany, Italy and Spain, the share of CIs in Serbian economy is almost two times higher, while the difference in share in total employment is somewhat smaller. However, certain warnings are necessary. Having in mind that this is a

Table 9: Export of creative goods in SEE countries, 2014-2017, in 000 USD

Exporter	2014	2015	2016	2017
World	612,923,593	546,164,424	522,054,222	521,275,796
Southeastern Europe (SEE)	**16,291,727**	**15,178,942**	**16,692,291**	**17,992,391**
Croatia	448,723	430,041	449,669	482,584
BIH	223,120	218,145	240,871	282,782
Montenegro	6,524	5,289	5,760	6,968
Albania	45,017	75,937	95,484	45,090
Serbia	**317,796**	**299,337**	**356,328**	**397,252**
% contribution of SEE CIs in total SEE export	2.66	2.78	3.20	3.45
% contribution of Serbian CIs in SEE export	1.95	1.97	2.13	2.21
Growth rate of SEE CIs	7.56	-6.83	9.97	7.79
Growth rate of Serbian CI export	11.18	-5.81	19.04	11.48

Source: Author's calculation based on the Trade Map data retrieved from www.trademap.org (accessed on 10 November 2018).

dynamic sector worldwide, some of the data presented might be obsolete i.e. the share of CIs has probably increased by now in all of these countries. This comparison puts Serbia in the context of high-income countries where other sectors are developed as well; thus, the share of CIs is smaller. However, in Serbia, being a transition economy, many other sectors are still recovering.

Table 11: Contribution of CIs in GVA and total employment, 2014-2016 (broad CI definition)

Countries	GVA (%)	Jobs (%)
Serbia (2016)	**7.5**	**5.8**
France (2011)	5.1	3.7
Germany (2011)	3.9	4.1
Italy (2011)	3.9	3.7
Spain (2011)	3.4	3.4

Note: CI data for the selected EU countries are obtained from [23].

Due to inclusion of a significantly larger number of subsectors than in the narrow approach, the results are inflated and the significance of CIs is magnified. Hence, one should be very careful when drawing conclusions, especially in the case of emerging economies, and we believe that the proper approach would be to use the narrow concept.

Comparisons with the rest of the Serbian economy

Both narrowly and broadly defined, Serbian CI sectors are gaining in importance in Serbian economy and are showing much faster development than the rest of the Serbian economy. The number of newly established start-ups in CI sectors is also growing much faster than in other sectors of the economy.

Table 12: Contribution of sectoral GVA in total GVA – CIs compared to other sectors of the economy (in current prices, %)

Sectors	2014	2017
Creative industries (narrow concept)	2.5%	3.9%
Creative industries (broad concept)	6.7%	7.8%
Construction	5.1%	5.0%
Tourism	1.3%	1.6%
Agriculture, forestry and fishing	9.3%	7.3%
Mining	1.3%	2.6%

Source: Authors' calculation, the Statistical Office of the Republic of Serbia, Statistical Yearbooks 2015 and 2018.

Businesses which fall under CIs are more productive than other Serbian enterprises. Productivity in narrowly defined CIs amounts to EUR 18,738 (EUR 22,077 for broadly defined CIs, 35.01 percent higher than the economy average, which was 15,838 EUR in 2017 as represented in more detail in Table 13). The high productivity of broadly defined CIs is to some extent explained by spending on Research and Development (R&D) and by high value of intangible assets. R&D spending in the CI sector accounts for 9 percent of total national R&D investment. R&D investment among CI enterprises presents 0.12 percent of total business revenue per year compared to the economy average where the share of R&D investment in total business revenue is around 0.08 percent. Intangible assets in CIs represent about 42 percent of total intangible assets generated in national economy.

Table 13: Business performance indicators of CIs (broad concept) compared to the rest of the Serbian economy (2017)

Sectors	CIs	National average
Productivity (in EUR)	22,077	15,838
R&D expenses total (in EUR million)	5.6	57.1
R&D expenses total (in EUR) as % of total business revenues	0.12	0.07
Export revenue in total business revenue %	10.9	12.3
Intangible assets (in EUR)	901,245,687	2,449,588,568

Source: Authors' calculation.
Note: Only enterprises are included in the calculation of business performance indicators.

Conclusions

This paper reviews methods for assessing the economic contribution of creative industries and presents the differences with respect to their scope and data limitations. It also provides a detailed mapping according to the most relevant industry-based approach and DCMS categorization of CIs. The presented indicators represent a baseline source of information about several economic dimensions of the development of creative industries and provide possibility for international benchmarking comparison and a "big-picture" perspective on the state and prospects of creative industries in Serbia.

Based on the presented data, Serbia exhibits considerable potential for the development of its creative economy. The results show that CIs were among key contributors to the growth of Serbian economy in the observed period, with the average annual growth rate of the number of narrowly defined CI entities of 5.6 percent (8.4 percent for broadly defined CIs; this growth was more than 6 percentage points higher than the average growth rate in the national economy – 2.01 percent). This confirms that creative industries attracted increasing volume of entrepreneurial skills and resources. However, the paper also shows that it is crucial to adequately categorize creative industries. Their economic contribution varies dramatically depending on the initial selection criteria and adopted methodology. In the case of narrow approach, the contribution of creative industries is almost completely driven by the IT, software and computer services subsector. This subsector's contribution increased from 37 to close to 63 percent of the total narrowly defined CI GVA (or by 26 percentage points). This increase was relatively less significant in case of the broad approach where it was just 7 percentage points. However, IT, software and computer services in Serbia have somewhat different structure compared to this field in the developed countries. Usually, the IT-oriented sector, as part of creative industries, is mostly focused on the production of digital creative contents. In Serbia, this sector predominantly depends on outsourcing or licensing contracts with lower levels of creativity and often without potential for intellectual property protection. Currently, the majority of this sector can be described as a pseudocreative activity.

The limitations of the industry-based approach in measuring economic contribution of creative industries in this paper mainly refer to the lack of data related to the craft sector, social entrepreneurship in creative industries, nonprofit organizations, as well fashion, urban and product design. These activities remained out of the scope of our research. Further assessments of the characteristics of creative industries in Serbia should consider these limitations, as well as provide better understanding of regional aspects and impacts of creative industries through spillover. The second limitation of our results is related to the fact that we applied the industry-based method. Hence, we did not take into account creative employment in other industries. The criticism of the industry-based approach has been emphasized by several authors. For example, Markusen et al. show that considerations of the total number of employees working within creative industries may lead to inaccurate estimations since only a part of them may actually be involved in the creative contents production [15, p. 36].

The use of a combined industry and occupation-based approach could provide additional insights and a more detailed assessment and understanding of Serbian creative economy.

The impact of the creative industries in Serbia is not limited only to economic indicators presented in this paper. Serbian creative industries are one of the key drivers of technological progress and long-term development. We believe that this paper provides sufficient basis for further research and sheds light that will contribute to the design of evidence-based policies promoting creative economy in Serbia.

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THE RASPBERRY COMMODITY EXCHANGE IN SERBIA: AN EXPLORATORY RESEARCH OF PRODUCERS' ATTITUDES

Berza maline u Srbiji - ispitivanje stavova proizvođača

Abstract

This paper analyzes the possibility of developing a commodity exchange in which raspberries produced in Serbia would be traded. Establishing a raspberry commodity exchange would provide for the determination of price for this fruit in the market, which would probably increase producers' satisfaction. For this purpose, the regulatory conditions for the development of commodity exchanges in Serbia and the volume of raspberry production in Serbia were analyzed. In order to assess the quality of refrigeration services and the perceived value of sales through a stock exchange, this paper also comprises an empirical research that has been conducted. Moreover, the connection of these variables with satisfaction and loyalty of raspberry producers to services of the owners of refrigeration facilities was analyzed, as well. Hence, the paper indirectly analyzes the readiness of raspberry producers to start trading in the commodity exchange. Statistical data processing and analysis were performed by using the statistical packages Microsoft Excel and SPSS. Higher perceived values of sales through a commodity exchange than the values of assessment of the quality of refrigeration services, as well as the negative influence of this perceived value on satisfaction with refrigeration services, indicate the willingness of raspberry producers to switch to selling in commodity exchanges.

Keywords: *raspberry, commodity exchange, quality of services of raspberry purchasers, perceived value of sales through commodity exchange.*

Sažetak

U radu je analizirana mogućnost razvoja robne berze na kojoj bi se trgovalo malinama proizvedenim u Srbiji. Osnivanjem berze malina obezbedilo bi se tržišno utvrđivanje cene ovog voća, što bi verovatno povećalo zadovoljstvo kod proizvođača. U te svrhe analizirani su regulatorni uslovi razvoja robnih berzi u Srbiji i obim proizvodnje malina koji se ostvaruje u Srbiji. U cilju ocene kvaliteta usluga otkupljivača maline (hladnjačara) i percepcije vrednosti prodaje preko berze, u radu je sprovedeno i empirijsko istraživanje. Takođe, analizirana je i povezanost ovih varijabli sa zadovoljstvom i lojalnošću proizvođača maline (malinara) uslugama hladnjačara. Na ovaj način, indirektno je analizirana spremnost malinara za prelazak na prodaju preko robne berze. Statistička obrada i analiza podataka izvršene su korišćenjem softverskih paketa Microsoft Excel i SPSS. Više ocene percipirane vrednosti prodaje preko berze od ocene kvaliteta usluga hladnjačara, kao i negativan uticaj te percipirane vrednosti na zadovoljstvo uslugama hladnjačara, indirektno ukazuju na spremnost proizvođača malina na prelazak na prodaju preko berze.

Ključne reči: *maline, robna berza, kvalitet usluga otkupljivača maline, percipirana vrednost prodaje preko robne berze.*

Introduction

Commodity exchanges are places where standardized products are traded according to predefined rules. In practice, there is a large number of commodity exchanges through which agricultural products are successfully sold. For instance, corn, wheat and soybean are traded in the famous Chicago Mercantile Exchange. In the Multi Commodity Exchange of India Ltd, palm oil, cotton and black pepper are traded. Zhengzhou Commodity Exchange in China organizes trade in cotton, white sugar, apples, rapeseed and some other agricultural products. In the Izmir Commodity Exchange, cotton and raisins are traded.

The aim of this paper is to point out to the possibility of developing a raspberry commodity exchange in Serbia. The first step in this process was to analyze the regulatory framework of commodity exchanges' operations in Serbia. It defines the legal framework for establishing and the functioning of these institutions. In addition to this, in order to establish a commodity exchange, it is necessary to have a sufficient amount of raspberry so that this form of trading would be cost-effective and sustainable in the long run.

On the other hand, the willingness and interest of raspberry producers to trade through a commodity exchange is needed. One of the most efficient means of attracting customers of any services (in this particular case, the raspberry producers) is their satisfaction with the respective services. For the purpose of analyzing the satisfaction of raspberry producers with refrigeration services and their willingness to trade in a commodity exchange, an empirical research was carried out. It focuses on two main variables. The first variable is the quality of refrigeration services. The second variable is the perceived value of trading through a commodity exchange. The paper analyzes their impact on satisfaction and loyalty of raspberry producers to the owners of refrigeration facilities.

According to Zeithaml, Berry & Parasuraman [34], provision of high-quality service is considered to be the key strategy for success in today's competitive environment. The users' satisfaction with refrigeration services can be achieved through high quality of services. Within the scope of this paper, raspberry producers have assessed the services provided by the owners of refrigeration facilities, based on their own experience in the use of such services. In order to raise the level of quality of the services aimed at satisfaction of their clients, many commodity exchanges in the world hire special agencies that are in charge of controlling the quantity and quality of goods, while older commodity exchanges have developed their own departments to handle such operations. In addition to the standardization of goods, commodity trading in the exchanges also places great importance on the way of storing goods. These tasks are fulfilled by authorized warehouses that handle the commodities in accordance with the standards of the exchange markets. For the purpose of evaluating the services of commodity exchanges in the paper, the perceived value is used – evaluated by raspberry producers based on information they have about commodity exchanges, and not on their own experiences, given that there is no commodity exchange for raspberry trade in Serbia. The aim of the empirical research is to examine the satisfaction of raspberry producers with the quality of refrigeration services and their loyalty to sales through refrigeration facilities, as well as the perceived value of sales through a commodity exchange and its influence on satisfaction with sales through refrigeration facilities. The final objective of the study is to examine the interest of raspberry producers in Serbia to switch to alternative ways of trading, i.e., their willingness to sell raspberries in a commodity exchange.

Regulatory framework for the operation of commodity exchanges in Serbia

The regulatory conditions for the operation of commodity exchanges in Serbia are very specific. The Law on Trade (Art. 22) defines commodity exchange as a separate market institution that organizes a meeting of customers and sellers of standardized and interchangeable goods. The same Law envisages that commodity exchange and stock exchange operations are regulated by a special law. However, goods and derivative securities based on goods in Serbia have been treated differently over time. The Law on Stock Exchanges, Stock Exchange Operations and Stock Brokers (applied from 1994 to 2002) defined commodities

as commodity market material, and commodity exchange as an institution which organizes trading in such market material. On the other hand, the Law on the Market of Securities and Other Financial Instruments (applied from 2002 to 2011) completely ignored goods and all market materials that derive from goods. The Law on the Capital Market that came into force in 2011 provided an opportunity to develop modern forward exchange markets [38]. It is also largely in line with relevant EU and IOSCO directives.

In accordance with the Law on the Capital Market, by mid-2019, the Law on Commodity Exchange was adopted in Serbia (to be applicable as of May 2020). The adoption of this Law brought about the fulfilment of important prerequisites for a more intensive commodity exchange development. The aim of this Law is the establishment of a fair, transparent and effective market of standardized materials and the protection of market integrity [47, Art. 3]. Since the development of commodity exchanges, agricultural producers in particular have experienced benefits, given that their income is traditionally conditioned by the product price and that they are largely exposed to risk of price changes. The system of trading in commodity exchanges ensures the most reliable model of impartial and transparent market promotion of commodities. At the same time, buyers also benefit from the commodity exchange. Trading through a commodity exchange includes the standardization of exchange materials, which involves a guarantee of quality and quantity of goods.

There is only one commodity exchange in Serbia, Produktna berza a.d. Novi Sad. It was founded in 1921 and headquartered in Novi Sad. Currently, it trades in six groups of products: cereals, animal feed components, seeds, mineral fertilizers, industrial plants and consumer goods. However, only spot trade is performed in the commodity exchange in Novi Sad**.** Since 2002, Produktna berza organizes continuous spot trade among the members of the commodity exchange through electronic pairing of account limits. A major shift in the previous development of commodity market in Serbia was brought about by the establishment of the Indemnity Fund in 2009, whose role in the system of public warehouses is to guarantee the quality and quantity of stored goods. In addition to this, as a result of the adoption of the Law on Commodity Exchange, it may well be expected that a more intensive development of the spot market in the observed area will take place in the future, as will the establishment of the futures market.

Analysis of raspberries as a potential commodity exchange material

In 1996, the Chilean Food Association came up with the idea of bringing together all of the world's largest raspberry producers. This led to a conference being organized in Chile in 1998, where it was decided to establish the International Raspberry Organization [37]. So far, 11 conferences in total were held: in Chile (1998 and 2010), USA (2000), Hungary (2002), Australia (2004), Serbia (2006 and 2016), Poland (2008), Canada (2012), China (2014) and Bulgaria (2018). The next conference will take place in Poland in 2020.

Bearing in mind that the Russian Federation is not a member of the IRO and that it has a significant share in the global production of this fruit, the total global raspberry production will continue to be analyzed on the basis of the data published by the Food and Agriculture Organization – FAO (Table 1).

It can be concluded that there has been an increase in raspberry planting by around 20% on a global scale in the last ten years. In this respect, there was an increase in the production of this fruit in the observed period (Table 2).

Table 1: World area harvested raspberries

year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
ha	98,024	96,930	106,362	106,816	102,201	92,598	93,087	100,879	115,852	118,219

Source: FAOSTAT.

Table 2: World production raspberries

year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
tonnes	523,198	553,638	522,062	599,483	569,351	588,114	628,163	676,447	841,899	812,735

Source: FAOSTAT.

It is noticeable that in the observed ten-year period, raspberries production increased by about 65%. Observed by regions, Europe is convincingly the largest raspberry producer (Table 3).

Table 3: Production share of raspberries by region, 2008-2017

Europe	71.40%
Americas	26.20%
Asia	2.30%
Africa	0.10%
Oceania	0.10%

Source: FAOSTAT.

71.4% of total raspberry production on a global level in the 2008-2017 period was generated in Europe. The largest raspberry producer in the world is the Russian Federation, which produced an average of 141,077.9 tonnes of raspberries annually, while Serbia ranked fourth, with an average annual production of 86,530.4 tonnes during the observed decade (Table 4).

Table 4: The largest raspberry producers in the world, 2008-2017

Country	Quantity in tonnes
Russian Federation	141,077.9
Poland	106,158.3
USA	92,170.5
Serbia	86,530.4

Source: FAOSTAT.

Raspberry production in Serbia in the 2008-2017 period is presented in Table 5.

Table 5: Raspberry production in Serbia in the 2008-2017 period

Year	Quantity in tonnes
2008	84,299
2009	89,961
2010	83,870
2011	89,602
2012	70,320
2013	68,458
2014	61,715
2015	97,165
2016	113,172
2017	109,742

Source: SORS.

Raspberry production in Serbia is becoming increasingly popular, which is confirmed by a significant increase in its production in the last three years during the observed period. The raspberry cultivar Willamette makes up for more than 90% of this production.

According to data relating only to 2017, Serbia ranks third, with a total production of 109,742 tonnes of raspberries (Table 6).

Table 6: The largest raspberry producers in the world in 2017

Country	Quantity in tonnes
Russian Federation	146,377
Mexico	120,184
Serbia	109,742
USA	106,100
Poland	104,482

Source: FAOSTAT.

The bulk of raspberry production is intended for export, and only a small portion is retained in the domestic market. Export of raspberries from Serbia is presented in Table 7.

Table 7: Export of raspberries from Serbia in the 2010-2017 period

Year	Export in thousands of tonnes
2010	63
2011	78.7
2012	64.8
2013	59.7
2014	78
2015	101
2016	75
2017	99

Source: Nikolić, 2018.

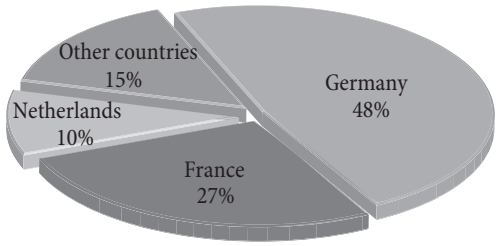
It is important to note that between 90% and 95% of the total raspberry production is exported. Raspberry is mainly exported as frozen fruit, where Serbia is the world leader. In 2017, exports of frozen raspberries from Serbia amounted to approximately 94,000 tonnes, which accounted for 29.9% of the total world export of frozen raspberries [35].

The most important buyers of Serbian raspberry are presented in Figure 1.

According to data from 2017, almost one half of the raspberries produced in Serbia is exported to Germany, while approximately a quarter of the production is exported to France. It is noticeable that raspberries are very attractive fruits for foreign buyers.

On the other hand, Serbia has recorded an increase in import of raspberries from other countries. It is estimated that in the 2010-2015 period, between 1,000 and 3,000 tonnes of raspberries were imported in Serbia, and in 2016

Figure 1: The most important buyers of Serbian raspberry



Source: Nikolić, 2018.

approximately 5,000 tonnes. In 2017, raspberry import to Serbia amounted to about 11,000 tonnes, which is an increase of more than 100% compared to 2016 [17].

Ten years ago , raspberries were grown in Serbia on an area of 14,000 to 15,000 hectares [25, pp. 171-178]. However, by the end of 2017, raspberries in Serbia were occupying an area of 21,861 hectares, which is approximately 12.5% of the total area covered by cultivated plants in the observed country [40]. In the regions of **Š**umadija and Western Serbia, raspberries are grown on an area of 18,175 ha, which is more than 80% of the total area covered by raspberries in Serbia. They are mostly produced in the territory of the municipalities of Ivanjica and Arilje, where approximately a quarter of the total raspberry plantations in Serbia are grown [16].

The empirical research conducted in the territory of Arilje indicates that raspberry production in Serbia is very profitable. In order to plant and cultivate raspberries on an area of one hectare, with proper irrigation systems put in place, an investment of roughly EUR 12,140 is required. Earnings in the first year alone amount to EUR 9,300. It is observed that the accumulation rate is approximately 77%, which means that the earnings on the capital invested are generated already in the second year [8, pp. 57-68].

Raspberry yield per hectare in Serbia is presented in Table 8.

Table 8: Raspberry yield per hectare in Serbia

Productive area, ha	21,861
Production, t	109,742
Yield, t/ha	5.02

Source: SORS.

In Serbia, one hectare yields roughly 5 tonnes of raspberries on average. Although the Russian Federation is the largest producer, it does not generate high raspberry yields per hectare. This is probably because it does not apply the latest technology in raspberry processing and cultivation. The Netherlands, Italy, Switzerland and the United States have the highest raspberry yield per hectare [25, pp. 171-178].

In addition to yield, another important element in achieving total raspberry income is the price. The purchase price of raspberries is changing every year, which causes uncertainty among raspberry producers and often dissatisfaction, as well. In order to achieve the best possible export price through joint appearance in the foreign market, the cases of associations of individual producers and raspberry purchasers are increasingly frequent in Serbia. An independent appearance of individual producers in the foreign market could damage the reputation of the Serbian raspberry, and the financial effects could be significantly below the real level. Mutual competition between individual producers and raspberry purchasers in the foreign market may be one of the reasons for offsetting the price of raspberry below the market level [25, pp. 171-178]. Empirical research conducted in Šumadija and Western Serbia indicates that the sector of raspberry production in Serbia shows great potential for successful and sustainable cluster development. However, for this development to take place, the following important prerequisites need to be fulfilled: better organization of marketing channels through horizontal and vertical integration of all the stakeholders in this sector, strengthening cooperatives specialized in the production of raspberries and application of innovations and scientific knowledge in the production, processing and distribution of raspberries [21, pp. 1417-1431]. Also, the development of cluster initiatives requires joint work of agricultural producers, processors, refrigerators, traders, the Government, regional development agency, science and research institutions, as well as other institutions and organizations [21, pp. 1417-1431].

In order to find a long-term solution to the problems that often arise in the production and distribution of raspberries, at the beginning of 2017, the ministry in charge of the agricultural sector development in Serbia agreed with the producers and purchasers of this fruit to form a working group. The group was formed in May 2018.

The main task of the working group is the preparation of a strategic document that will fully address and define the situation in the field of raspberry production and purchase, highlight the critical points in the retail chain of the raspberry production with the aim of adopting appropriate measures for strategically solving the existing problems. Moreover, its other high-priority goals are to consider the adverse effects of climatic and pedologic factors on the production and yield of raspberries, as well as improving the quality and health situation of raspberry planting material; improving the conditions for storing and transporting raspberries; regulation of the raspberry purchase rules and definition of minimum requirements for purchase points, fruit classification, etc.; rational organization of the purchase, placement and sale of raspberries in the world market; planned increase in production areas while preserving the quality of the fruit; other issues in the field of raspberry production.

The aforementioned facts may indicate the economic justification for establishing a commodity exchange for raspberries, whose existence would enable the definition of the market price of this fruit in Serbia. In addition, it is necessary to observe the readiness of raspberry producers to switch to an alternative way of selling this fruit (selling through the commodity exchange), which was the objective of the conducted empirical research.

Service quality and perceived value

The objective of the conducted empirical research is to analyze the influence of refrigeration service quality, as well as the influence of perceived value of sales through a commodity exchange on the satisfaction and loyalty of the raspberry producers to the owners of refrigeration facilities. Customer orientation implies concern for the quality of service and customer satisfaction, and as a reward it generates loyalty of customers, which results in increased profitability and revenue. Quality is the key to achieving customer satisfaction. The quality of services has to be constantly improved in order to achieve satisfaction of the customers with the provided services, i.e., products. Parasuraman, Zeithaml & Berry [20] define services as multidimensional. Dimensions of services are immeasurability, heterogeneity and inseparability of production and consumption. Crosby [4] explains that due to the non-material nature of services, they cannot be measured by durability or number of defects. Because of the heterogeneity of the services, quality measurement is always a great challenge. Parasuraman et al. [20] have defined ten dimensions of service quality that were later reduced and grouped into five dimensions of service quality [34, pp. 31-46]: tangibility, reliability, responsiveness, assurance and empathy as five standard service quality research tools. In this paper, the statements based on the abovementioned five dimensions were used to investigate the quality of cold storage services.

The most often used definition of value in marketing literature observes value as a difference in benefits and sacrifices, which occur during the purchase and use of products and services [6]. Therefore, the value implies a set of different benefits that consumers receive in exchange for investing their money, time and energy when purchasing and consuming products and/or services. In addition to the physical attributes of the products, customers also expect different advantages during the procurement process (kindness and helpfulness of the staff, provision of additional services). Costs as the second element of value include financial expenditures, time spent and physical and psychological efforts that consumers invest into the process of procurement and purchase of products [14]. Some studies indicate that financial expenditure is the only element of costs [30, pp. 278-290]. Nevertheless, besides financial expenditures, other investments are also needed in order to procure, to own and to use a product/service. While evaluating alternatives during purchase of products or services, customers decide for the ones whose perceived benefits (quality, kindness, delivery speed, reputation, etc.) exceed the perceived expenditures (money, time, effort) [27, pp. 73-79].

Value is often considered not to be an objective dimension defined by the enterprise, but rather something that consumers estimate based on their own personal experience when using a product or service and/or collecting information from their environment [7, pp. 111-112]. For the purpose of this paper, the respondents evaluated the perceived value of a commodity exchange based on the

information available in their environment, given the fact that they do not have any personal experience in using commodity exchange services.

Different authors use different dimensions for measuring perceived values. Petrick [22] developed a model for measuring the key elements of perceived value in hotel management. The model contains 18 statements grouped into five basic units (factors): quality, reputation, emotional response, monetary price and behavioral price. Relying on the original Petrick's scale, Nasution & Mavondo [15] ranked the following three dimensions of perceived value of services in terms of significance: reputation, value for money and prestige. The statements for measuring these three dimensions were used for measuring perceived value in this study.

Perceived value is also an important means of customer satisfaction. Petrick [23] emphasizes that perceived value is an important factor that relates to customer satisfaction and intention to repurchase. Zeithaml [33] defines perceived value as the consumer's overall assessment of the product's usefulness based on the perception of what is obtained and what is given. Cronin, Brady & Hult [3] show in their study that perceived value is the most important factor of the intention to repurchase.

Satisfaction and loyalty

Customer satisfaction is one of the most important tasks of every service organization, since the future business success of the enterprise depends on the level of customer satisfaction. Satisfaction, i.e., customer satisfaction, depends first of all on the benefits gained when delivering value, but also on customers' expectations based on previous experience, their friends' opinion and accuracy of marketing information obtained from the service company.

Current studies suggest that a fully satisfied customer will much more likely repurchase the services of the same company. Customer satisfaction is a sense of pleasant fulfillment. An increase in the level of satisfaction is accompanied by the intensification of customers' intentions that result in their loyalty.

Satisfaction and loyalty are, hence, two very much related concepts. If customers are satisfied with a service, they will use the service again, which is a token of loyalty. A loyal customer transfers his positive impressions to others and thus secures new customers. A loyal customer is open to cooperation, usually not sensitive to price changes and is interested in new services [2, pp. 484-490].

The concept of loyalty consists of the behavioral component (intention to reuse, including the amount of money and frequency) [10, pp. 15-31] and the attitude component (preferences, trust in products or services, as well as in word-of-mouth) [34, pp. 31-46].

According to this, customers are loyal to a particular company if they have the habit of repeating the purchase of its products and/or services, as well as of spreading positive word-of-mouth and attracting new customers to the company. This implies that the measurement of customer loyalty involves examining the level of intention to repurchase, but also the level of customers' willingness to recommend the company to their friends and acquaintances.

The statements for the abovementioned components were used for examining loyalty in the empirical research conducted for the purpose of this paper.

Relationship between quality, perceived value, satisfaction and loyalty

In literature, perceived value is often confused with or used as a synonym for customer satisfaction. However, some authors differentiate these two variables. Woodruff [32] explains that perceived value can occur at any stage of the purchase, including repurchase. Oliver [19] says that satisfaction should be viewed as an evaluation after the purchase.

Numerous studies indicate the relationship between perceived value, satisfaction and loyalty. Some authors such as Liljander & Strandvik [11], Spreng & Patterson [26] or Ravald & Gronroos [24] support in their research the attitude of positive and direct influence of perceived value on customer satisfaction. McDougall & Levesque [13] confirm in their research that perceived value has an indirect impact on the repurchase intention, being one of the loyalty components achieved through customer satisfaction. Those customers who have received superior value from products/services of a particular company

often favor the respective company and recommend it to others [7, pp. 111-112]. Whether customers will repeat their purchase from the same producer and be willing to share positive impressions with others depends on the perceived value they have gained on the basis of their previous experiences [1, pp. 95-108]. It also depends on the expected future business relationships in which the quality of interaction is viewed as a substitute for future expected benefits. Incorporating perceived value into models for measuring satisfaction and loyalty enables a more detailed view of customer satisfaction assessment and their commitment to a particular company and its products and/or services. Gallarza & Saura [5] prove in their study that there is a connection between quality, perceived value, satisfaction and loyalty in customer behavior. In order to increase customer loyalty, it is necessary to improve service quality. Without a satisfied user, there is no loyal user, and satisfaction itself is related to quality [31, pp. 99-123]. If employees in a service organization show interest for clients and meet their demands at any given moment, the customers will build up trust and be satisfied, which leads to establishing long-term relationships and creating loyal customers.

Considering the previously conducted studies, as well as the objective of this research, the following research hypotheses were formulated:

H1: There is a positive influence of the quality of refrigeration services on the satisfaction of the users of refrigeration services;

H2: There is a negative influence of the perceived value of sales through a commodity exchange on the satisfaction of the users of refrigeration services;

H3: There is a positive influence of the satisfaction of the users of refrigeration services on their loyalty;

H4: There is a statically significant difference in the influence of satisfaction on loyalty among the respondents whose basic or additional sources of income are raspberries.

Methods and materials

Having in mind the dominant role of the municipalities of Ivanjica and Arilje in raspberry production in Serbia, the empirical research was carried out in the territory of these two municipalities. The research was conducted in November 2017, whereby 80 valid surveys were collected. The structure of the sample in terms of socio-demographic characteristics is presented in Table 9. It should be noted that the majority of the respondents in the sample are raspberry producers whose main source of income is not raspberry production (72.5%). Moreover, the largest percentage of the respondents are raspberry producers with more than 10 years of experience in growing raspberries (77.6%). The data were obtained by distributing the questionnaires in person, whereby the respondents assessed to what extent they agree with the statements on the five-point Likert scale (1 – Strongly disagree; 5 – Strongly agree). Statistical processing and data analysis were performed by using the

Table 9: Descriptive statistics for the characteristics of the respondents

		% of the respondents
Income – Raspberry production	The main source of income	27.5
	Not the main source of income	72.5
Years of raspberry production	Up to 10 years	22.5
	10 to 20 years	38.8
	Over 20 years	38.8
Area covered by raspberries	Up to 25 ares	46.3
	25-50 ares	30.0
	More than 50 ares	23.8
Number of workers	Up to 3	61.3
	3-6	33.8
	Over 6	5.0
Number of seasonal workers	Up to 3	53.8
	3-6	36.3
	More than 6	10.0

Source: Authors' calculation.

software packages Microsoft Excel and SPSS (Statistical Package for Social Sciences, 21.0).

Results and discussion

When speaking about statistical analyses, descriptive statistics was applied first, and then also exploratory factor analysis, which served for grouping the statements into factors whose relations are observed. As a measure of internal consistency within the factors, we used the Cronbach's alpha coefficient. The assumed relationship between the observed factors was analyzed by applying the multiple and simple linear regression.

For the purpose of grouping the statements from the questionnaire into factors, an exploratory factor analysis was performed. This analysis resulted in two factors that refer to the quality of refrigeration services and the perceived value of sales through a commodity exchange. The value of the Cronbach's alpha coefficient is, for both factors, higher than the recommended value of 0.7 [18], which shows that the factors have good internal consistency. Individual factor loadings and the values of the Cronbach's alpha coefficient for each factor are presented in Table 10.

Indicators that must be considered when assessing the justification for applying the exploratory factor analysis are the Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) indicator for sampling adequacy. The value of the KMO indicator in this study is 0.730, while the Bartlett's test of sphericity has a statistically significant value (Sig. = 0.000), indicating that the application of factor analysis is justified. The total percentage of variance explained by these two factors is 56.44%.

The results of descriptive statistics for the statements used in the research are given in Table 11. Based on these results, it can be concluded that the factor Quality of refrigeration services (M = 3.030, SD = 0.752) has a lower average rating than the factor Perceived value of sales through a commodity exchange (M = 3.962, SD = 0.736). Within the factor Quality of refrigeration services, the highest average rating is recorded for the statement – Owners of refrigeration facilities have the appropriate equipment and facilities (M = 3.900, SD = 0.894), while the statement – Owners of refrigeration facilities understand the needs of each client – has the lowest average rating (M = 2.562, SD = 1.112).

When it comes to the factor Perceived value of sales through a commodity exchange, the respondents awarded the highest average grade to the statement – Sales through a commodity exchange would be more profitable than sales through refrigeration facilities (M = 4.350, SD = 0.828). On the other hand, the lowest average rating within this factor is observed for the statement – Effort invested in sales through a commodity exchange would be less than

Table 10: Results of the exploratory factor analysis

Statements	Factor loading	A
Quality of refrigeration services		0.760
Owners of refrigeration facilities keep their promises in a reliable and precise way	0.773	
Owners of refrigeration facilities are ready and willing to help and provide a quick service	0.690	
Owners of refrigeration facilities have the necessary knowledge and skills	0.758	
Owners of refrigeration facilities understand the needs of each client	0.650	
Owners of refrigeration facilities have the appropriate equipment and facilities	0.644	
Perceived value of sales through a commodity exchange		0.825
Sales through a commodity exchange would be more profitable than sales through refrigeration facilities	0.693	
Effort invested in sales through a commodity exchange would be less than the effort to sell through refrigeration facilities	0.810	
Time spent on selling through a commodity exchange would be less than time spent on selling through refrigeration facilities	0.839	
Communication with commodity exchange workers would be better and more efficient than communication with workers in refrigeration facilities	0.780	
Selling through a commodity exchange is more prestigious than selling through refrigeration facilities	0.679	
Bartlett's test of sphericity		Sig. = 0.000
KMO		0.730

Source: Authors' calculation.

the effort to sell through refrigeration facilities (M = 3.650, SD = 1.032).

The results of descriptive statistics also point to the fact that average ratings of Satisfaction (M = 2.379, SD = 0.987) and Loyalty to sales through refrigeration facilities (M = 2.104, SD = 0.905) are very low and significantly lower than the average ratings of the Perceived value of sales through a commodity exchange. In fact, the lowest average value is observed for the statement referring to the readiness of raspberry producers to sell through refrigeration facilities even if their commission was higher than commissions of a commodity exchange (M = 1.700, SD = 1.095).

The results of correlation analyses are presented in Table 12. Namely, we observe that there is a high degree of correlation between the variables Quality of refrigeration services, Satisfaction and Loyalty of raspberry producers. Therefore, with an increase in quality of refrigeration services, there is also an increase in satisfaction and loyalty of raspberry producers who use their services. On the other hand, a negative correlation occurs between Perceived value of sales through a commodity exchange and the Quality of refrigeration services, Satisfaction and Loyalty of raspberry producers. With regard to such results, it can be concluded that, with an increase in the perceived value of selling products through a commodity exchange, there is a decrease in perception of the quality of refrigeration services, as well as a decrease in satisfaction and loyalty of raspberry producers to selling through refrigeration facilities. Finally, a positive correlation occurs between Satisfaction and Loyalty of raspberry producers, indicating that, with an increase in satisfaction of raspberry producers, their loyalty to the owners of refrigeration facilities whose services they use also increases.

With an aim of examining the hypotheses, multiple and simple linear regression were used. Namely, the multiple regression analysis was first applied to examine the influence of the factors Quality of refrigeration services and Perceived value of sales through a commodity exchange on Satisfaction with sales through refrigeration facilities. The results of this analysis are given in Table 13. The results of multiple linear regression indicate that Quality of refrigeration services (β = 0.686, Sig. = 0.000) has a positive and statistically significant influence on

Table 11: Results of descriptive statistics analysis

Statements	M	SD
Quality of refrigeration services	3.030	0.752
Owners of refrigeration facilities keep their promises in a reliable and precise way	2.765	1.093
Owners of refrigeration facilities are ready and willing to help and provide a quick service	2.900	1.038
Owners of refrigeration facilities have the necessary knowledge and skills	3.025	1.113
Owners of refrigeration facilities understand the needs of each client	2.562	1.112
Owners of refrigeration facilities have the appropriate equipment and facilities	3.900	0.894
Perceived value of sales through a commodity exchange	3.962	0.736
Sales through a commodity exchange would be more profitable than sales through refrigeration facilities	4.350	0.828
Effort invested in sales through a commodity exchange would be less than the effort to sell through refrigeration facilities	3.650	1.032
Time spent on selling through a commodity exchange would be less than time spent on selling through refrigeration facilities	3.787	1.039
Communication with commodity exchange workers would be better and more efficient than communication with workers in refrigeration facilities	3.762	0.996
Selling through a commodity exchange is more prestigious than selling through refrigeration facilities	4.262	0.882
Satisfaction with sales through refrigeration facilities	2.379	0.987
Sales through refrigeration facilities is a smart decision	2.550	1.054
I am satisfied with sales through refrigeration facilities	2.262	1.087
I am very satisfied with my experience and cooperation with the owners of refrigeration facilities	2.325	1.052
Loyalty to sales through refrigeration facilities	2.104	0.905
I would recommend to others to sell through refrigeration facilities	2.487	1.006
I will continue to sell through refrigeration facilities even if a commodity exchange is established	2.125	1.194
I will continue to sell through refrigeration facilities even if their commission is higher than commissions of a commodity exchange	1.700	1.095

Source: Authors' calculation.

Table 12: Correlation matrix

	Quality of refrigeration services	Perceived value	Satisfaction	Loyalty
Quality of refrigeration services	1			
Perceived value	-0.210*	1		
Satisfaction	0.714***	-0.276*	1	
Loyalty	0.615***	-0.476***	0.721***	1

Source: Authors' calculation.

Table 13: Results of multiple linear regression (dependent variable – Satisfaction with sales through refrigeration facilities)

Hypothesis	Independent variable	β	T	Sig.
H1	Quality of refrigeration services	0.686	8.544	0.000
H2	Perceived value of sales through a commodity exchange	-0.132	-1.647	0.104

Source: Authors' calculation

Satisfaction with sales through refrigeration facilities. On the other hand, Perceived value of sales through a commodity exchange (β = -0.132, Sig. = 0.104) has a negative and statistically significant influence on Satisfaction with sales through refrigeration facilities. Based on the results of the regression analysis, it is to conclude that hypothesis H1 can be accepted, while hypothesis H2 of the present research cannot be accepted.

When it comes to the impact of Satisfaction with sales through refrigeration facilities on Loyalty to sales through refrigeration facilities, this impact was examined by using the simple linear regression analysis. The results of this analysis are presented in Table 14. The results obtained indicate that Satisfaction has a pronounced, positive and statistically significant influence on Loyalty to sales through refrigeration facilities (β = 0.721, Sig. = 0.000). Based on this, it is to conclude that hypothesis H3 can be accepted.

Examination of statistically significant differences between the attitudes of certain groups of raspberry producers, according to whether raspberry production is their basic source of income or not, was performed by applying the t-test for independent samples. The results of analyzing the statistically significant differences between the attitudes of the respondents of the respective groups are presented in Table 15. Namely, based on the results, we can conclude that there are no statistically significant differences between the attitudes of the respondents according to the income criterion, in terms of the respondents' satisfaction attitudes (t = -0.589, Sig. = 0.560) and their loyalty to sales through refrigeration facilities (t = 0.509, Sig. = 0.614). Therefore, this is to say that hypothesis H4 cannot be accepted.

Conclusion

An adequate regulatory framework is a very important requirement for commodity exchanges to be established and to function efficiently. In mid-2019, the Law on Commodity Exchange was adopted in Serbia (to be applicable as of

Table 14: Results of simple linear regression (dependent variable – Loyalty of the users of refrigeration facilities)

Hypothesis	Independent variable	F	β	t	Sig.
H3	Satisfaction	84.478	0.721	9.191	0.000

Source: 'calculation.

Table 15: Results of the t-test for two independent samples

	Income 1		Income 2		t-value	Sig.
	M	SD	M	SD		
Satisfaction	2.257	1.216	2.425	0.893	-0.589	0.560
Loyalty	2.197	1.057	2.069	0.848	0.509	0.614

Source: Authors' calculation.

May 2020) and it should support commodity exchange development in the future period.

However, in addition to the defined rules, the functioning of a commodity exchange also requires a sufficient quantity of goods. Nearly one quarter of the world's total raspberry production is generated in Serbia, with almost all of the production being exported. In addition to this, standardization of commodity exchange materials plays an important role in the process of commodity exchange trading. It ensures that goods have a declared quality, which may often come across as a problem with alternative ways of trading.

The observed dissatisfaction of raspberry producers in Serbia with the quality of refrigeration services imposes the need for establishing a more efficient mechanism for trading in this fruit. The results of the empirical research show that the respondents awarded a lower rating to the quality of refrigeration services in comparison to the perceived value of a commodity exchange, but also that the perceived value of sales through a commodity exchange negatively influences the satisfaction with refrigeration services and, consequently, the loyalty to the owners of refrigeration facilities. Raspberry producers gave lower ratings for the statements referring to their willingness to continue selling through refrigeration facilities even if commodity exchange was established or in the event that commissions charged by refrigeration facilities were higher than commissions of the commodity exchange, which can indirectly lead to the conclusion that they would be ready to trade through a commodity exchange. Having the previous conclusions in mind, as well as the positive experiences of the functioning of commodity exchanges in the world and adequacy of raspberries as a commodity exchange material, the idea of establishing a raspberry commodity exchange in Serbia is put forward as a possible solution.

It must be emphasized that this conclusion was derived from the analysis of producers which are not entirely dedicated to the raspberry production (raspberry production is an additional source of income for them) because of the predominant peasant economy structure in the local communities which were observed. This may diminish the relevance of the conclusion regarding this issue.

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ENTREPRENEURIAL UNIVERSITIES AND INTERMEDIARY ORGANIZATIONS AS A SUCCESS FACTOR IN SMES: LITERATURE REVIEW

Preduzetnički univerziteti i posredničke organizacije kao faktor uspešnosti malih i srednjih preduzeća – pregled literature

Abstract

The main goal of this article is to indicate the role of entrepreneurial universities and intermediary entities as a success factor of small and medium enterprises. Entrepreneurial universities represent institutions that undertake entrepreneurial activities with the objective of improving regional or national economic performance. On the other hand, intermediary entities advance the commercialization of science by providing a set of specialized services. The article points out the role and significance of three types of intermediary entities, such as university technology transfer and licensing offices, physical space intermediaries (incubators, accelerators and co-working) and specific financial providers' intermediaries (venture capital, angel finance and crowdfunding platforms). Moreover, the article underlines the role and the importance of the aforementioned intermediary entities in Serbia, with the aim of demonstrating their influence on forming new small and medium enterprises. We explore how these various intermediaries function and how they provide complementary and related services in support of scientific commercialization through entrepreneurship. The basic purpose of the aforementioned types of entities is to serve as factors of survival, growth and development of small and medium enterprises.

Keywords: *entrepreneurial university, intermediary organizations, technology transfer, incubators, accelerators, financial resources.*

Sažetak

Osnovni cilj ovog rada jeste da ukaže na ulogu koju preduzetnički univerziteti i posredničke organizacije imaju kao faktori uspešnosti malih i srednjih preduzeća. Preduzetnički univerziteti predstavljaju institucije koje preduzimaju preduzetničke aktivnosti s ciljem unapređenja regionalnih i nacionalnih ekonomskih pokazatelja. S druge strane, uloga posredničkih organizacija jeste unapređenje mogućnosti komercijalizacije nauke pružajući skup specijalizovanih usluga. U radu je istaknuta uloga i značaj tri osnovna tipa posredničkih organizacija, kao što su univerzitetski transfer tehnologije i postojanje kancelarija za licenciranje, fizičke intermedijarne organizacije (inkubatori, akceleratori i *co-working* prostor) i specifični izvori finansiranja novih poslovnih poduhvata (rizični kapital, investicioni anđeli i masovno finansiranje). Takođe, u radu je istaknuta uloga i značaj pomenutih posredničkih organizacija u Srbiji, sa namerom da se ukaže na njihov uticaj na formiranje novih malih i srednjih preduzeća. U radu istražujemo kako funkcionišu ovi različiti oblici posrednika i kako pružaju komplementarne i srodne usluge kao podršku naučnoj komercijalizaciji kroz preduzetništvo. Osnovna svrha pomenutih tipova organizacija jeste da služe kao faktori opstanka, rasta i razvoja malih i srednjih preduzeća.

Ključne reči: *preduzetnički univerzitet, posredničke organizacije, transfer tehnologije, inkubatori, akceleratori, izvori finansiranja.*

Introduction

Education, research and innovation represent basic driving forces for development in a knowledge-based society. Innovations in a knowledge-based society are very important because knowledge creation and exchange are not goals per se but rather provide the basis for development and source of new innovations [41]. An advanced society is based on the existence of entrepreneurial members of society and business activities which are present on a global level and can be seen in developed and developing countries. Entrepreneurs, i.e., new, fast-growing and innovative SMEs, are the biggest contributors to changes in an economic system. This is due to the introduction of new products and services, new production, organizational and marketing models and methods which increase productivity and efficiency and strengthen the competitiveness of the economy [40]. Entrepreneurial thinking and raising awareness of entrepreneurship in general should be encouraged, primarily through the educational system. Entrepreneurship must be viewed as a constantly upgraded skillset in the process of continuous education. It is necessary to create a broad scheme that will include all levels of formal and informal education and all the relevant stakeholders in the educational process (pupils, students, teachers, professors, businesses, relevant institutions and organizations) [64]. In other words, education and research have long been regarded as the basis of economic growth, industrial restructuring, and as employment providers by a governing body of a nation. Due to this fact, there is a general trend of commercializing different aspects of science by adapting a research funding structure, providing incentives for new businesses and by reforming higher education, and introducing new legislation on intellectual property [50]. The traditional concept of wealth (land, labor and capital) is now being re-evaluated since science and entrepreneurship has emerged as a factor of economic growth.

Entrepreneurial university: determinants and types

Interest in entrepreneurial activity at universities has never been greater than nowadays in the 21st century, considering the opportunities that appear to result from developing new technologies, such as new materials, microprocessors, computers, telecommunication and robotics. Moreover, ten new technologies which are or will become the driving forces behind the fourth industrial revolution are: the concept of biometric payment, sale of solar energy, desalination, the application of artificial intelligence, the Internet of Things, mapping human DNA, smart self-driving vehicles, smart clothing, smart homes and biotechnology [29]. Universities now have a special status in relation to entrepreneurship education. In addition to their standard role in the development of science and education, their importance in the development of innovativeness, and indirectly competitiveness of the economy and economic development, are now being emphasized. Accordingly, we may at this point define the ''entrepreneurial university'' conceptually [63]. In the existing literature, there are many studies that use different approaches to defining the expression ''entrepreneurial university'' [10], [12], [18], [22], [33], [34], [35], [37], [38], [44], [45], [46], [47], [48], [49], [57], [59], [61], [62], [67], [77], [78], [79], [80], [89], [90], [99], [100], [101], [114], [115].

In Burton Clark's book from 1998 *Entrepreneurial Pathways of University Transformation* [18], entrepreneurial university is defined as university with modernized departments, research centers, faculties and schools. This necessity has been driven by new societal expectations and efforts to preserve its autonomy, including the matters of funding and outside interests, even those of the state [50]. As defined by Etzkowitz et al. [37], an entrepreneurial university is ''any university that undertakes entrepreneurial activities with the objective of improving regional and national economic performance as well as the university's financial advantage and that of its faculty''. Furthermore, universities are considered as important catalysts for international, national and regional economic and social development as those entities develop productive and creative links between education and research according to Kirby [62]. O'Shea et al. [77], [78], [79] consider the anatomy of an entrepreneurial university, with the most important elements being: human capital resources, financial resources, physical resources, commercial

resources, status and prestige, networks and alliances, and localization.

It should be noted that education and research are the first and second mission of universities respectively, and indeed these two are a vital part of an entrepreneurial university. The new mission, called the third mission, requires from universities and academic institutions to be more entrepreneurial, and thus contribute to socio-economic development of a country and a region to a greater extent [34], [36]. Therefore, any prestigious university or academic institution should focus on the third mission to be able to compete with others and to handle the needs and challenges faced in their communities and societies. Salamzadeh et al. [92] elaborated on an input-process-output model to define the entrepreneurial universities. In their view "an entrepreneurial university is a dynamic system, which includes special inputs (resources, rules and regulations, structure, mission, entrepreneurial capabilities and expectations of the society, industry, government and market), processes (teaching, research, managerial processes, logistical processes, commercialization, selection, funding and financial processes, networking, multilateral interaction and innovation, research and development activities), outputs (entrepreneur human resources, effective research in line with the market needs, innovations and inventions, entrepreneurial networks and entrepreneurial centers), and aims to mobilize all of its resources, abilities and capabilities in order to fulfil its third mission." The issues of the entrepreneurial university means that universities now have a mandate to produce new knowledge and reshape activities and values in order to facilitate the transfer of technology and knowledge spillover [8].

Similarly coined terms are ''entrepreneurial science'', ''entrepreneurial scientists'' or ''academic entrepreneurship'', which refer to workers and the type of work taking place in these institutions. Even though university professors have actively cooperated with the industrial sector, patented ideas and started companies since the late 19th century, the expression *academic entrepreneurship* is much more recent. Only in the last two or three decades has it been used systematically when university scientists take an important role in providing successful commercialization of research-based knowledge and ideas. According to some scholars, such as Sooreh et al. [99], academic entrepreneurship and the philosophy of entrepreneurial universities go far beyond a mere engagement with industries [2], [13], [85]. Topics such as spin-off creation process [17], university technology transfer offices (UTTO) [28], new venture creation [92], commercialization of university research [103], academic status [46], start-up companies [91], [93], and many others have been included in the literature of academic entrepreneurship. As with the institutional terminology, these terms are most commonly used for activities such as patenting/licensing and forming start-up and spin-off companies (''science-directed commercialization''), rather than for ''regular'' contract work or expert advice for an established industry (''user-directed commercialization''), despite the fact that this may be the most frequent type of commercialization in a wider space [50]. This distinction is of central importance. Contract work and collaboration, consultancy and expert advice, private funding, graduate exchanges, all fall under the traditional mode of commercialization (user-directed), indicating the ways in which industry requirements and related activities play a dominant role in such processes. These activities have been part of university operations from the very beginning, and these activities are generally seen as straightforward or positive when discussing the effects on basic research and teaching [50]. However, when we talk about patenting or licensing and creating start-up and spin-off companies (science-directed), the driving force is often a scientist with marketable ideas and unique research results, with a different outcome for their academic institution. It has been argued, for example, that increased patenting may pave the way to reducing scientific exchange and communication, as the main employment of research results is directed to future research. The public role of universities that make exclusive or secretive licensing arrangements may be questioned as well. Another important dividing line between the two types of commercialization is that user-directed activities seem to thrive within the traditional academic departments, laboratories and units, while science-directed activities

may require a broader support structure in the form of intermediary organizations. At this point, it should be mentioned that intermediary organizations are entities that occupy a gap between scientific discovery and final realization of commercialization value, and their role is to provide specialized services and access to equipment and resources beyond the reach of many start-up firms [50].

Businesses and industry, on the one hand, and universities that engage in the science-directed commercialization, on the other, typically form a strong synergy, as the business side finds the university side to be a valuable collaborator in the development process of the product. This kind of arrangement regards the input in the form of research contracts with industry and the size of the revenues from such contracts, and the output as a co-authorship between academics and industrial researchers. This approach can also result in a fairly different output profile from other universities when we take into consideration the focus and co-authorship of scientific publications and the number of confidential reports. For some academic institutions, these associations also bring about the exchange of graduates and PhD students [50]. Universities that are part of a science-directed commercialization option are evidently patentees and beneficiaries of licensing, issuing licenses to third parties. Differently from other universities, the output of this option constitutes a series of patents rather than articles and books. Those universities may have made strategic decisions to focus their development in the fields where the outcome has a high demand for commercialization (e.g., biotechnology, nanotechnology, artificial intelligence, information technology, etc.). The resulting output of their research might be commercialized by using institution-owned (or staff-owned) spin-offs. Finally, a university that has chosen to engage in a science-directed commercialization will typically make administrative arrangements to position itself on the market. These may include the establishment of university technology transfer offices, consulting legal experts in intellectual property (IP) law, forming administrative departments with the purpose of supporting contract negotiations and monetary transfers, or creating rules and procedures for the internal redistribution of the revenues created by business activities.

Intermediary organizations and entrepreneurial ecosystems

With the increasing frequency, the entrepreneurial universities represent a higher education institution that plays a dominant role in innovation and economic growth, which is also the definition adopted in this paper. Entrepreneurial universities are not only a source of general knowledge available to all who can read scholarly journals, hire a student and/or pay for different types of projects, but they are also a source of increasingly commodified knowledge, embedded in patents and start-up and spin-off companies. Examples of the world-renowned universities that have contributed to a regional industrial development are the Massachusetts Institutes of Technology (MIT) and Stanford [50]. Having taken into consideration the importance of the entrepreneurial university and education, the Centre for entrepreneurial teaching within the EU included a plan according to which at least 35% of the high school and university students in all member states until 2030 should have the possibility to participate in a program regarding the entrepreneurial university. In order to reach the established goal within the set timeframe, the education system of all member states at the national level should aim at implementing various programs for entrepreneurial education, while encouraging innovative partnerships between business systems and educational institutions [32].

In Serbia, several segments of entrepreneurial university have been developed in Belgrade, Novi Sad, Kragujevac, Niš and Novi Pazar. At the University of Belgrade, there is the Center for Technology Transfer, which conducts identification, protection and commercialization of scientific research results and protection of intellectual property of the University, which will be covered later on in this paper. The Faculty of Technical Sciences of the University of Novi Sad (UNT) is particularly important as an entrepreneurial-minded institution which provides the biggest number of highly educated engineers. More than a hundred companies have been launched from this institution and most of them are recognized as global players in the IT industry. The city is also considered as the Serbian IT center, due to the fact that more than 50%

of software engineers are located in Novi Sad, and there is still an increasing demand for this profession. Of special significance to the strengthening of innovativeness is the Science and Technology Park of the UNT. With the support of the Faculty of Technical Sciences, around 140 start-up and spin-off companies have been founded, mainly in the IT sector, employing young engineers who graduated from the UNT. Some of these companies implement projects for large international corporations and have contributed to Novi Sad becoming recognized internationally as a ''Software Valley''. Project teams and prominent researchers from the UNT have been the recipients of numerous national and international awards for the best technical innovations [106]. At the University of Kragujevac, centers have been formed as a result of work on international projects, namely: Lifelong Learning Center, Knowledge Transfer Center, Collaborative Training Center, Creativity Center, Business Support Office. At the University of Niš, among others, there is the Innovation Center as an organizational unit of the University, which conducts in an organizational and systematic way the application of its own and external scientific results and modern technological processes aimed at creating innovations, development of prototypes, new products, processes and services. At the State University of Novi Pazar, the Creativity Center has been formed, with a vision to encourage creativity and entrepreneurial intentions in the academic population, to research innovative ways of studying that are facilitated by modern technologies. What is more, it is important to mention that students participating in entrepreneurship education are more likely to start their own business, and their companies tend to be more innovative and more successful than those led by persons without entrepreneurship education background [63].

Entrepreneurship is determined by several factors and trends, including social, legal and institutional. Therefore, in a society that encourages entrepreneurship, institutions are there to simplify entrepreneurial activity, which serves as an important aspect for improving economic growth and prosperity. Audretsch [8] further argues that universities have a wider scope than simply generating technology transfer (patents, spin-offs and start-ups), as they contribute to and provide leadership for creating entrepreneurial thinking, actions, institutions and entrepreneurial capital.

Although functions and activities of new business start-ups are indisputably important – from perception of business opportunities, their evaluation, ensuring required resources, to the management of business operations – they are only part of the entire entrepreneurial process that defines assumptions for capitalizing on identified business opportunities. Consequently, comparing entrepreneurship with the process of a new business start-up represents a significant simplification in understanding the entrepreneurship phenomenon [83]. A more comprehensive approach to understanding the essence and economic function of entrepreneurship implies a wider consideration of the entrepreneurial ecosystems. By definition, entrepreneurial ecosystems are ''a set of interconnected entrepreneurial actors, institutions, entrepreneurial organizations and entrepreneurial processes which formally and informally coalesce to connect, mediate and govern the performance within the entrepreneurial environment'' [71]. In that system, universities have been providing intermediaries, which act as a bridge between the scientific discovery and the final creation of commercial value, provision of the specialized services and access to equipment and resources beyond the reach of many start-ups [19].

On the other hand, Savić, Pitić and Lazarević in their paper ''Innovation-Driven Economy and Serbia'' [95] defined the business and entrepreneurial ecosystem as an economic community supported by a foundation of interacting organizations and individuals – the organisms of the business world. The economic community produces goods and services of value to customers, themselves being ecosystem members. Member organisms also include suppliers, lead producers, competitors and other stakeholders. The determinants of efficiency in the innovation ecosystem matrix are as follows [95]: capital and resources, talents and champions, infrastructure and support programs, market and support networks, culture and communities, policy and regulations, visions and strategy. According to the International Telecommunication Union methodology [56], the participants in the innovation ecosystem are: 1) the state sector with a great number of

government institutions, 2) entrepreneurs, whose business model is based on the creation of innovative solutions, 3) educational and research and development institutions, which contribute to the development of human capital and research in the innovation ecosystem, 4) support measures, which provide specialized services and expert innovation support, including incubators, accelerators, business associations and mentors, 5) private sector, and 6) financial institutions, which include banks, seed funds, investors and others who finance innovations in the ecosystem. In addition, the ecosystem literature has created a basic division of intermediaries in the following way: 1) university intermediaries (technology transfer and licensing offices); 2) physical space (incubators, accelerators and co-working spaces); and 3) specific finance providers (venture capital, angel investors, crowdfunding platforms). Intermediary organizations provide support to innovation by engaging directly with individual establishments by providing services and access to resources that can improve business development or expedite technology commercialization [19]. Table 1 defines each intermediary organization and provides examples of their roles in scientific entrepreneurship.

University intermediaries: intensified cooperation between university and industry

The beginning of commercialization of academic science usually starts with university technology transfer offices (UTTOs) or licensing offices, which interact with businesses to license a university-created technology. The key mechanisms for university technology transfer commercialization are licensing agreements between universities and the private sector, research joint ventures, and university-based start-ups. These activities can potentially result in financial gains for university, and other benefits to these institutions (e.g., additional sponsored research, hiring of graduate students and post-doctoral fellows), and job creation in the local region [87].

University technology transfer offices, participants of technology market, are defined as transactions for use, diffusion and creation of technology (or intellectual property). Technology licensing is conducted by companies of all sizes, but academic start-ups are the ones that are most commonly involved in scholarly work, given that they will deliver the greatest impact. In many countries, national governments have provided support for these initiatives via legislation to facilitate technological diffusion from

Table 1: Different types of intermediary organizations

Intermediary type	Definition	Roles in scientific entrepreneurship
UNIVERSITY INTERMEDIARIES		
University technology transfer /licensing offices	University offices with the role of managing IP for the technologies created at universities	• Incentives to disclose inventions • Involvement of the faculty in the development process • Collaboration with businesses with the aim to license technology
PHYSICAL SPACE INTERMEDIARIES		
Incubators	Locations used to create a starting point for enterprises and for the idea development	• Provide affordable space • Provide support services • Generate revenue for firms
Accelerators	Physical space, complemented with resources and financial investment	• Offer intensive programming • Accelerate milestones • Invest in exchange for equity
Co-working spaces	Physical spaces that promote proximity and interaction	• Provide flexible, less structured programming • Offer space for social interaction • Facilitate networking and peer mentoring
SPECIFIC FINANCIAL PROVIDERS INTERMEDIARIES		
Venture capital	Investment firms that raise funds from individuals and institutions to support new ventures with high growth potential	• Provide multistage, benchmarked financing • Motivated to increase firm performance
Angel investors	Individual investors or investment clubs that provide early-stage financing in support of new ventures	• Provide early-stage funding • Act as a source of patient capital • Offer business advice and mentoring
Crowdfunding platforms	Method of securing large numbers of small investments	• Enable inventors to gain immediate product feedback • Support idea sharing

Source: Adapted from [19].

universities to firms and collaborative research (e.g., the Law on Innovation Activity in Republic of Serbia), they subsidize for research joint ventures involving universities and firms (e.g., the European Union's Framework Programs and the US Commerce Department's Advanced Technology Program (ATP)), and share expertise and laboratory facilities. Along these lines, national, state, and regional government authorities have also provided support for science parks and incubators.

O'Shea, Allen, Chevalier, and Roche [77] compiled a list of factors that influence the number of start-ups that a university is able to generate, such as: past UTTO success, university's quality, the size and source of research funding, and the amount of resources devoted to UTTO staff. Moreover, Siegel and Wright argued that three main determinants of UTTOs are: 1) they provide university's incentives to disclose inventions and engage in the commercialization process, 2) they maintain researchers' involvement in the development process, and 3) they provide information about the value of technology [98]. Aceytuno [1] has investigated the major European models of technology transfer such as the Anglo-Saxon, Nordic and Central European. Wright and associates [112] determined in a study of UTTOs in Belgium, Germany, Sweden and UK that UTTOs are better at intermediating the transfer of explicit rather than tacit knowledge. Based on interviews with 128 UTTOs directors, Markman, Phan, Balkin and Gianiodis [75] show that whereas for-profit UTTO structures are positively related to new venture formation, traditional university and nonprofit UTTO structures are more likely to correlate with the presence of university-based business incubators. What is more, while discussing the case based on Belgium's KU Leuven UTTO, as research and educational institution with international appeal whose programs are based on the innovative research of its scientists, Debackere and Veugelers [26] argued that UTTOs reduce information asymmetries between industry and university, while fostering industry-university linkages, which are lacking in the European context and cause the ''European paradox''– high levels of scientific expertise with low contributions to industry. This awareness is underlined by Huyghe and colleagues [55] in their research, where they discovered that more than a half of the surveyed pre and postdoctoral research fellows at twenty-four European universities were completely unaware of their university's technology transfer operations. To improve the commercialization of academic achievements, UTTOs use various mechanisms, such as equity and uniform start-up licenses, educational support programs, and incubators. Universities have begun to adopt equity instead of licensing fees, to encourage new start-up formation. Di Gregorio and Shane [27] found that UTTO policies, more than capital market constraints, affect the number of new ventures created: when UTTOs make equity investments, more start-ups are formed. Many types of licensing agreements are used by UTTOs, with new express licenses recently becoming popular.

In 2018, the Joint Research Centre of the European Commission (EC) launched a Competence Centre on Technology Transfer (CC TT) intended to become a recognized reference point for expertise on technology transfer for the EC and the institutions of the Union. The CC TT provides technology transfer policy related expertise and services to the EC and other institutions of the Union and operational support services to a broader range of stakeholders including: member states and individual institutions facing technology transfer related challenges and issues. The CC TT takes a holistic approach to the technology transfer process and provides services in three interconnected domains capturing a complex value chain. These are: technology transfer capacity building, technology transfer financing, innovation ecosystems design [39].

In spite of a number of new institutions that have been founded in Belgrade, Novi Sad, Niš and Kragujevac in the last five years (eight business and technology incubators, four science and technology parks and four centers for the technology transfer) in Serbia, there is still lack of infrastructural support for innovations. However, these organizations for providing infrastructural support to an innovation activity often lack sufficient capacity or human or financial resources necessary to accomplish its mission. A great number of business and technology incubators were formed with the aim of providing support to the spin-off and start-up companies; however, those

are frequently donation initiatives for which a long term financing has not been secured.

In order to develop the level of economic innovativeness, which is a prerequisite for the development of entrepreneurship, it is necessary, as set out in the Strategy of Scientific and Technological Development for the 2016 –2020 period, to change the system of science and innovation management in Serbia, increase the level of investment in this sector, improve the relevance of scientific research for the development of the economy, develop stimulating financial mechanisms and an institutional framework for linking science and economy. A significant innovation support program initiated by the state is the Innovation Fund. It encourages the formation of new companies and development of the existing ones, promotes the transfer of technology from the academic to the commercial sector, and provides financial support to innovative projects, which are jointly developed by scientific research institutions and SMEs. In addition to the Innovation Fund, transfer of knowledge, development of new technologies and innovation commercialization in the partnership between the Government, University of Belgrade and City of Belgrade, there is also the Science Technology Park (STP) Belgrade, as well as the Center for Technology Transfer of the University of Belgrade (CTT UB) [95].

The Science Technology Park Belgrade is intended for start-ups and growing high-tech development companies (SMEs and development centers of international companies), helping them develop and commercialize innovative products and services. The STP Belgrade has been established as a partnership between the Government of the Republic of Serbia (represented by the Ministry of Education, Science and Technological Development), the City of Belgrade and the University of Belgrade, based on international experiences and best practices, thus becoming a place where institutions meet science and industry. The STP Belgrade has become a new business core of the city that brings together dozens of high-tech development companies/teams by providing different programs and activities, and plays an essential role in developing an innovation ecosystem in Serbia [97]. On the other hand, the Center for Technology Transfer of the University of Belgrade's goal is to help scientists and researchers to realize new, life-improving products. The CTT UB's mission: to help protect intellectual property (IP) produced at the UB and facilitate the transfer of IP rights to industry, resulting in new, life-improving products; to improve and increase collaboration between the UB and industry; to support researchers and students in implementing their ideas/projects [16].

Physical space intermediaries: incubators, accelerators and co-working

The commercialization of science requires physical workspace, laboratory space and advanced equipment in order to be carried out. Incubators, accelerators, and co-working spaces are the most important physical space intermediaries between university and industry. The concept of a business incubator is considered as a systematic effort directed at new venture creation through the provision of physical facilities, technical and administrative support, services to guide firm growth and mitigate failure. Business incubators are defined as an organized way of formation of small and medium-sized enterprises, from the idea to its ability to function independently. A large number of different entities participate in the development of incubators, such as local and regional governments, universities, chambers of commerce, science parks, private real-estate developers, and non-profit organizations, some of which are involved in sponsoring, establishing, or running incubation programs [3]. Honig and Karlsson [53] define business incubators as ''organizations whose purpose is to support the creation and growth of new businesses, by supplying a shared office environment and agglomeration of new and small businesses". Furthermore, Bruneel et al. [13] define incubators as ''tools to accelerate the creation of successful entrepreneurial companies".

The most crucial importance of an incubator, through which its efficiency is evaluated, is the number of successful businesses that mature and continue their business outside the incubator premises. This further influences the creation of a positive image of entrepreneurship and the creation of a new entrepreneurial culture that directs individuals to accept responsibility for their own material status. It also motivates them to accept new forms of work engagement,

as well as to self-employment, abandoning the philosophy of "getting a job" and adopting the philosophy of "creating a job for oneself", fostering and promoting entrepreneurial qualities and acceptance of change as a way of life.

Al-Mubaraki and [5] Busler identified several strengths of incubators, which include the following: (a) supporting economic development by creating new jobs; (b) accelerating the modernization and diversification of the region's economy; (c) fostering and supporting enterprises that create the best environment for businesses to start up; (d) investing long-term time and effort to strengthen the relationships between academia and industry; (e) providing networking opportunities between academia and industry to collaborate for mutual benefit; and (f) commercializing knowledge and building relationships that add value to the economy.

There is considerable diversity in the types of incubators, their modes of operation and the objectives they pursue. This observation was underlined by Peters, Rice and Sundararajan [86, p. 83], who considered incubators as ''an evolving innovative organizational form that is a vehicle for enterprise development.'' However, most incubators tend to be either physical incubators (PI) providing work space for clients, virtual incubators (VI), which utilize computer technology to deliver services, or a hybrid approach incorporating elements of the two main types. Bruneel, Ratinho, Clarysse and Green [14] presented a summary of the evolution of business incubation's value proposition. The first-generation incubators focused only on office space and shared resources. Second-generation incubators added coaching and training support, while third-generation incubators focused on access to technological, professional, and financial networks. The earliest incubators obtained their financing from state sponsorship, but afterwards for-profit and corporate incubator emerged, with incumbent companies offering incubation and in return collecting the proceeds of their success as new sources of revenues [52]. Furthermore, incubators can be classified in one of the following ways: mixed-type incubators, which serve all technologies and types of firms; economic-development incubators, which aim to leverage local activities to create employment opportunities; technology incubators, which typically focus on specific sectors and offer access to specialized resources (e.g., testing facilities), which are particularly important for the commercialization of science.

In the United States, the most common form of incubator model found is university-based incubators. The strategic focus of a university-based business incubator is technology transfer and commercialization of research primarily, which originates from university, as well as local high technology businesses. The European Union encourages the development and networking of business incubators, which have begun to develop over the last 30 years in the most developed EU countries. Their primary goal was to create jobs and products of greater added value. EU member states and EU candidate countries have all adopted the incubator model in different areas. We have also adopted this model. In Serbia, for example, the Business Incubator Novi Sad provides significant infrastructural support. Its overall goal is to help entrepreneurs to transfer their business ideas into a successful business concept. Apart from the office, conference and common rooms, their tenants also receive consultancy services, administrative support and a bookkeeper at their disposal. If potential entrepreneur has a brilliant business idea or already a finished product set for the market, an application for the entry is always open. Evaluation is happening four times a year and with that being done you are one step closer to join them. The effectiveness of incubator participation on the commercialization results of individual organizations also differs. Schwartz [96] found statistically significant higher survival probabilities for firms located in incubators compared to firms located outside those incubator organizations [96]. Key findings of the study, realized by Molnar and associates [69], [75], include that business incubation programs help companies create many new jobs; incubation programs provide a substantial return on investment and create new jobs for a low subsidy cost; incubator companies experience very healthy growth; business incubation programs produce graduate firms with high survival rates; most incubator graduates remain in their communities; most incubator firms provide employee benefits. Also, a study was conducted to analyze the role of business incubators in emerging markets by Dutt

and associates [30], and their research design involves examining business incubators in emerging markets as a form of open system intermediary. They examine the relative emphasis that business incubators in emerging-market countries place on developing markets versus developing specific businesses. This study examines how private, government, academic, and nongovernmental organizations' sponsorship of incubators influences the mix of services that incubators provide.

In the study of Rothaermel and Thursby [90], the authors explore the effect of university linkages on incubator firm failure and graduation, with linkages being licenses or professors in the firms' senior management team. They find support for their hypotheses that a university link reduces probability of new venture failure, but prevents the firm's graduation from the incubator. Lasrado et al. [66] investigate whether firms graduating from university incubators attain higher levels of post-incubation performance than firms participating in non-university affiliated incubators do. Results show that university-incubated firms do indeed benefit from their relationship with university incubators. After firms graduate from a university incubator, the number of jobs and sales grow over time, showing that their performance improves continually. Moreover, the authors find that university-incubated firms generate greater employment and sales than non-incubated firms, which indicates superior performance.

While it is acknowledged that incubators provide a wide range of services, the actual utilization of such services was not clear. Mattare et al. [72] surveyed 77 incubator tenants in Maryland, US, and ranked the top ten desired services in rounded figures as: networking (44%); marketing plan assistance (39%); social media marketing (30%); training/workshops (30%); counselling/consulting (29%); financial planning (29%); website development (27%); business plan development (26%); peer network (26%); and meeting space (25%). The performance of business incubators is often measured by the number of graduates who launch successful businesses and move onto a path of economic growth, thus contributing to the achievement of the main incubator objectives of economic development, the establishment of entrepreneurial ventures, and meaningful job creation.

Wiggins and Gibson [111] identified five tasks that business incubators must accomplish in order to succeed: (1) establish clear metrics for success, (2) provide entrepreneurial leadership, (3) develop and deliver value-added services to member companies, (4) develop a rational new-company selection process and (5) ensure that member companies gain access to necessary human and financial resources to succeed. Pals [81] discusses several factors related to incubator success. First, a clear mission statement is significant for knowing incubator long-term goals. Second, collaboration between university and a business incubator allows the business incubator to gain access to potential new tenant companies. Third, clear selection criteria of tenants to enter a business incubator will be helpful to the committee that chooses appropriate tenant companies. Fourth, networking with funding organizations is an important key to the success of business incubators. Fifth, monitoring and keeping records are important for finances and contracts. Incubators need to track results, such as the number of tenant companies receiving admission and those exiting them, so that incubator management can have adequate feedback. Sixth, incubators should focus on services as keys to success, including the infrastructure for tenant companies to receive tools and advice in order for them to succeed. Seventh, a strong manager should have several characteristics including business experience, background in operations procedure, computer skills, financial management skills, marketing skills, interpersonal skills, motivation skills and problem-solving skills, and should be a hard worker.

Over the past decade, a special type of incubator called an ''accelerator'' or ''seed accelerator'' proliferated rapidly and emerged as an integrated part of the entrepreneurship ecosystem. Cohen and Hochberg have provided a general definition of accelerators as ''a fixed-term, cohort-based program, including mentorship and educational components that culminates in a public pitch event or demo-day.'' Accelerators are a rapidly growing phenomenon. The first accelerator, Y Combinator, was founded by Paul Graham in 2005 in Cambridge, Massachusetts, and soon moved and established itself in Silicon Valley. In 2007, David Cohen and Brad Feld, two start-up investors, set up TechStars in Boulder, Colorado, hoping to transform its start-up

ecosystem through the accelerator model. Nowadays, estimates of the number of accelerators range from 300+ to over 2000, spanning on six continents. The number is growing rapidly [21].

The only accelerator and actually the first one that started operating in Serbia is StartLabs. This is a US-based seed fund, investing in start-ups from Southeast Europe. StartLabs provides up to €50,000 seed investment for innovative entrepreneurs [95]. Opportunities are blooming just across the national border within the Bulgarian LAUNCHub, Eleven, and the global ones like Seedcamp. These accelerators recognized the potential of Serbian start-ups and already invested in many of them, as well as in the ones mentioned above. Table 2 below provides a summary of the differences between incubators and accelerators.

While the accelerators are described sometimes as a ''new generation incubator model'' [84], they differ from incubators on eight important dimensions, among others duration, cohorts, business model, selection, venture stage, education offered, venture location and mentorship [20]. For example, accelerator programs are limited-duration programs – lasting approximately three months. Research on incubators suggests that firms graduate from incubators anywhere from one to five years after they begin [6]. Another by-product of the structured, limited-duration programs of accelerators is that ventures enter and exit the programs in groups, known as cohorts or batches. While venture founders in an incubator may also develop relationships with other founders at the incubator, the experience of starting a program simultaneously strengthens uncommonly strong bonds and communal identity between founders in the same accelerator cohort. The batching selection process also focuses the accelerator's marketing and outreach around the key dates. Moreover, open application process attracts ventures from a wide, even global, pool. Top accelerator programs accept as few as one percent of applicants [21]. Many accelerators are privately owned, and take an equity stake in the ventures participating in the programs. On the other hand, incubators are mostly publicly owned, managed by managers, and generally without their own investment funds [4], [51]. Intense mentorship and education are cornerstones of accelerator programs and often a primary reason why ventures participate. Research on incubators [51] suggests that incubators offer fee-based professional services, such as accountants and lawyers. Education at accelerators, however, appears to be extensive, and often includes seminars on a wide range of entrepreneurship topics, including unit economics, search engine optimization, and term sheet negotiation. Such seminars are usually delivered by either the directors of the programs or by guest speakers who often provide one-on-one guidance after their talks.

Most accelerators offer co-working space and other services in addition to mentorship, educational and networking opportunities. Co-working spaces represent a low-rent alternative to workspaces and offer a more informal setting. They are different from the shared offices in a sense that they offer greater social involvement, pleasing ambiance and management dynamic by cashed-out entrepreneurs and potential investors [109]. Co-working spaces are present both in singular hotspots (such as WeWorks) and in large organizations (such as Microsoft and Google). Although incubators and accelerators have begun offering co-working spaces, Moriset [76] expressed

Table 2: Summary of the differences between incubators and accelerators

	Incubators	Accelerators
Duration	1-5 years	3 months
Cohorts	Yes	No
Business model	Investment; non-profit	Rent; non-profit
Selection frequency	Competitive, cyclical	Non competitive
Venture stage	Early	Early, or late
Education offered	Seminars	Ad hoc, HR/legal
Venture location	Usually on-site	On-site
Mentorship	Intense, by self and others	Minimal, tactical

Source: [20].

doubts about their long-term impact, as they do not generate much profit for operators nor add much value to the occupants.

There are three types of co-working space users: freelancers, microbusinesses, and people working for themselves or for companies external to the space [82]. In order to have results from collaboration, it is necessary for a co-working organization to act as a facilitator and mediator of the process, as it was discovered that placing people together will not necessarily create meaningful collaborative relationships. Research on the contribution of co-working spaces to science entrepreneurship is limited thus far. A case analysis in South Wales found that co-working spaces support entrepreneurs and entrepreneurial activities through networking, peer mentoring, and easier access to forms of capital, among other things, but this study has limited generalizability [43]. Waters-Lynch and associates [109] argued that Schumpeterian economic theory is a useful theoretical lens through which co-working may be studied to understand how it contributes to innovation.

Finance providers: venture capital and angel investors

The common problem that entrepreneurs face is raising money that will ensure the greatest success in business compared to the costs that these sources require. In developed countries, micro, small and middle-sized companies focus on numerous funding sources, such as bank loans, leasing, factoring, mezzanine financing, stock exchange [25]. In addition, science-based start-ups are subject to greater expenses due to the costs of laboratories and clean workspaces, highly skilled employees, insurance, consulting services, and the need to protect intellectual property. In order to compensate for these expenses, various funding sources have emerged, with varying costs to the entrepreneur and greater package options for additional services. There are financial intermediaries who are in charge of screening potential start-ups, preparing legal documents, and following up the progress on behalf of the investors.

Contemporary forms of financing such as private equity, venture capital, business angels and crowdfunding can all serve as a good alternative to traditional banking products, especially for highly innovative firms [105]. It should be emphasized that private equity is a broader term than venture capital (risk capital). It is important to distinguish between these two terms. As a rule, venture capital refers to financing an enterprise in an early phase of development and in the phase of expansion [114]. Venture capital can invest in the seed phase (research, assessment and development of initial concept, i.e., R&D phase), start-up phase (product development and marketing) and expansion phase (growth and expansion for achieving profitability). On the other hand, private equity can be informally and formally organized. If informally organized, private equity can take the form of business angels, who are wealthy individuals with corporate experience. These individuals are ready to invest their money, contacts and experience in a particular industry in order to profit from increase in the company's value. When formally organized, private equity takes the form of private equity funds, a limited partnership where investors are limited partners and the fund manager serves as the general partner. Once established, private equity funds are institutional investors who are willing to invest funds in companies which do not have a long history of business. Their goal is to recognize a growth potential of a company, to invest money in it, and to help company develop financially and in terms of marketing and technology. As this type of investor is included in the daily activities of the company, there is the presence of a stable economic and institutional environment [31]. What is more, when talking about the funding-role of universities, universities take equity instead of licensing fees, which has the effect of legitimizing the start-up on the one hand and acquiring the potential financial benefits on the other.

VC firms are partnerships whose primary task is to raise money from investors of any origin (corporate, bank-owned, or private or government-sponsored) and to channel those investments into worthwhile projects that have the potential to generate a substantial return on investment. They have been defined as investors, or wealthy individuals, whose main objective is to invest in new ventures with a high growth rate [24]. Venture capitalists rely on a system that uses tranches to finance

a project. Hence, if a project falls short of its estimated performance or expectations, the funding can be interrupted. Having both public research funding and VC will result in innovative activity, from the point of view of patents and start-ups [94]; however, the ability of VC investment to stimulate innovation also depends on characteristics of the VC firm [65]. According to Hsu [54], VC-funded firms are more likely to engage in cooperative commercialization strategies (such as strategic alliances), and to have more initial public offering than other non-VC funded firms. The reputation of VC firms also plays part in successful funding, which is why start-ups will agree to pay more in terms of equity for investments from VC firms with higher reputations.

Some important aspects of VC networks that are taken into consideration are the presence of social capital [113] and geographic proximity to a VC firm, although many VCs have an extensive network of geographic coverage. There is more local bias when VC is specialized in a technology industry and when investments are made in a greater number of rounds. Results show that local investments are more likely to have successful exits, which also has implications for the ways in which VCs add value to portfolio firms, although social capital is differentiated from a geographical point of view. Pinch and Sunley [87], for example, found that VCs in the Southampton, UK, clusters are less effective as knowledge transfer agents than VCs in leading high-tech clusters (such as Silicon Valley).

The venture capital investors possess four different attributes. The first one is investment, primarily in start-up, technologically-oriented enterprises that cannot obtain a conventional loan – facility. The second one represents funds that are made available without a time limit, where the capital investment is not aimed at dividends or interest, but at the profit generated when the equity stake or shares in a company are sold. The third one is participation in the form of capital investment, which carries a very high risk that may result in losing the investment principle, although at the same time high investment profitability is possible. Finally, the fourth one is the fact that inexperienced entrepreneurs as well as small and medium-sized companies are also offered the optimal management of know-how as a way of assistance in making the investments as successful as possible, where the investor plays an active role in the entrepreneurial activities.

Venture capital involves a five-step process: (1) obtaining funds from limited partners; (2) identifying, analyzing, and selecting appropriate investment entities; (3) structuring the terms of investment; (4) implementing a deal and monitoring portfolio companies; and (5) achieving returns and ultimately exiting from the investment [25].

According to Wright and associates [112, p. 1209], ''venture capitalists and angels with specialist technological skills may act as intermediaries that provide access to customers and suppliers.'' Technology-based firms may be the ones interested in this kind of intermediation. When conducting research, Vanacker, Collewaert, and Paeleman [108] matched a sample of VC and angel-backed firms to similar non-backed firms and used OLS regression to assess the impact on performance measured by gross profits, and found that both funding sources moderate the relationship between slack resources and firm performance in comparison to non-backed companies. Their conclusion was that angel investors make better use of human resources, while VC investment was found better at managing and using financial and human resources. These outcomes point out that the efficiency of start-ups in commercialization operations may benefit more from VC than angel investment, as well as that greater VC ownership increases performance.

The choice of investment by the VCs is also more inclined towards experimental and radical innovations, as underscored by Kerr and Nanda [60], but a high level of trust between projects and VCs is also more likely to create a legally binding relationship. Cumming and Dai [23] discovered that fund size has a diminishing marginal return on start-ups. In a novel exploitation of exogenous variation in new airline routes, Bernstein, Giroud, and Townsend [9] found that greater on-site involvement, particularly of the lead VC, increased innovation in firms along a number of dimensions; they interpreted these findings as indicating that monitoring by a VC is in fact a valuable asset for funded firms.

In the USA, venture capital and private equity have been a significant source of financing for small and medium sized enterprises. At the European Union level, European

Union is carrying out a program aimed at encouraging the investment of VC and PE. The program is conceived by analogy with the program of the American Congress. The joint program of the European Commission and the European Investment Fund was named JEREMIE (Joint European Resources for Micro to Medium Enterprises). The program was established with the aim to facilitate access to venture capital loans, guarantees and funds for EU members. On the other side, the percentage of venture capital and private equity in the Republic of Serbia are at a very low level. Economic trends impose necessity of the development and increasing of VC and PE activity in order to achieve a sustainable development of the economic system [73]. With regard to the current position of the venture capital industry in Serbia, it is important to note that there are no officially registered venture capital funds in Serbia. However, several regional VC funds have Serbia on their investment horizon. It is essential to mention that these VC funds are usually registered in jurisdictions with preferential tax status, although they have offices in Serbia to support capacity development of portfolio companies. The most important VC fund that is present in Serbia is definitely Enterprise Innovation Fund (ENIF), managed by SC Ventures. This fund has been active since 2016, focusing on an investment portfolio that consists of innovative SMEs at various stages of business development, from the seed to expansion phase, in the Western Balkans. ENIF aims at reinforcing the financial structure of innovative SMEs, resulting in a strong and bankable balance sheet. Target fund size is 40 million EUR that will be invested through equity and quasi-equity financing, where SMEs can obtain investments from EUR 100 000 up to EUR 1.5 million. Based on available data, total invested amount in Serbia during the last two years from the ENIF has been estimated at 2.5 million EUR. Additionally, the amount of annual equity financing available to Serbian SMEs is estimated at up to 2 million EUR [107].

Angel investors can be defined as individual investors who are involved at an earlier stage of development, and provide financing in smaller individual amounts. This process allows for projects to provide a proof of concept for scientific discoveries. As regards the total amount of financing by angels, a project receives higher financing than by VCs [110]. Angels usually have experience with technological projects, and they are able to advise project participants [20]. Beneficial for commercializing science, angels also have much longer time horizons than VCs, as they do not have to exit at some point on behalf of other investors; however, like VCs, they prefer to be located close to start-ups in which they invest. Although in the past angel investors were not particularly interested in the media and empirical research, this trend has recently reversed, even when obtaining data from them is challenging. Kerr and associates [60] used the data obtained directly from organized angel groups in a regression discontinuity design to study the effect of angels on firm outcomes. They defined a discontinuity threshold as the level of critical interest shown in a company by angels, and their results indicated that start-ups funded by two successful angel groups had a higher probability of survival or successful exit, and better employment outcomes than those rejected by the same groups. Bernstein, Korteweg, and Laws [9] investigated how angel investors make investment decisions based on start-up characteristics. Email notifications, served to attract the attention of the potential investors, but angel investors were more influenced by the composition of the funding team than the firm sales and the identities of other investors, reinforcing their importance for the commercialization of science.

Serbian Business Angels Network is the first organization of this type in Serbia, formed with the intention to connect domestic entrepreneurs with angel investors. Serbian Business Angels Network (established as early as 2009) is one of the first organizations of this type; it was modelled after such organizations in the Silicon Valley; this network consists of exceptional individuals who invest their capital and knowledge in firms with high development potential [25].

Crowdfunding platforms

Crowdfunding is the most recent form of financing a project, defined as ''the efforts by entrepreneurial individuals and groups – cultural, social, and for-profit to fund their ventures by drawing on relatively small contributions from a relatively large number of individuals using the Internet, without

standard financial intermediaries" [58]. The emergence of crowdfunding can be traced to the aftermath of the 2008 recession. Financing through traditional channels, such as banks, was much less available and it became more regulated over time, while equity crowdfunding standards are slow to develop in many countries [15]. Crowdfunding is an alternative method of raising capital in place of traditional methods of gaining capital from banks, commonly called crowdfunding campaigns. By virtue of web-based platforms, combined with advertising and word-of-mouth marketing, projects are able to reach a much broader range of potential investors than the angel-funding model. There are three key participants in the crowdfunding process. The campaign/project organizer, raising the funds to implement their idea, the platform that plays the role of a mediator for an agreed-upon percentage of the funds collected, and project backers, i.e., persons investing their money in projects.

There are several forms of compensations that crowdfunding campaigns offer. Donation models, delivered mostly by charities and nonprofits, do not provide financial compensation. Reward models give gifts in return for investment. Pre-purchase models allow investors to pre-order at a more advantageous price the product in return for their investment. Lending models offer return with interest to the investors. Finally, equity models offer shares in profit, or ownership [58]. Lehner, Grabmann and Ennsgraber [68] gained an insight into crowdfunding, noticing its ability to serve as an alternative distribution channel, whereby funders test products before they are presented to the market. According to Frydrych, Bock, Kinder, and Koeck [42], the composition of the funding team and the time necessary to achieve funding goals affect the outcomes of the campaign. Stanko and Henard [102] found that apart from generating funding, the campaigns help the creators with product feedback and idea sharing, which in turn allows campaigners to monitor how their ideas are perceived and in what way they can be improved. Openness of a campaign to external feedback and starting the campaign early in the development process attracts attention of the backers, who feel involved and valued, not just in a financial sense but also at the developmental stage. Although using an on-line platform enables geographic freedom of extending interest in a project, most campaigns are concentrated in geographic regions, typically more economically and entrepreneurially fertile [74], which reinforces the idea that crowdfunding projects could be considered as part of the regional innovation ecosystem.

World Bank forecasts indicate that by 2020 the crowdfunding market will be valued at 96 billion dollars. The Council for Innovative Entrepreneurship and Information Technologies of the Government of the Republic of Serbia recognized crowdfunding in 2018 as important for the development of this area. The German-Serbian Initiative for Sustainable Growth and Employment also recognized the potential that crowdfunding could have in Serbia, and has been supporting this innovative concept since 2017 [7]. After a study on challenges for youth entrepreneurship, noting that the greatest challenge is precisely access to capital, the German-Serbian Initiative for Sustainable Growth and Employment, in cooperation with the Brodoto social enterprise, started popularizing the concept of crowdfunding in Serbia.

Conclusions

Entrepreneurial thinking and raising awareness of entrepreneurship in general should be encouraged, primarily through the educational system. Universities now have a special status in relation to entrepreneurship education. This research was conducted in order to present the entrepreneurial universities and intermediary organizations. Entrepreneurial university is realized through focusing on the third mission of universities which ensures the success of universities in becoming more entrepreneurial. On one side, entrepreneurial university is any university that undertakes entrepreneurial activities with the objective of improving regional and national economic performance. On the other, intermediary organizations are entities that occupy a gap between scientific discovery and final realization of commercialization value, and their role is to provide specialized services and access to equipment and resources beyond the reach of many start-up firms.

The ecosystem literature has created a basic division of intermediaries in the following way: 1) university intermediaries (technology transfer and licensing offices);

2) physical space (incubators, accelerators and co-working spaces); and 3) specific finance providers (venture capital, angel investors, crowdfunding platforms). Intermediary organizations provide support to innovation by engaging directly with individual establishments by providing services and access to resources that can improve business development or expedite technology commercialization. This paper presents systematic literature review of intermediary organizations, their determinants, types, a question of effectiveness, most cited and most useful research in the field of technology transfer, business incubators, venture capital, crowdfunding etc. Also, the article underlines the role and the importance of the aforementioned intermediary entities in Serbia, with the aim of demonstrating their influence on forming new small and medium enterprises.

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DOES KNOWLEDGE MANAGEMENT BOOST WAGES IN LARGE AND MEDIUMD-SIZED SERBIAN COMPANIES?

Da li menadžment znanja povećava plate u velikim i srednjim srpskim kompanijama?

Abstract

This study analyzes the impact of knowledge management on the business variables of large and medium-sized companies in Serbia. The research relies on Romer's theory of endogenous knowledge as a basis for stable growth. For the purpose of the study, a dataset for measuring knowledge management was created, containing 11 variables grouped into fivecategories: academic education, employee training, storage, knowledge dissemination and technical support. The aim is to confirm the dataset'simpact on the average wage in the companies. Using the closed-endedquestionnaire, with interval and Likert scales, managers of 126 companies were interviewed. By way offactor analysis, four complex factorscores were isolated, representing strategies that companies use and combine in knowledge management. Based on the results of the ordinal regression analysis carried out in large companies at the level of totaleconomy, a set of four independent variables explains 69% of the variability of the dependent variable Company's average wage. As for medium-sized companies, the R2 coefficientis higher and amounts to 74.4%. When it comes to large and medium-sizedindustrial companies, the management pushes forwardastrategy of investing in employee training at seminars, funding subscriptions for accessing virtual libraries and knowledge bases, as well asorganizing knowledge storage procedure. Management of these companies also strivesto have the highest possible percentage of experts with master's and bachelor's degreesamong its employees.

Keywords: *knowledge management, factor analysis, average wage, large and medium-sized companies, industry.*

Sažetak

U ovoj studiji se analizira uticaj menadžmenta znanja na poslovne varijable velikih i srednjih kompanija u Srbiji. Istraživanje se oslanja na Romerovu teoriju o endogenom znanju kao osnovi za stabilan rast. U svrhu istraživanja, kreiran je *dataset* za merenje menadžmenta znanja koji sadrži 11 varijabli svrstanih u pet tematskih celina: akademsko obrazovanje, obuka zaposlenih, skladištenje, diseminacija znanja i tehnička podrška. Cilj istraživanja jestedase potvrdiuticaj *dataseta* na prosečnu mesečnu platu zaposlenih u kompanijama. Korišćenjem upitnika sa zatvorenim odgovorima, intervalskim i Likertovim lestvicama, intervjuisani su menadžeri 126 kompanija. Putem faktorske analize, izolovanasu četiri složena faktorska skora, koji predstavljaju strategije koje kompanije koriste i kombinuju u upravljanju znanjem. Na osnovu rezultata ordinalne regresione analize, sprovedene u velikim kompanijama na nivou privrede, set od četiri nezavisne prediktorske varijable objašnjava 69% varijabilnosti zavisne varijable „prosečna plata zaposlenih u kompaniji". U slučaju srednjih kompanija, koeficijent R2 je veći i iznosi 74.4%. Kada je reč o velikim i srednjim industrijskim kompanijama, primetno je da menadžment forsira strategiju ulaganja u obuku zaposlenih na seminarima, finansiranje pretplate za pristup virtuelnim bibliotekama i bazama znanja, kao i organizovanje procedure skladištenja znanja. Menadžment ovih kompanija takođe nastoji da među zaposlenima ima najveći mogući procenat eksperata sa master i fakultetskim diplomama.

Ključne reči: *menadžment znanja, faktorska analiza, prosečna plata, velike i srednje kompanije, industrija.*

Introduction

The role of knowledge in the companies' operationsis increasing. The entire conceptof knowledge and its types has changed over time. The shifttoward deeper understanding of the role of knowledge and innovations in the process of economic development is expressed in the recent reports of the World Economic Forum [30],from factor-driven economies, via efficiency-driven to innovation-driven economies. The most advanced economies in the contemporary world belong to the innovation-driven type. The role of knowledge and its macro-level recognition has been elaborated in the work of Nordhaus [18],becoming a postulate of the endogenous growth model. Full recognition in contemporary theory was illustrated by awarding Nordhaus (and Romer) a Nobel Prize for their contributions.

However, the subject and its various aspects are discussed in microeconomic research and business economics, as well. The common ground is the understanding of human capital that could be analyzed on macro, but also on a microlevel. Therefore, when asking who is responsible for the problem at the microlevel – different standpoints will surface(from capital assets to HR management). The same goes when trying to answer the question "Who should be the one investing in knowledge? "- one would get different answers. It could be expected that people should invest, expecting better economic outlooksin the future, but also that the employers should invest in bettering the structure of knowledge and skills of their employees, to improve their performance. The focus in the research is to identify the extent to which knowledge contributes to companies' results and how relevant knowledge and education are for boosting wages in largeand medium-sized companies in the Republic of Serbia. Therefore, the problem in focus is the interrelation between knowledge management and its impacton wages.

Literature review: From human capital theory to knowledge management in companies

In his Methodology of economics, MarkBlaug[3] has devoted a full chapter tomethodological aspects of analyzing and understanding human capital.The roots of the human capital theory go back to the first published work of Schultz[24],followed by the thematic issue of the Journal of Political Economy (under the title Investments in human beings, 1982) and the research of GaryBecker [2],creating the dataset for measuring human capital. What are the constituents of the human capital?According to Becker[2], there are four main factors creating human capital. The first is education (Becker is noting that it could be measured only via calculating the expenditures for education in the countries where public schooling – being for free – isnot a major part of the education system). According to OECD, human capital consists of knowledge, competences and skills relevant for economic activities[19],[20].The second one is health. Namely, only healthy employees can contribute to the companies' outputs. The Human Capital Index [31]only offerssome basic facts on the probability that citizens of certaincountries could reach a certain age (life expectancy). There is interdependence between education and health. More educated people live longer. However, up to this moment, analyses have revealedjust acertain correlation between education and life expectancy, but the causality is not proved [29]. The third factor is including the costs of migrations. Namely, the product becomes a commodity (capital) when it entersamarket matching itsdemand. The same principle applies to human capital. Migrations toward markets that are most appealing to employees are an important phenomenon and need to be inserted in the human capital formula. Finally, the fourth factor is the amount of financial resourcesavailable for financing the periods of searching for appropriate employment – where knowledgeyieldsthe highestreturns. Methodologically, it is important to note the opinion of Blaug and his skepticism that testing the implications of the human capital theory could produce new knowledge and deeper understanding of the phenomenon. Contrary to this, Jakob Mincer [16]is the biggest optimist, arguing that the scientific program of human capital is progressive and afertile ground for further development and new scientific results.

Nevertheless, it seems that Becker is right when puttingthe problem of credentialism on the agenda. How to measure the contribution of human capital to the output of companies? How to design the starting salaries of employees

(and paying for thisfactor of production) withoutknowing exactly what theircontribution would be to the companies' output? Having in mind the already identified diploma and grade inflation, the problem of credentialismis somehow undermining the understanding of human capital as a pure factor of production. The Nobel Prize for economics in 2018,awardedto Paul Romer[21],[22], shifted the attention again toward human capital, underlying the role of the economics of ideas and proof of the shifttoward innovation-driven economies. Here are some of the typicalproblems of designing, enlarging and treasuring the intangible assets ofcompanies:

a. The role and limits of academic and regular systems of education.
b. Education and capacity building of employees. Some of the educational activities are financed by the companies, some are expected to be paid by the employees in order to strengthen their own competitiveness.
c. Repository of knowledge and common-pool resources. Patents and intellectual property:There are the questionsof to whom they belong and how to quantify them in the standard accounting systems.
d. Dissemination of knowledge created within the enterprise – cultural capitalhubs[13] for exchanging ideas, debriefing sessions, offering crowdpreneurship platforms.
e. Developing technical support for successful knowledge management. Databases, online courses and webinars, access to virtual libraries,IT platforms for crowdpreneurship (supporting the intrapreneurship).

The idea of strengthening theintrapreneurial activities [33] and its evidence are very present today in modern companies. After a number of social "experiments" worldwide (from Mittbestimung in West Germany to self-management in the former Yugoslavia), nowadays, the employee initiativeshave to be supported with new organizational communication, internal publicrelations and the crowdpreneurship approach[32].However, the approach is subject to theinfluence of the organizational culture, typicalofsome countries (let us mention the power distance dimension) and of the education system (for instance, if the system is supportive ofteam work or not).All this is creating the environment suitable for implementation of different concepts of knowledge management.

The scientific concept of knowledge management has started to develop in the 1990s.IkujiroNonaka defined knowledge as the unique source of competitive advantage:"When markets shift, technologies proliferate, competitors multiply, and products become obsolete almost overnight, successful companies are those that consistently create new knowledge, disseminate it widely throughout the organization, and quickly embody it in new technologies and products"[17, p. 96]. Explaining the importance of knowledge management, Peter Drucker [10] said that in present-day economy, knowledge was the wellspring of reasonable, cutting edge enhancements,whereas theother standard factors such asland, workforce and money were staying at ensuing levels of criticalness. Davenport [9] describedknowledge management as the procedure of capturing, distributing and effectively using knowledge. During the said period, numerous consulting firms started to apply in-house management programs. According to Eisenhardt&Martin [11],knowledge is considered to be the most important resource for organizations working in dynamicallycompetitive environments. Speaking about the knowledge management, Darroch&McNaughton [8] said that the learning process happened when knowledge was utilized as a part of the association,and at last this learning came about into creativeness and improvement. Trying to define the concept of knowledge management, Seidler-de Alwis&Hartmann[23] explained that KM had a crucial influence on the success of innovation processes in companies and played a vital role as a company resource and success factor. According to Bobinac[4], impacts of knowledge management includeincreasing profitability and revenue, improving customer service and satisfaction, ensuring a more stable position in the market, reducing the costs of developing new products, increasing innovation processes and collecting knowledge fromcustomers and employees. While the concept of intrapreneurship [1] insists on financial autonomy of innovative teams, KM emphasizes the importance of dissemination techniques as a way to allocate knowledge insidea company. Recently, authors have investigated the impact of KM on bank productivity. In the case of Koosar Bank of Iran, the

analysis showed that knowledge sharing increased not only productivity, but also innovative contribution of employees [27]. Bolisani&Bratianu[6] pointed to the inevitability of having a new knowledge economy in a postindustrial society. At the center of this new economy is the knowledge-based company. In suchan organization, the pressure of efficiency and productivity should be replaced by new metrics capableofmeasuring the quality of contribution of knowledge and learning to company performance [6].

Empirical approach and results

Sample and dataset description

This research analyzes the impactof the knowledge management concept on the business variables of companies in Serbia. The selection of citiesfor the sample was intentional. The sample included companies in the most important economic centers in Serbia: Belgrade, Novi Sad and Niš. The sample covered the following five business sectors: industry, construction, IT, trade and services. When planning a sample, we paid attention to the fact that the shareof Serbian business sectors inGDP must be credibly reflected in the sample [7].Inselectinga company, we tookinto account that the sample should represent the actualratio between the number of micro, small, medium-sized and large companies in Serbia. For the definition of the size of companies, weused a valid national criterion [28]. A selection of companies from the list of the Serbian Business Directory [26]was made by applyingsimple random sampling without repeating. As an instrument for collecting data, we used an online questionnaire with closed-endedquestions, the interval and the Likert scale. An online self-administered questionnaire was forwarded to managers of the selected companies. The interviewswereconducted from November 1st to 30th, 2018. The questionnaire was distributed twice, at intervals of 15 days. The second time, questionnaires were sent again to companies that did not provide answers after the first attempt. We sent 360 questionnaires and receivedanswers from 126 companies.

The dataset for measuring the KM concept in companies contains 11 variables grouped into fivecategories. The first categorytitled 'Academic education'consists of three variables: the share of employees in the company with bachelor's, master's and PhD degrees. The second categorytitled'Employees' training' consists of the following variables: attending seminars and courses outside the company, as well as attending educational seminars and courses within the company. The third categorytitled'Storage'consists of the following variables: the existenceof an organized procedure for storing the necessary knowledge useful for the functioning of the company and the existence of a system for protection and registration of innovative solutions and procedures (withthe Intellectual Property Office). The fourth category titled'Dissemination'contains two variables: the obligation of participants in innovative knowledge seminars to report the resultsto departments, sectors or direct colleagues, as well as a variable that measures the obligation of the employees to inform coworkers about the results concerning the company's activities upon returning from a business trip (after visiting fairs, exhibitions and other business events). The fifth category titled'Technical support'consists of two variables. The first variable measures the possibility to access intranet in companies, while the otherone measures the possibility to access virtual libraries and knowledge bases. Each of these variables was measured by using the 4-pointLikert scale, where score 1 represents the minimum, andscore 4 represents the maximum value of the measured indicator. When it comes to business variables, for the purpose of this study the average wage of employees in companies was measured. Measurement was performed through the 3-pointLikert scale. Respondents were asked the question: Is the average wage in your company lower, equal or higher than RSD 47,893, the median net wagein Serbia?The data for the median net wage in Serbia for 2017 were retrievedfrom the Official Gazette [25].The influence of knowledge management on business variables was measured by using appropriate statistical and econometric techniques.

The model

Since significant correlation values between the variables in the dataset for measuring knowledge management

have been confirmed, they have been processed by factor analysis to identify the existence of a number of complex factors, with the idea of analyzing their impact on the company's business variables. The starting point for the analysis is the following basic model:

$$X_{i=} a_{i1}F_1 + a_{i2}F_2 + a_{i3}F_3 + a_{i4}F_4 + e_i \quad (1)$$

where*X* is the value of the factor score, *i* the ordinal number of the variable, *F* is the factor index, *a*factor loadingand *e* specific factor associated only with the given variable. The study employedfactor analysis with the method of extraction of maximum likelihood[15]. As presented in Table 1, the necessary conditions of the Kaiser-Mayer and Bartlett's test for the continuation of the analysis [12] have been met.

Table 1:KMO and Bartlett's test

Kaiser-Meyer-Olkinmeasure of sampling adequacy.		.710
Bartlett's test of sphericity	Approx. chi-square	306.160
	df	55
	Sig.	.000

Source: Authors' calculations.

Once the varimax rotation was implemented, four important complex factors were allocated. The factors with the factor loadings are presentedin Table 2. Taken together, they explain 51.22% of the total variance. In general, the minimum value of factor loadings taken into account in this research is ± 0.3, while factor loadings with values of ± 0.70 are considered indicative of a well-defined structure and they are the real objectiveof factor analysis [14]. In this study, the minimum threshold input for factor loadings is set to ± 0.339, so in accordance with this,the relevantcells in the table are colored in gray.

Observing the entire sample, four factors which represent strategies that companies use and combine in knowledge management are extracted. As it is presented, Factor 1 includes a strategy that relies on attending educational seminars outside and within a company, on the obligation to report to the department, sector or direct colleagues the results of innovative knowledge seminars, on paying the subscription for accessing virtual libraries and knowledge bases, and on organizing a procedure for storing knowledge useful for the functioning of the company. Factor 2 contains a strategy that includes the obligation of employees to inform coworkers upon returning from business trips about the results concerning the company's activities, the obligation to report to the department, sector or direct colleagues the results of innovative knowledge seminars and the procedures for storing knowledge useful for the functioning of the company. Within Factor 3, the knowledge management strategy puts in the forefront the employment of experts with a PhD degree, as well as the existence of a system of protection and registration of innovative solutions and procedures. Factor 4 implies

Table 2:Rotated factor matrix[a]

	Factor			
	1	2	3	4
Number of employees with bachelor's degree %	0.316	0.068	0.103	0.477
Number of MSc/MA %	0.019	0.071	-0.022	0.771
Number of employees with a PhD %	-0.017	0.048	0.982	0.180
Attending seminars and coursesoutside the company %	0.576	0.139	0.170	0.127
Attending educational seminars and courseswithin the company %	0.846	0.109	0.130	0.208
Are there organized procedures for storing necessary knowledge useful for the functioning of the company?	0.383	0.339	0.088	0.144
Is there a system of protection and registration of innovative solutions and procedures (withthe Intellectual Property Office)?	0.280	-0.017	0.406	-0.104
Do participants in innovative knowledge seminars have the obligation to report the results to the department, sector or direct colleagues?	0.500	0.380	0.153	-0.083
Upon returning from business trips (after visiting fairs, exhibitions and other business events), are the employees obliged to inform coworkers about the results concerning the company's activities?	0.098	0.984	-0.141	0.031
Is there access to virtual libraries and knowledge bases?	0.645	0.136	-0.049	0.068
Are you connected via intranet?	0.155	0.238	0.080	0.095

Extraction method: Maximum likelihood.
Rotation method: Varimax with Kaiser normalization.
[a]. Rotation converged in 5 iterations.
Source: Authors' calculations.

a strategy in which companies try to have the highest possible percentage of expertswith master's and bachelor's degreesamong their employees. Company management can use one or combine multiple strategies for knowledge management. This may depend on the business sector, the size of the company, the business environment and other circumstances.

Regression analysis and results

Identifying four complex factors for knowledge management enabled the measurement of their impact on the companies' business variables. This chapter analyzes the factors' influence on the business variabletitledWages. The wages of thecompanies'employees were measured through the three-pointLikert scale. In the survey, the following question was asked: Is the average wage in your company lower, equal or higher than RSD 47,893, the median net wagein Serbia?The study firstanalyzedthe impact of the four factor scores on wages in large and medium-sized companies at thelevel of totaleconomy. The H1 hypothesis was tested: *Regression factor scores 1-4 (as independent variables, predictors) influence the change of the dependent variable Wages of employees in the company in large and medium-sized companies.*Ordinal regression was applied, because the dependent variable was measured by the ordinal scale. In order to test the hypothesis H1, large and medium-sized companies were isolated from the rest of thesample. Having completed this step, the following ordinal regression model was set up:

$$y_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \beta_3 x_{i3} + \beta_4 x_{i4} + \varepsilon_i \quad (2)$$

where, for $i=n$ observations:

y_i = dependent variable (average company's wage)

β_0 = y intercept (constant)

β_1 = slope coefficient of the predictor xi1

β_2 = slope coefficient of the predictor xi2

β_3 = slope coefficient of the predictor xi3

β_4 = slope coefficient of the predictor xi4

x_{i1}, x_{i2}, x_{i3}, x_{i4}= the independent variables or predictors (regression factor scores 1-4)

ε_i = random error

Table 3 shows the case processing summary of ordinal regression.

The results revealsignificant values of pseudo R-square coefficients (Table 4). Based on the values obtained for the Nagelkerke R-square coefficient, a set of four predictor variables explains 69% of variability of Wages of employees in the company.

Table 4:Large companies (251+ employees): Pseudo R-square

Cox and Snell	.587
Nagelkerke	.690
McFadden	.465
Link function: Logit.	

Source: Authors' calculations.

Table 5 shows that there is a significance of regression factor scores 1 and 2. In the context of knowledge management, large companies rely on two strategies. Within the first strategy, the management invests resources in employees attending educational seminars withinthe company and outside of it, emphasizing the obligation to report to the department, sector or direct colleagues the results of innovative knowledge seminars. In addition, large companies allocate funds for subscriptions for accessing virtual libraries and knowledge bases, as well as for organizing storage procedure for knowledgeuseful for the functioning of the company. When it comes to the second strategy, which is represented by the regression

Table 3: Large companies (251+ employees): Ordinal regression analysis Case processing summary

		N	Marginal percentage
Is the average wage in your company lower, equal or higher than RSD 47,893, the median net wage in Serbia?	Lower than RSD 47,893	4	20.0%
	Equal to RSD 47,893	4	20.0%
	Higher than RSD 47,893	12	60.0%
Valid		20	100.0%
Missing		0	
Total		20	

Source: Authors' calculations.

Table 5:Large companies (251+ employees): Parameter estimates

							95% Confidence interval	
		Estimate	Std. error	Wald	df	Sig.	Lower bound	Upper bound
Threshold	[v13 = 1]	-3.867	1.489	6.748	1	.009	-6.785	-.949
[v13 = 2]		-1.616	1.035	2.435	1	.119	-3.645	.414
Location	**REGR. factor score 1 for analysis 1**	**2.473**	**1.107**	**4.990**	**1**	**.025**	**.303**	**4.643**
	REGR. factor score 2 for analysis 1	**-2.189**	**1.279**	**2.926**	**1**	**.087**	**-4.696**	**.319**
	REGR. factor score 3 for analysis 1	-.255	.665	.148	1	.701	-1.558	1.047
	REGR. factor score 4 for analysis 1	.648	1.084	.358	1	.550	-1.477	2.773

Link function: Logit.

Source: Authors' calculations.

factor score 2, large companies impose an obligation on employees to inform coworkersabout the results related to the company's activities, as well as the obligation to reportto the department, sector or direct colleagues the results of innovative knowledge seminars upon their return from business trips. Besides, the second strategy also includes allocations for storage procedures ofknowledge useful for the functioning of the company.

In addition to the factor score 1 having a positive impact on the growth of employees' wages in large companies, a negative estimatedvalue of -2.189in the factor score 2 is also observed. This would mean that factor score 2 has a negative impact on wage growth. The causesof this phenomenon are complex, and they pertain to the domainof psychology. The reasons for this phenomenon are related to employeemotivation that ismost affected by the way and approach in which large companies organize and design briefing sessions where employees upon returning from business trips are obliged to inform coworkers about the results concerning the company's activities, as well as the obligation to report to the department, sector or direct colleagues the results of innovative knowledge seminars. The way of organizing these briefings can be problematic if they are held outside of working hours and if there is no financialstimulation. Furthermore, if they are not designed in a creative manner, briefings can becomea burden foremployees and lead to a reduction in employeemotivation. An unfair criterion for the selection of employees going on business trips can lead to unhealthy competition among employees, which negatively affects the work atmosphere and productivity.

When it comes to medium-sized companies, the case processing summary of the ordinal regression analysis ispresentedin Table 6.

The results show thatthere are significant values for all three types of pseudo R-square coefficients. Based on the values obtained for the Nagelkerke pseudo R-squarecoefficient, a set of four predictor variables explains the 74.4%variability of the dependent variable Wages of employees in the company (Table 7).

Table 7: Medium-sized companies (51-250 employees): Pseudo R-square

Cox and Snell	.655
Nagelkerke	.744
McFadden	.501

Link function: Logit.

Source: Authors' calculations.

Table 8 shows contributions by factor scores. It is noticeable that in medium-sized companies,factorscores 4 and 2 have the greatest impact on employees'wages.

Table 6: Medium-sized companies (51-250 employees): Ordinal regression analysis Case processing summary

		N	Marginal percentage
Is the average wage in your company lower, equal or higher than RSD 47,893, the median net wage in Serbia?	Lower than RSD 47,893	8	28.6%
	Equal to RSD 47,893	13	46.4%
	Higher than RSD 47,893	7	25.0%
Valid		28	100.0%
Missing		0	
Total		28	

Source: Authors' calculations.

Table 8: Medium-sized companies (51-250 employees): Parameter estimates

							95% Confidence interval	
		Estimate	Std. error	Wald	df	Sig.	Lower bound	Upper bound
Threshold	[v13 = 1]	-2.231	.776	8.264	1	.004	-3.752	-.710
[v13 = 2]		2.414	.948	6.486	1	.011	.556	4.273
Location	REGR.factor score 1 for analysis 1	.661	1.048	.398	1	.528	-1.393	2.714
	REGR.factor score 2 for analysis 1	**1.722**	**.853**	**4.071**	**1**	**.044**	**.049**	**3.394**
	REGR. factor score 3 for analysis 1	.448	.707	.402	1	.526	-.937	1.834
	REGR.factor score 4 for analysis 1	**3.783**	**1.311**	**8.325**	**1**	**.004**	**1.213**	**6.353**

Link function: Logit.

Source: Authors' calculations.

The management of medium-sized companies uses a combination of two strategies for knowledge management that are different from those practiced by large companies. The first strategy includes the management's efforts to employthe highest possible percentage of experts with master's and bachelor's degrees. The management observes such experts as sources of innovative solutions useful for the company. Based on the resultsobtained, this strategy for medium-sized companies leads to a greater increase inemployees' wagescompared to the otherone.The second strategy is represented by the regression factor score 2. Just as in large companies, it includes the obligation of employees to inform coworkers through briefingsabout the results concerning the company's activities, as well as the obligation to report to the department, sector or direct colleagues the results of innovative knowledge seminars upon returning from business trips. This strategy also includes allocations for procedures for storing knowledge useful for the functioning of the company. Although this strategy is also practiced by large companies, there is a difference. Unlike large companies, in the case of medium-sized companies, this strategy has a positive impact on employees'wage growth. This could probably be explained by a more creative and effective manner of organizing briefings, where employees should, after returning from their business trips, inform coworkers about the results concerning the company's activities. Medium-sizedcompanies are likely to have a fairer criterion for sending employees on business trips, which also contributes to the growth of employeemotivation. We can conclude that the hypothesis H1 is confirmed.

Regarding the situation in individual business sectors, the industrial sector was selected as the target sector forthis analysis. The following research was based on the hypothesis H2: *Regression factor scores 1-4 (as independent variables, predictors) affect the change of the dependent variable Wages of employees in the company in large and medium-sized industrial companies.* In order to test the hypothesis H2, large and medium-sized industrial companies were isolated from the rest of thesample. Having completed this step, the following case processing summary of the ordinal regression analysis was obtained (Table 9).

According to theNagelkerke pseudo R-square coefficient, a set of four predictor variables explains 77.9% of the variability of Wagesof employees in the company (Table 10).

When analyzing the contributions by factor scores,we observedthat Factor 1 and Factor 4 makethe largest and most significant contribution(Table 11). A positive estimate is interpreted in the following way. For every

Table 9: Large and medium-sized industrial companies: Ordinal regression analysis Case processing summary

		N	Marginal percentage
Is the average wage in your company lower, equal or higher than RSD 47,893, the median net wage in Serbia?	Lower than RSD 47,893	4	22.2%
	Equal to RSD 47,893	9	50.0%
	Higher than RSD 47,893	5	27.8%
Valid		18	100.0%
Missing		0	
Total		18	

Source: Authors' calculations.

Table 10: Large and medium-sized industrial companies:Pseudo R-square

Cox and Snell	.681
Nagelkerke	.779
McFadden	.551
Link function: Logit.	

Source: Authors' calculations.

one unit increase in an independent variable, there is a predicted increase (of a certain amount) in the log-odds of falling at a higher level of the dependent variable [12]. More specifically, if factor score 1 is increased by one line, there is a predicted increase of 4.356 in the log-odds of falling at a higher level of the dependent variable. When factor score 4 is increased by one line, there is a predicted increase of 3.412 in the log-odds of falling at a higher level of the variableCompany's average wages.

When it comes to knowledge management, large and medium-sized industrial companies favor the strategy of investing resources in employees' trainings in seminars outside and within companies, insisting on the obligation to report to the department, sector or direct colleagues the results of innovative knowledge seminars and onpayingfor employees' subscriptions for accessing virtual libraries and knowledge bases and organizing a storage procedure for knowledge that is useful for the functioning of the company. Management of large and medium-sized industrial companies also aspires to have the highest possible percentage of experts with master's and bachelor's degreesamong their employees. Based on the resultsobtained, we can conclude that the hypothesis H2 is confirmed.Segmentation and differentiation in terms of medium-sized or large industrial companies in particular was not possible, since in this case the sample size is below the statistical acceptability limit.

Conclusion

The study explains the importance of knowledge management for companies' business. Satisfactorywages areone of the most important incentives for employee motivation. Above-average wages provide loyalty of employees. When employees are happy with their wages, they will strive to maximize productivity and achieve the company's goals. In the long run, increasing the wages savesmoney for the company and functions asan investment for high-quality business[5].Ourresearch testedand confirmed the positive impactof KM dataset on company's average wages. According to the results, four complex factors were isolated, representing strategies that companies use and combine in knowledge management. The use of these strategies depends on the business sector, companysize and business environment.At the level of total economy, the positive influence of isolated factors on wages was confirmed both in large and medium-sized companies. However, there are differences in the choice of combinations of KM strategies betweenlarge and medium-sized companies. Large companies combine complex factors 1 and 2, while medium-sized companiesbase their knowledge management on a combination of factors 2 and 4.When it comes to individual business sectors, the industrial sector was selected as the target one. In the case of large and medium-sizedindustrial companies, a set of four predictor variables explained 77.9% of the variability of the average company's wage. It was observedthat Factor 1 and Factor 4makethe largest and most significant contribution.According to Romer's model of increasing returns[21], a stable positive growth is a result of endogenous accumulation of knowledge. As the Nobel Prize winner says, knowledge determines how successful

Table 11: Large and medium-sized industrial companies: Parameter estimates

							95% Confidence interval	
		Estimate	Std. error	Wald	df	Sig.	Lower bound	Upper bound
Threshold	[v13 = 1]	-4.396	1.932	5.176	1	.023	-8.183	-.609
[v13 = 2]		1.096	1.353	.656	1	.418	-1.556	3.748
Location	REGR. factor score 1 for analysis 1	4.356	1.870	5.423	1	.020	.690	8.022
	REGR. factor score 2 for analysis 1	.725	1.103	.432	1	.511	-1.437	2.886
	REGR. factor score 3 for analysis 1	.789	.901	.766	1	.382	-.978	2.555
	REGR. factor score 4 for analysis 1	3.412	1.867	3.341	1	.068	-.247	7.070
Link function: Logit.								

Source: Authors' calculations.

we are infacing the constraints that nature imposes on economic growth[22].Knowledge accumulation, as well as the positive effects it generates in production,areof great importance for yielding growth.

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EFFECTS OF THE SOCIAL ENVIRONMENT ON CONSUMERS' INTENTION TO USE MOBILE COMMERCE

Efekti društvenog okruženja na nameru potrošača da koriste mobilnu trgovinu

Abstract

The widespread use of mobile phones has contributed to their use in business purposes, primarily in the area of commerce and financial services. In the contemporary digital environment, mobile commerce is the field of business activity which is in continuous expansion. In recent years, the use of mobile commerce in the Republic of Serbia also has high growth rates. In accordance with the concepts of numerous studies in the field of mobile commerce, the aim of this paper is to identify the key drivers of customer satisfaction and intentions to use the mobile services. The proposed research model includes two key variables contained in many technology acceptance models – the performance expectancy/usefulness and the effort expectancy/ease of use, but the model is particularly focused on the social environment presented through two components: personal influence and social networks. The survey was conducted on a sample of 402 respondents. The relationships between the variables of the research model were analyzed, regarding the use of mobile commerce, at the level of two segments of respondents: innovators and followers. Application of a multi-group analysis and segmentation of the respondents on the basis of this specific criteria gives special value to this paper. The paper provides useful practical implications, particularly in the field of use of social networks in order to create promotional and educational campaigns through which citizens can learn about the characteristics, benefits and the use of mobile commerce.

Keywords: *consumer, mobile commerce, satisfaction, intention to use, social environment.*

Sažetak

Široka upotreba mobilnih telefona doprinela je njihovom korišćenju i u poslovne svrhe, pre svega u oblasti trgovine i finansijskih usluga. U savremenom digitalnom okruženju, mobilna trgovina predstavlja polje poslovne aktivnosti koje je u kontinuiranoj ekspanziji. Mobilna trgovina poslednjih godina doživljava trend rastućeg korišćenja i u Republici Srbiji. U skladu sa konceptima brojnih studija iz oblasti mobilne trgovine, cilj rada je identifikacija ključnih pokretača satisfakcije korisnika i namere budućeg korišćenja mobilne trgovine. Predloženi istraživački model obuhvata dve ključne varijable koje sadrže mnogi modeli za prihvatanje novih tehnologija – očekivane performanse/korisnost i očekivani napor/lakoću korišćenja, ali model je posebno fokusiran na društveno okruženje koje je u radu predstavljeno kroz dve komponente: personalni uticaj i društvene mreže. Istraživanje je sprovedeno na uzorku od 402 ispitanika. Analizirani su odnosi varijabli istraživačkog modela na nivou dva segmenta ispitanika: inovatora i sledbenika u pogledu korišćenja mobilne trgovine. Primena višegrupne analize i segmentacija ispitanika po osnovu ovog specifičnog kriterijuma daju posebnu vrednost radu. Rad pruža i korisne praktične implikacije, posebno u domenu korišćenja društvenih mreža u cilju kreiranja promotivnih i edukacionih kampanja putem kojih se građani mogu upoznati sa karakteristikama, koristima i načinom korišćenja mobilne trgovine.

Ključne reči: *potrošači, mobilna trgovina, satisfakcija, namera korišćenja, društveno okruženje.*

Introduction

The digital market has recorded high rates of growth during the last 10 years. In 2018, 1.8 billion people performed their shopping online [27]. In 2019, the total volume of trade within the online market accounted for USD3.530 billion, while in 2022 it is expected to reach USD6.540 billion, which will represent around 22% of the total value of global retail [27]. The development of the online market has significantly influenced the changes in business performance and within business orientation of companies, as well as the change of the business model of almost all market-oriented companies, and especially trade companies, producers of products intended for final consumers, as well as companies which do business in service areas where high competitive pressure is expressed.

Mobile commerce is certainly an important area, i.e., the use of mobile devices for shopping and sales of products, services and contents, and its availability at any time and from any place stands out as the main advantage. Bearing in mind the high potential of mobile commerce, the interest of companies and researchers about what influences the consumers to start and continue using mobile commerce is increasing and it is also the subject of analysis within this paper.

The most important contribution of this paper is the examination of the influence of social surroundings, broken down into today`s two key components – personal influence and very popular and influential social networks. The other significant contribution of this paper is that it compares the perceptions and differences in attitudes of two, to date rarely compared groups – the innovators, i.e., users with high degree of personal innovativeness and readiness to try new things among the first consumers and the followers, i.e., users who accept novelties only after they have been accepted by the critical mass of innovators.

The consumers on the digital market

Within the contemporary period, the span of products and services which are being sold within the digital surroundings has been so spread that it is difficult to identify the category which is not present. The total value of online shopping in 2017 was estimated at around USD1.900 billion worldwide [12]. Online shopping is performed globally and on all continents regardless of the differences in economic development of particular geographic regions. According to the research performed by KPMG, the average number of online transactions on an annual level by every individual inhabitant is around 9.2 in Latin America, 11 in Africa, 11.9 in Eastern Europe and in Russia, 16.1 in Australia and Oceania, 18.4 in Western Europe, 19 in North America and 22 in Asia [12].

The growth in smart phone use has significantly contributed to the growth of the online market. Consumers use computers to gather information and perform shopping within the online surroundings, which is categorized by literature as e-trade or e-commerce. Besides computers, over the last ten years, smart phones have been used more and more. The use of smart phones within the online market to perform transactions represents a unique evolution of the online market, so besides the term e-commerce, the term m-commerce is used more and more frequently. Smart phones have enabled the people to be more often connected to the internet, to communicate with friends, browse the information on brands, products and services, as well as to perform transactions. Smart phones have significantly improved the efficiency of the online market and have contributed to its development. In 2017, the total achieved volume of sales via m-commerce was USD151 billion, which accounted for around 35% of the total amount of online market trade.

Thanks to the development of smart phones, the number of consumers using mobile phones in performing the process of online transactions has increased significantly. An extremely rising trend can be seen worldwide concerning the users of this type of phone, which contributes to the development of the online markets. For example, in 2018, 87% of U.S. population was connected via smart phones to the internet, which has significantly contributed to the growth of the information flow via this network channel [6]. The number of smart phones used worldwide has been intensively increasing over the last years. During the same period, m-commerce is also characterized by high growth rates. For example, e-Marketer (2017) estimated that, even

during 2017, two-thirds of the internet users in USA were shopping via mobile phones (in 2012 only one-fourth of the users used to do that), and that already in 2021 the retail via mobile devices would account for more than a half of the total e-retail on the U.S. market, which is also confirmed by research made by Business Insider (2019). In 2017, in Europe, more than a third of retail transactions came from mobile devices (Business Near, 2018) and it is estimated that in the United Kingdom already during 2020 half of the retail transactions will come from the same source (e-Marketer 2020). On the other hand, the Nodus report (2018) estimates that the total value of transactions in m-commerce during only 5 years, from 2014 to 2019, has increased by the unbelievable 1,300%.

The analyses of digital consumer behavior are extremely important due to the growth of their influence on the income generated by market-oriented companies. Digital consumers use online surroundings in order to facilitate the buying transaction for themselves – the gathering of information on products and services, the analyses of experience by other consumers and the simplification of the process of buying goods and services using online shops [23].

Within the analyses of digital surroundings, it has been noted that there are individuals who spend a lot of time online and who can be characterized as highly active persons in online surroundings. The consumers which are highly active within the digital surroundings are divided into four relatively homogeneous groups [31]:

- *brand lawyers* – consumers who significantly contribute to the brand promotion within the digital surroundings. They are very often present within social networks and are active participants in the majority of communication concerning brands. They often post comments and pictures concerning different brands they are using or which they are interested in. The intensity of posts on average varies from once a day to once a week;
- *digital moms* – consumers who actively share advice on products and services which they are using in online surroundings. Their posts almost have the form of blogs. This group of digital consumers is predominantly formed by women who follow with great attention the posts of other consumers in online surroundings and different video contents;
- *digital transmitters* – consumers who tend to transfer their own experience from consumption and use of different products and services via social networks in a creative and original way. They post photos and video contents from personal life – the event at the restaurant, their own business surroundings, etc. The basic motive for posting of this group is not the influence on others, but rather making the impression or drawing attention to one's own lifestyle. This type of consumers indirectly transmits its own experiences from consumption and influences other consumers. In the future, it is expected that this group will post video contents more often than photos; and
- *millennial generation* – the new generation of consumers who spend a significant part of time in digital surroundings. They prefer communication, arrangements and advice taking from their friends via online channels of communication. They are well informed about different online shops and places where they can find out detailed information on characteristics of different services. They actively follow comments and grades left by other consumers within the online surroundings.

The influences on consumer behavior within the digital surroundings are multiple, complex and insufficiently researched, which represents a challenge for a great number of researchers from the area of business economics.

Literature review and the research model

The research of consumer behavior and the determination of factors which influence their decision to accept some new technology, such as m-commerce, has a long history and is usually based on some of the well-known, traditional theories and models on consumer behavior and technology acceptance, such as the technology acceptance model (TAM), diffusion of innovation theory (DOI), the unified theory of acceptance and use of technology (UTAUT) and many others. The TAM model is one of the most famous and mostly used models within this area. It was suggested by Davis (1989) and up to now, with smaller

appendices and modifications, it has successfully been used in studies regarding the acceptance of numerous mobile technologies, such as m-commerce [12], m-services [38] or mobile payment systems [17].

Some newer research indicates that TAM model is too simple for a complex process of decision making [34]. That is why UTAUT, as the most advance model is used, suggested by Venkatesh and created by unifying eight up to that moment accepted theories and models of consumer behavior [33]. UTAUT has also been very successfully tested in studies on accepting mobile technologies, such as for example m-commerce [21], m-advertising [34], m-banking [39] or m-tourism [30].

UTAUT is used as the basic theoretical model within this paper as well, i.e., two variables have been retrieved from it:

- *perceived performance* can be defined as the degree to which the consumer believes that the use of m-commerce will bring it benefits [7], and generally this variable is very similar to the variable perceived usefulness from the TAM model; and
- *perceived effort* is usually defined as the perceived degree of simplicity of using m-commerce [7], and is very similar to the variable perceived simplicity of use from the TAM model.

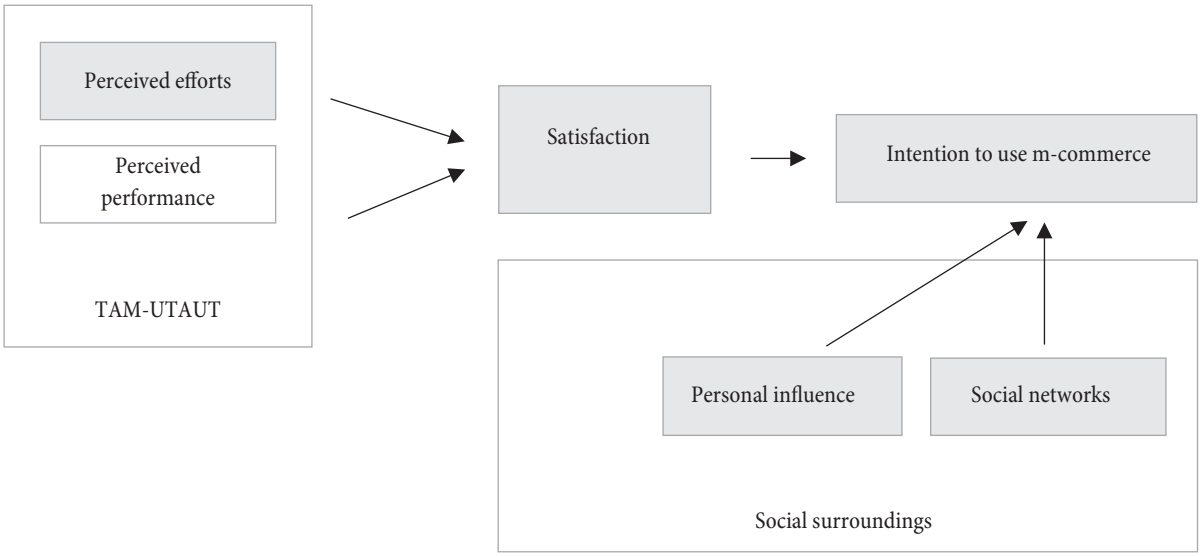
Satisfaction is one of the basic variables which are used in marketing, in studies on consumer loyalty [21], and can generally be described as the fulfillment of the expectation of the consumer, if the product or service characteristics tend to be better compared to what the consumer expected. In that case, the degree of satisfaction is greater and vice versa [37]. The influence of perceived performance or perceived effort or their equivalents on the user satisfaction of m-commerce users has been researched in numerous previous studies [1], [16], [21], [29], [37].

As one additional factor of influence on consumer decisions are social surroundings, i.e., attitudes, opinions and behavior of close and influential persons such as friends, relatives, firm management and others that must be taken into consideration and stressed [21]. This influence on the consumer can come by different channels, but within this research, two most important channels by the authors' opinion have been analyzed [21]:

- *personal influence*. Under personal influence a direct, personal contact of the consumer with the people from nearby surroundings is assumed, which is in literature considered to be the strongest and most persuasive;
- *social networks*. Social networks represent a contemporary phenomenon and a place where a great number of users express their own opinions and experience, including those connected with new technologies and services, and these attitudes have the influence onto a significant number of social network users.

Figure 1 shows the research model of the study.

Figure 1: Research model of the study



The aim of the paper is to find out if there are differences, according to the proposed model, in behavior patterns of users divided into two categories:

- *innovators*, i.e., innovative users who tend to try new technologies among the first; and
- *followers,* i.e., users who accept new technologies and services later on, after being accepted and recommended by the critical mass of innovators.

The literature referring to the acceptance of new mobile technologies does not offer much research which has dealt with the topic in question. Chawla and Joshi (2017) have used cluster analysis according to attitudes on the intention of using m-banking and have formed three clusters: the leaders, the followers and the late comers, and have shown that there are statistically significant differences among their attitudes and intentions [5]. Lee and Son (2017) have researched the effects of consumer innovativeness on the use of mobile applications and have also shown that there are significant differences in the behavior of innovators and non-innovators within the area [18]. Finally, the Güngör study has also shown statistically significant differences in behavior models of innovators and followers regarding the acceptance of mobile applications for payment [13].

The methodology of the empirical study

Gathering of primary data has been carried out in a two-week period, whilst the potential respondents have been contacted at the exit of two major shopping centers in Belgrade, the capital of the Republic of Serbia. In order for the sample to include people from different demographic and socio-economic profiles, the survey has been realized during weekdays and weekends. At the very beginning of the conversation, the respondents have been informed that the data were gathered for scientific purposes and in order not to be under time pressure while filling out the questionnaire, those people who have accepted to participate in the research have left the interviewers their e-mail address. After that, the interviewers have sent an e-mail with the instructions regarding questionnaire filling out and the link which would enable the access to the questionnaire. Seven days later, 402 validly filled out questionnaires have been collected. It is important to point out that the sample included only those people who have declared to have used the mobile phone in order to effect some sort of shopping or business transaction over the last year. When it comes to the demographic structure, women were present in a slightly higher percentage (52.2) compared to men (47.8). Similar distribution was present regarding the age as the criterion for respondents' division, since younger respondents (up to the age of 34) accounted for 53.7% of the sample, while the older respondents, who had 35 or more years, accounted for 46.3% of the sample.

While filling out the questionnaire the respondents have expressed their degree of concordance with the statements on a seven-degree Likert scale. All the statements within the questionnaire expressed the aspects of usefulness, the ease of using m-commerce, the general level of satisfaction and the intention of future use of m-commerce, as well as the influence of social surroundings on the use of mobile services. When it comes to social surroundings, the research model encompassed the two key variables: personal surroundings (comprised of family, friends and colleagues of the respondents) and social networks.

The model contains a total of six latent variables, i.e., it encompasses, besides the variables which denote the aspect of social surroundings, also the two basic variables of the known models for accepting mobile technologies (usefulness/perceived performance and ease of use/perceived effort), the satisfaction and the intent of future use. The basis for formulating the statements was comprised of relevant studies from the area of m-commerce and m-payment systems [32].

The analysis of data firstly included the calculation of frequencies in order to obtain the demographic structure of the sample and then the reliability analysis as well as confirmative factor analysis with the intention to test the internal consistency of statements, the variable concordance and the validity of the model. The main analysis within the empirical study is represented by a multi-group model of structured equations, which was used to determine the differences in tested relationships of variables between the two analyzed groups of respondents: innovators and the followers. This was the main aim of

the empirical study, since all respondents were placed in one of the two mentioned groups depending on whether they were among the first in their surroundings to start using mobile phones for the needs of effecting different payments, or not.

To be precise, when we are talking about the tested relations between variables, the paper analyzes the effects of perceived performance and perceived effort on consumer satisfaction, as well as the effects of satisfaction, personal surroundings and social networks as an intent of future use of m-commerce.

The results of the study

Before analyzing the relationship between variables of the research model within the level of identified segments, the model reliability measurement has been performed. For every individual construction the value has been calculated using the Cronbach's Alpha coefficient. The obtained results clearly confirm that all variables of the model were measured by internally concordant statements, since in all cases the value of the Cronbach's Alpha coefficient surpasses the threshold of 0.7 (the value of the Cronbach's Alpha coefficient: perceived performance = 0.9; perceived effort = 0.94; social networks = 0.94; personal influence = 0.94; satisfaction = 0.90; the intention to use m-commerce = 0.92).

The values of the concordance index have been calculated by using the confirmative factor analysis (Table 1). In the case of all indices the gained values surpassed the adequate concordance thresholds or the obtained values were somewhat below the standardly defined thresholds. The values of the coefficients SRMR and RMSEA were below the threshold of 0.1 [28]. Also, the values of the indices RFI, NFI, CFI, TLI were higher than the threshold of 0.9 [14].

On the other hand, the value of the GFI index was somewhat lower than the threshold of 0.9, while the χ^2/df was also somewhat over the threshold value of 3 recommended by Carmines and McIver [4]. Talking about concordance and model validity, it is important to emphasize that the values of all coefficients of correlation between individual variables and statements by which they were measured were higher than 0.7, which implies the convergent validity of the model.

Table 1: The indices of model concordance

Index	Value
χ^2 / df	3.31
RFI	0.91
GFI	0.88
NFI	0.93
CFI	0.95
TLI	0.94
SRMR	0.05
RMSEA	0.08

RFI – relative fix index; GFI – goodness-of-fit index; NFI – normed fit index; CFI – comparative goodness of fit; TLI – Tucker-Lewis Index; SRMR – standardized root mean square residual; RMSEA – root mean square error of approximation.

The heart of the empirical analysis within this paper are the results of the multi-group model of structural equations. This analysis has offered the possibility to test the relationships between variables of the proposed model at the level of two segments: innovators and followers (Table 2). This is a very specific segmentation of consumers which has up to now rarely been used in field marketing research.

Table 2: Testing the moderating effects (the criterion of segmentation: innovativeness regarding the use of m-commerce)

Effect	innovators	p value	followers	p value	z value
PP → SAT	0.495	0.000	0.170	0.009	-3.213**
PE → SAT	0.355	0.000	0.053	0.576	-2.447*
SN → IU	0.308	0.000	0.354	0.000	0.600ns
PI → IU	0.467	0.000	0.359	0.018	-0.621ns
SAT → IU	-0.021	0.819	0.431	0.019	2.193*

** The result is significant at the level of 0.01
* The result is significant at the level of 0.05
ns The result is not significant
PP – perceived performance
PE – perceived effort
SN – social networks
PI – personal influence
SAT– satisfaction
IU – the intention to use m-commerce

If we focus on the segment of the innovators, it can be stated that all effects are statistically significant, apart from the influence of satisfaction on the intention to use m-commerce in the future. At first glance, the result seems surprising, but the innovators are those consumers who among first in their surroundings started effecting different payments via mobile phone, who are familiar with the use of modern information-communication

technologies, so they are committed in the long-term to the use of m-commerce and have the clear intention of using it, despite certain reasons which can cause their current dissatisfaction.

The satisfaction can be influenced by numerous factors, and in the case of innovators' perceived performance, i.e., the advantages offered by m-commerce stand out as a very strong driver of satisfaction. Precisely the advantages are probably the most important reason for the future use of m-services. On the other hand, within the segment of the followers, there is a notably weaker influence of usefulness on satisfaction, but also a more expressed influence of satisfaction on the intention of future use of m-services. The only insignificant effect within the segment of the followers refers to the relationship between the perceived effort and user satisfaction.

By using a comparative analysis of the segments, it can be concluded that differences appear in three out of five tested effects. Interestingly, there are no statistically significant differences when it comes to the influence of the two components of social surroundings on the intention of future use. These effects are significant in both segments, which indicates that people from the nearby surroundings of the consumer, as well as social networks have significant influence on their intentions regarding the use of m-commerce in the future.

Conclusion

The present study offers several important contributions. Firstly, within the territory of the Republic of Serbia there is still not a great number of empirical research when it comes to m-commerce, which has been expanding during the last years, contributed to by the growing trend of digitalization, not only in business, but in everyday life activities. Secondly, the comprised model is based on the main assumptions of known global models for accepting mobile technologies, due to which it can be stated that the model importance is contributed to by its strong theoretical basis. Thirdly, the model also includes two variables which denote the aspect of social surroundings, which makes the model specific. Fourthly, the innovative note of the empirical study is based on a unique and up to now rarely used segmentation of consumers on innovators and followers.

It is interesting to note that the influences of perceived performance and perceived effort on satisfaction are much stronger within the segment of innovators. Namely, the multi-group analysis has shown the existence of a statistically significant difference between the tested effects within the two analyzed groups. The result seems logical since innovators have started long before the followers to use the m-commerce and mobile services since this fits into the "digital" lifestyle concept of these consumers.

The followers also perceive m-commerce as a useful means of realization of different payments, but to a much smaller extent than innovators. If the attention is drawn to the two components of social surroundings (personal influence and social networks), it can be noted that the intention of innovators regarding the use of mobile services is much more influenced by close people from direct surroundings compared to social networks. Within the segment of the followers, the situation is different, i.e., in this segment the influence of social networks on the intentions of using the services is somewhat higher than the influence of families, friends and colleagues. Such a result is probably the reflection of the fact that a greater number of followers are still not familiar enough with the concept of m-commerce, due to which numerous information regarding it are gathered via social networks and different forums.

Since the influence of perceived performance on the consumer satisfaction is statistically significant in both segments, the providers of m-services need to point out the aspect of usefulness of these services within their marketing campaigns, the possibility to perform transactions quickly, with lower costs, from any place and at any time. It is important for people to get familiar with the fact that m-commerce simplifies the realization of business activities and contributes to the improvement of work performance.

Bearing in mind the fact that personal influence and social networks significantly determine the intention of using services within both segments, it is necessary to motivate the consumers to actively share their experience regarding m-commerce with other consumers via social

networks and online forums. In this manner, mobile providers can use the positive effects of the interpersonal communication, where even the negative comments can be a very important source of feedback information in order to improve the different aspects of m-commerce. By using social networks, not only promotional but also educational campaigns can be implemented which would enable the people to get to know the characteristics, advantages and the way of using m-commerce. It is also important to identify the opinion leaders and influencers and to include them within the loyalty programs in order to stimulate the spreading of the positive interpersonal campaign.

This research has several limitations. Firstly, the research model has encompassed only two potential drivers of satisfaction, and within future research it is desirable to include a greater number of variables in order to clearly see which among them has the most importance in determining satisfaction. Within the present study, in the segment of the followers, a much higher influence of usefulness on satisfaction compared to ease of use can be noted. But, with the model widening, an insight could be gained into other antecedents of satisfaction as well. The limitation of the study is also presented in the fact that it does not test the indirect effect of expected performance on the intent of use (via satisfaction), which would be very useful to carry out in the segment of innovators, where perceived performance has a strong influence on satisfaction, whilst the general level of satisfaction has not been differentiated as a statistically significant antecedent of intention.

Within future research, it is desirable to gather primary data in other countries of Southeastern Europe as well, thus gaining conditions for the realization of a multicultural study. Moreover, it is desirable to strengthen the quantitative analysis with the results of qualitative in-depth interviews with the mobile service providers.

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INFLUENCE OF DIGITALISATION AND TECHNOLOGICAL INNOVATIONS IN THE FINANCIAL MARKET ON THE DEVELOPMENT OF THE FINANCIAL MARKET

Uticaj digitalizacije i tehnoloških inovacija na finansijskom tržištu na razvijenost finansijskog tržišta

Abstract

The aim of the paper is to establish a connection between the credit rating of the country and the development of the financial market on one hand, and the level of technology and innovation development across countries, on the other. The first research question is: "What is the connection, if any, between the credit rating of a country and its level of technology and innovation development?" The second research question is: "What is the connection, if any, between financial market development and the level of technology and innovation development?". The methods used in the paper are analysis and synthesis of previous research and theoretical findings, regression analysis, whereas the conclusions were made by applying the induction method. The answers to the research questions may indicate the direction of change in regulation that would have a stimulating or disincentivising effect on the development of innovations and technologies in the financial markets in developing countries. The contribution of the paper is reflected in the opportunities for developing and improving the financial market in developing countries. The research findings reveal a connection between credit rating and technology and innovation levels across countries, and a connection between financial market development and technology and innovation levels across countries. We have offered an answer to the question of whether it is rational for financial intermediaries in developing countries to change their business models and adapt them to the accelerated market changes. In addition, we have highlighted the need to adjust the regulation and reduce operational costs of financial intermediaries in developing countries.

Given that we have demonstrated a cause-and-effect relationship between innovation and technological development of financial intermediaries and market development, we also emphasise the need to eliminate the constraints and other limiting factors that affect further digitalisation in the financial sector in the region.

Keywords: *digitalisation, innovation, market development, 4th Industrial Revolution.*

Sažetak

Cilj rada je da se dovedu u vezu kreditni rejting zemlje i razvijenost finansijskog tržišta sa jedne strane i nivo tehnologije i inovacija po zemljama, sa druge. Prvo istraživačko pitanje glasi: „Da li su i u kakvoj vezi kreditni rejting zemlje i nivo tehnologije i inovacija?" Drugo istraživačko pitanje glasi: „Da li su i u kakvoj vezi razvijenost finansijskog tržišta i nivo tehnologije i inovacija?". Metode korištene u radu su analiza i sinteza prethodnih istraživanja i teoretskih nalaza, regresiona analiza, a zaključci su izvučeni metodom indukcije. Dobijeni odgovori na istraživačka pitanja mogu ukazati na pravac promjene regulative koja bi stimulativno ili destimulativno djelovala na razvoj inovacija i tehnologija na finansijskim tržištima u zemljama u razvoju. Doprinos rada ogleda se u tome što su objašnjene mogućnosti za razvoj i unapređenje finansijskog tržišta u zemljama u razvoju. Rezultati istraživanja pokazuju vezu između kreditnog rejtinga i nivoa tehnologije i inovacija po zemljama te vezu između razvijenosti finansijskog tržišta i nivoa tehnologije i inovacija po zemljama. Ukazali smo i na to da li je racionalno da finansijski posrednici u zemljama u razvoju mijenjaju svoje poslovne modele i prilagođavaju ih ubrzanim promjenama na tržištu. Osim toga, ukazali smo na potrebu za prilagođavanjem regulative i smanjivanjem operativnih troškova finansijskih posrednika u zemljama u razvoju.

S obzirom na to da smo pokazali uzročno-posljedičnu vezu između inovacija i tehnološkog razvoja finansijskih posrednika i razvijenosti tržišta, ističemo i činjenicu da je potrebno eliminisati ograničenja i druge otežavajuće faktore koji utiču na dalji proces digitalizacije u finansijskom sektoru u regiji.

Ključne reči: *digitalizacija, inovacije, razvoj tržišta, Industrija 4.0.*

Introduction

In the past three centuries, civilisation has gone through three industrial revolutions, while according to the opinion of the world's leading economists, the Fourth Industrial Revolution or Industry 4.0, as it is popularly called, is in progress. Each of these industrial revolutions was characterised by technological innovations that had a key impact on the development of the entire mankind. What is characteristic of Industry 4.0 is that in different ways it already affects all business activities, while simultaneously developing digital and other technologies, but also affecting lifestyle in the entire world. After the process of globalisation and connecting the world into one global market, which resulted in an unobstructed expansion of business, a new era began which can be called the age of digital transformation. The basic characteristic of the new, digital age is that it takes new dimensions and new forms, from one day to the next. Although, in terms of their structure, form of business and other characteristics, banks are less likely to accept changes, they have largely adjusted their businesses to the changes in the business environment and, consequently, adopted and applied certain processes imposed by digitalisation. The continuous process of creating new banking products and services which are directly linked to the digitalisation process is a clear sign that the banking sector has taken the upcoming changes very seriously, which certainly result in the creation of competitive advantage and a better position in the market. Of course, intense competition in the market and the emergence of various services offered in connection with banking services, demonstrate market overload, and this is certainly the biggest challenge for banks in the upcoming period. It should be especially borne in mind that in this situation, banks are not just competing with each other, but also with high-tech companies providing similar services that have emerged in the last few years and started offering this kind of service. These companies have their own payment systems and customer databases, which results in a deduction of a portion of the banks' profit. All this clearly means that banks have to work intensively on innovations in the banking field and develop new business strategies and models that will be adapted to new demands in the market. Certainly, in addition to the activities related to the introduction of new services, as well as their adjustment to the market, the focus must still be on the clients of the bank, i.e., banks must pay attention to the optimum quality of services that will satisfy the needs of the existing clients and also attract new ones. It is very important that the process of transforming banking services is accompanied by the continuous monitoring of the market and clients' needs, since it should not be forgotten that all banks have and will have traditional customers in the future, who will certainly use the standard banking services, as well as clients who most likely will not use digital banking services in a certain period of time. Therefore, the banks will have to seek an optimal measure in transforming their business units and introducing digital bank branches that would completely replace human resources. Essentially, the process of digitalisation in the banking sector is, besides the great advantages for banks and their clients, also bringing certain challenges that banks need to handle. The research titled "A Brave New World for Global Banking" says that banks in Europe are at risk of loss which could account for almost a third of their profit. The following, even more rigorous, stage of digital transformation will further reduce the banks' profit in the upcoming years, which will be a consequence of even greater competition and the continuation of the decline in banks' margins. In such circumstances, banks are trying to compete by introducing innovative services, available through mobile devices. However, in this process, much of their revenues are taken by small digital marketing companies that are increasingly involved in work that was until recently reserved only for commercial banks. If banks plan to position themselves in the market in an adequate way and adapt to the new changes, it will be necessary to quickly change their business models by transforming themselves from exclusively financial institutions into institutions whose platform will be based on data analysis and offer of appropriate products and services with which they will compete in the market, as well as by opening up greater opportunities for cooperation with fintech companies.

Previous research

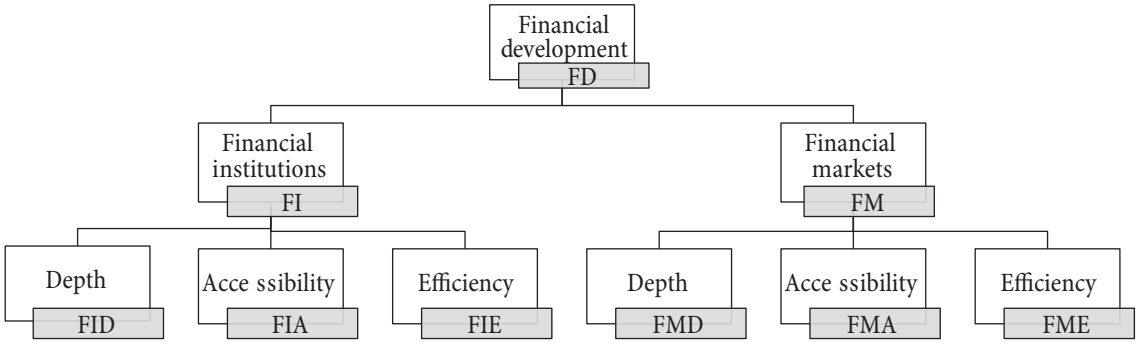
A large body of literature for the respective literature surveys has been accumulated to assess the impact of financial development on economic growth, inequality, and economic stability [15], [8], [7]. Financial development involves improvements in functions provided by the financial systems such as: (i) pooling of savings; (ii) allocating capital to productive investments; (iii) monitoring those investments; (iv) risk diversification; and (v) exchange of goods and services [15]. Each of these financial functions can influence savings and investment decisions and the efficiency of allocating funds. As a result, finance affects the accumulation of physical and human capital and total factor productivity – the three factors that determine economic growth. Given that financial development reduces informational asymmetries and financial constraints and promotes risk sharing, it can enhance the ability of financial systems to absorb shocks and reduce the amplification of cycles through the financial reduction of macroeconomic volatility and inequality.

Most of the empirical literature since the 1970s observes financial development through two measures of financial depth – the ratio of private credit to GDP and, to a lesser extent, through stock market capitalisation, also as a ratio to GDP. For example, in an influential industry-level study, Rajan & Zingales [20] use both measures to show that more financial development facilitates economic growth. On the macroeconomic volatility side, as measured by private credit from banks and other financial institutions to GDP, it plays a significant role in dampening the volatility of output, consumption, and investment growth, but only up to a certain point [7]. Most researchers in this field use variations of these two measures to examine the role of the financial system in economic development.

And yet, financial development is a multidimensional process. With the passage of time, financial sectors have evolved across the globe, and modern financial systems have become multifaceted. For example, while banks are typically the largest and most important players, investment banks, insurance companies, mutual funds, pension funds, venture capital firms, and many other types of non-bank financial institutions now play notable roles. Similarly, financial markets have developed in ways that allow individuals and firms to diversify their savings, and firms can now raise money through stocks, bonds, and wholesale money markets, bypassing the traditional bank lending. The constellation of such financial institutions and markets facilitates the provision of financial services. Furthermore, an important feature of financial systems is their accessibility and efficiency. Large financial systems are of limited use if they are not accessible to a sufficiently large portion of the population and firms. Even if the financial systems are sizeable and have a broad reach, their contribution to economic development will be limited if they are uneconomical and inefficient. This point is made also, for example, in Čihák, Demirgüç-Kunt, Feyen & Levine [6] and Aizenman, Jinjarak & Park [1]. The diversity of financial systems across countries implies that one needs to look at multiple indicators to measure financial development.

To overcome the shortcomings of single indicators as proxies for financial development, a large number of indices has been created, and these indices summarise how developed financial institutions and financial markets are in terms of their depth, accessibility, and efficiency, culminating in the final index of financial development (Figure 1). These indices were originally developed in the context of the IMF Staff Discussion Note "Rethinking Financial Deepening: Stability and Growth in Emerging Markets" [21]. This paper presents and explains the methodology that underpins the said indices. The subindices and the final overall index are constructed for 183 countries on an annual frequency between 1980 and 2013. Financial institutions include banks, insurance companies, mutual funds, and pension funds. Financial markets include stock and bond markets. Financial development is defined as a combination of depth (size and liquidity of markets), accessibility (ability of individuals and companies to access financial services), and efficiency (ability of institutions to provide financial services at low costs and with sustainable revenues, and the level of activity of capital markets). This broad multidimensional approach to defining financial development follows the matrix of financial system characteristics developed by Čihák et al. [6].

Figure 1: Financial development index pyramid



Source: [6].

The contribution of this paper is quite distinct. Firstly, we have supplemented the World Bank's FinStats, a more updated version of the Global Financial Development Database (GFDD) introduced by Čihák et al., with additional data from the Bank of International Settlements' (BIS) debt securities database, Dealogic's corporate debt database, and the IMF's Financial Access Survey. Secondly, we have summarised this diverse information in several easy-to-use indices. Given the wealth of information on financial system properties – there are 105 distinct indicators in GFDD and 46 indicators in FinStats – it is not feasible to track all of these different indicators individually, especially in empirical research. And even if it was possible, not one single indicator, when observed in isolation, would offer a comprehensive understanding of the level of financial development [12]. The subindices and the final index pull together these various indicators and allow a comprehensive assessment of particular features of financial systems and the overall level of financial development. As a result, the indices allow to pin down exactly where the deficiencies in financial development lie or which aspects of financial development affect macroeconomic performance, which could then be investigated in greater detail by using the disaggregated data from FinStats or GFDD.

The methodology described below was used to construct the index, including data sources, treatment of the missing values, functional form, and weights used in aggregation. It shows how new indices compare to the traditional measures and key stylised facts about financial development around the world. The discussion will look at some of the limitations and shortcomings of the index in order to show the extent to which the structure and size of pension funds affect the outcome of the index. The goal is to determine whether "copying" a particular country by structure and size of the index can further develop the financial market. In this regard, the term "emerging market" refers to countries that are characterised by institutional turbulence, low level of corporate governance and economic development in relation to the developed countries. Hoskisson, Eden, Lau & Wright mark all the countries of the Western Balkans as countries in transition [13, pp. 249-267]. For the sake of illustration, the institutional legacy of communism is reflected in a large, undisciplined and ineffective administration, a bureaucratic approach of the institutions and corruption.

"A bureaucratised and restrictive authority has opened the door to corruption and bribery of public services because most citizens seem to believe that it is the only way to get things done" [9, p. 206]. Even a glance at statistical offices in Western Balkan countries confirms the prolongation of such practice, i.e., the increase in number of employees in the budget-funded sectors of administration, public authorities, education, and art. On the other hand, there is an obvious decrease in the number of employees in the processing industry. Besides, relevant research also shows a high level of corruption in the new EU Member States as opposed to the old ones, as a consequence of the communist doctrine [24]. Also, when observing the trust in institutions, transition countries are always at the bottom of such lists [4]. Also, in small and open economies, such as the countries in the Western Balkans, monetary policy capabilities are limited by many constraints [3, p. 1039]. Therefore, in parallel with the weak development of the financial market, the criticism of the transition is based

on the significant increase of poverty and degradation, mostly of the middle class [5].

By comparing the developing markets, we notice that non-economic factors in the region play the most important role in determining the value of trade between countries [25, p. 57]. Economic instability results in "frequent reforms, where the economic growth and the social impact of changes were completely ignored, low rates of domestic and foreign investment, foreign trade deficit and low rates of GDP" [10, p. 198]. For example, there is a series of social and economic issues which remain undealt with and whose solution requires complicated and demanding solutions [2, p. 57].

Industry 4.0 and digital economy

Industry 4.0 or the so-called Fourth Industrial Revolution, i.e., the digitalisation of industry, has been a key topic for several years, where people are trying to find the answers to how the economies can be more competitive in the global markets [16, p. 9]. Klaus Schwab, the founder and chairman of the World Economic Forum, deals with this issue in his book "The Fourth Industrial Revolution", in which he analyses the consequences of development that is different from everything that has ever happened to mankind. However, one should think well about the consequences of the Fourth Industrial Revolution because, according to the conducted surveys, the use of digitalisation in the industry of the modern countries could result in the loss of a significant number of jobs in the upcoming period [16, p. 9]. The essence of Industry 4.0 is in the new approach, i.e., networking of smart digital devices with products, tools, robots, and people, while its primary goal is smart factories that are flexible and that efficiently integrate clients and business partners into a unique process. This would increase productivity and efficiency, and thereby ensure competitiveness in the global market. One of the interesting features of this revolution is that it is scheduled in advance, i.e., out of necessity due to the crisis, the recession and the slowdown in economic activity that made the leading European Union states look for answers on how their economies can strengthen the global competitiveness. Action Plan for the Fourth Industrial Revolution is composed of four courses of action [16, pp. 9-10].

- to enable all industrial companies, especially small and medium-sized companies, to have easier access to digital infrastructure and to adopt innovation;
- to enable the automotive and aviation industry to assume leadership over the digital industry;
- training the labour force, with the promotion of digital skills, education, and training;
- adoption of adequate regulatory solutions that will arrange security and accountability as a basis for further digitalisation.

The digitalisation process itself essentially involves the conversion of analogue to digital form, without losing information in this transformation, and thus facilitates faster flow, information exchange and better information of all participants [16, p. 9].The first association when it comes to the digital economy is the economy of internet businesses, e-commerce, e-banking and other services offered on a daily basis. However, the digital economy is a much wider concept than that. The digital economy is an economy based on digital technologies, primarily through the use of information technologies in all fields of the economy, including internal and external activities between business entities and individuals [16, p. 9].

It is also possible to find definitions that treat the digital economy as a new, post-industrial, global economy based on internet transactions and advanced technology, i.e., as a global network of economic activities based on information and communication technology, or more simply, as an economy based on digital technology. Essentially, the digital economy is an economy based on information, knowledge, ideas, and innovations. According to certain information, it is estimated that the digital economy is growing seven times faster than other economies, and that in the developed countries it makes up for 10% of gross domestic product, which means that digital economy is constantly growing and it is certain that modules of classical economic business will increasingly move towards the digital form.

According to research conducted by the European Banking Federation (EBF) in 2018, a digital single market is expected to boost the development of companies operating

Table 1: Technological and economic changes that marked the industrial revolutions so far

The First Industrial Revolution (second half of the 18th and the first half of the 19th century)	
Technological changes	Invention of the steam engine, development of rail traffic
Economic changes	Transfer from manual to mechanical and industrial production, development of textile industry and abandoning villages and agriculture and population moving to urban centres
The Second Industrial Revolution (Second half of the 19th and early 20th century)	
Technological changes	Invention of electrical energy and machines based on electrical drives
Economic changes	Mass production and production lines
The Third Industrial Revolution (from 1960 to 1995)	
Technological changes	Computer revolution, mainframe computers (1960), microprocessors and personal computers (1970-1980)
Economic changes	Computerised production and mass use of computers in all processes and private life
The Fourth Industrial Revolution (1995 – the first decades of the 21st century) – smart digital revolution	
Technological changes	Expansion of internet, smart devices, social networks, artificial intelligence, IoT, neurotechnology, 3D printers
Economic changes	Network – digital economy, virtual products and similar, information as a key economic recourse and source of growth, economy of platforms and free staff

Source: [14, p. 27].

in this system and to serve for the well-being of all clients, further economic growth and further employment.

As seen in the review, the previous industrial revolutions, in addition to technological changes, caused changes in the economy and in the entire society. However, economics, although it developed like any other science, did not change its postulates based on industrial production, i.e., economy, with technological revolutions. The Fourth Industrial Revolution brought about fundamental and essential changes and resulted in a completely new economy – the digital economy [14, p. 27].

The essential question is what constitutes the digital economy in structural terms and in terms of statistical and economic coverage. In this respect, it is useful to start from the definition given by Thomas Mesenbourg, as well as from the understanding of the digital economy, as defined by the OECD in 2012. Mesenbourg recognizes three main components of the digital economy [14, p. 27] as follows:

- e-business infrastructure (hardware, software, telecoms, networks, human capital, etc.);
- e-business (the focus is on how business is done/ conducted, that is, any process that an organisation conducts over computer-mediated networks);
- e-commerce (transfer of goods, for example when a book is sold online).

Under the term digital economy, the OECD implies "an umbrella term used to describe markets that focus on digital technologies. It involves the trade of information goods or services through electronic commerce. It operates on a layered basis, with separate segments for data transportation and applications" [16, p. 11]. The role of banks in this transformation is that they are not only innovative partners who invest in innovative financial technologies, but also contribute to economic growth and development in the overall financial market.

Table 2 shows that a certain number of countries has achieved high levels of technology and innovation. This primarily includes countries that are technological leaders in the world, as well as drivers of new ideas and innovative solutions. Although it is evident that a large number of countries has made great progress in the field of technology and innovation, on the other hand, however, there are those countries that are still stagnating and do not show any progress in the development of technology and innovative solutions. In general, these are the countries that are burdened with a number of problems, such as low standard of living, insufficiently developed infrastructure, poverty, and so forth.

Methodology

In the paper, we have observed the data provided by the National Bureau of Economic Research [17], the Organisation for Economic Co-operation and Development [18], World Economic Forum (2018), as well as credit ratings of countries published by the three most famous rating agencies in the world.

For each observed country, we have taken into account the amount of GDP for each country and the amount of the FD index, but we have also reported on the credit rating for each country in accordance with the

ratings obtained by the agencies: Moody's, S&P, and Fitch. Finally, we have presented an investment rating for each individual rating (Prime – first-class rating; High grade – high credit rating; Upper medium grade – upper-middle class; Lower medium grade – lower middle class; Non-investment grade – non-investment class; Speculative – speculative bonds; and Highly speculative – highly speculative bonds).

Table 2: Overview of structure and size of pension funds, indicators of market development and GDP per country

Country	GDP	Rank in technology and innovations	FD index	Moody's ratings	S&P ratings	Fitch ratings	Description
Australia	1,427,767	4.26	0.85	Aaa	AAA	AAA	Prime
Austria	459,401	7.46	0.64	Aa1	AA+	AA+	High grade
Belgium	536,055	6.51	0.58	Aa3	AA	AA-	High grade
Canada	1,733,706	5.81	0.86	Aaa	AAA	AAA	Prime
Chile	299,887	4.18	0.47	A1	A+	A	Upper medium grade
Czech Republic	244,540	7.94	0.37	A1	AA-	AA-	Upper medium grade
Denmark	354,683	6.29	0.64	Aaa	AAA	AAA	Prime
Estonia	29,527	5.75	0.33	A1	AA-	AA-	Upper medium grade
Finland	276,553	7	0.66	Aa1	AA+	AA+	High grade
France	2,794,696	6.87	0.76	Aa2	AA	AA	High grade
Germany	4,029,140	8.68	0.7	Aaa	AAA	AAA	Prime
Greece	218,057	4.44	0.54	B1	B+	BB-	Highly speculative
Hungary	156,393	6.96	0.44	Baa3	BBB	BBB	Lower medium grade
Ireland	366,448	7.34	0.69	A2	A+	A+	Upper medium grade
Israel	365,599	6.43	0.57	A1	AA-	A+	Upper medium grade
Italy	2,086,911	6.99	0.8	Baa3	BBB	BBB	Lower medium grade
Japan	5,070,626	8.99	0.87	A1	A+	A	Upper medium grade
Latvia	34,286	4.91	0.29	A3	A	A-	Upper medium grade
Lithuania	52,468	5.92	0.26	A3	A	A-	Upper medium grade
Mexico	1,199,264	6.74	0.41	A3	BBB+	BBB+	Upper medium grade
Netherlands	909,887	6.32	0.71	Aaa	AAA	AAA	Prime
New Zealand	205,997	4.79	0.61	Aaa	AA	AA	Prime
Norway	441,439	5.65	0.69	Aaa	AAA	AAA	Prime
Poland	549,478	6.83	0.47	A2	A-	A-	Upper medium grade
Portugal	237,962	5.36	0.69	Baa3	BBB	BBB	Lower medium grade
Slovakia	106,940	6.98	-	A2	A+	A+	Upper medium grade
Slovenia	54,969	6.8	0.39	Baa1	A+	A-	Lower medium grade
Spain	1,437,047	6.05	0.88	Baa1	A-	A-	Lower medium grade
Sweden	554,659	7.46	0.72	Aaa	AAA	AAA	Prime
Switzerland	709,118	8.39	0.94	Aaa	AAA	AAA	Prime
Turkey	713,513	5.87	0.83	Ba3	B+	BB	speculative
United Kingdom	2,808,899	7.05	0.82	Aa2	AA	AA	High grade
United States	20,513,000	7.78	0.87	Aaa	AA+	AAA	Prime
Mauritius	14,033	3.84	0.43	Baa1	0	0	Lower medium grade
Pakistan	306,987	3.82	0.23	B3	B-	B-	Highly speculative
Peru	228,944	3.67	0.38	A3	BBB+	BBB+	Upper medium grade
Colombia	336,940	4.61	0.44	Baa2	BBB-	BBB	Lower medium grade
Armenia	12,533	4.1	0.25	B1	0	B+	Highly speculative
Romania	239,440	6.61	0.31	Baa3	BBB-	BBB-	Lower medium grade
Zambia	25,778	2.39	0.12	0	B-	B-	Highly speculative
Croatia	59,971	5.5	0.41	Ba2	BBB-	BB+	speculative
Kenya	89,591	2.97	0.19	0	B+	B+	Highly speculative
South Africa	376,679	5.03	0.62	Baa3	BB	BB+	Lower medium grade
Thailand	490,120	7.13	0.73	Baa1	BBB+	BBB+	Lower medium grade
Bulgaria	63,651	5.23	0.38	Baa2	BBB-	BBB	Lower medium grade
Indonesia	1,005,268	5.41	0.36	Baa2	BBB-	BBB	Lower medium grade
Uganda	27,855	2.25	0.12	0	B	B+	Highly speculative

Country	GDP	Rank in technology and innovations	FD index	Moody's ratings	S&P ratings	Fitch ratings	Description
Russia	1,576,488	5.71	0.51	Baa3	BBB-	BBB-	Lower medium grade
India	2,689,992	5.99	0.41	Baa2	BBB-	BBB-	Lower medium grade
Nigeria	397,472	1.66	0.24	0	B	B+	Highly speculative
Malaysia	347,290	6.81	0.66	A3	A-	A-	Upper medium grade
Brazil	1,909,386	5.22	0.57	Ba2	BB-	BB-	speculative
Serbia	47,564	5.18	0.27	0	BB	BB	speculative
Egypt	249,471	4.99	0.31	B3	B	B+	Highly speculative
Costa Rica	60,816	4.97	0.27	B1	B+	B+	Highly speculative
Ghana	51,815	1.96	0.15	0	B	B	Highly speculative
Panama	66,031	3.82	0.35	Baa1	BBB	BBB	Lower medium grade
Singapore	346,621	7.28	0.71	Aaa	AAA	AAA	Prime
Uruguay	60,933	4.52	0.25	Baa2	BBB	BBB-	Lower medium grade
Dominican Republic	81,103	3.99	0.18	Ba3	BB-	BB-	speculative
Albania	15,121	2.73	0.21	B1	B+	0	Highly speculative

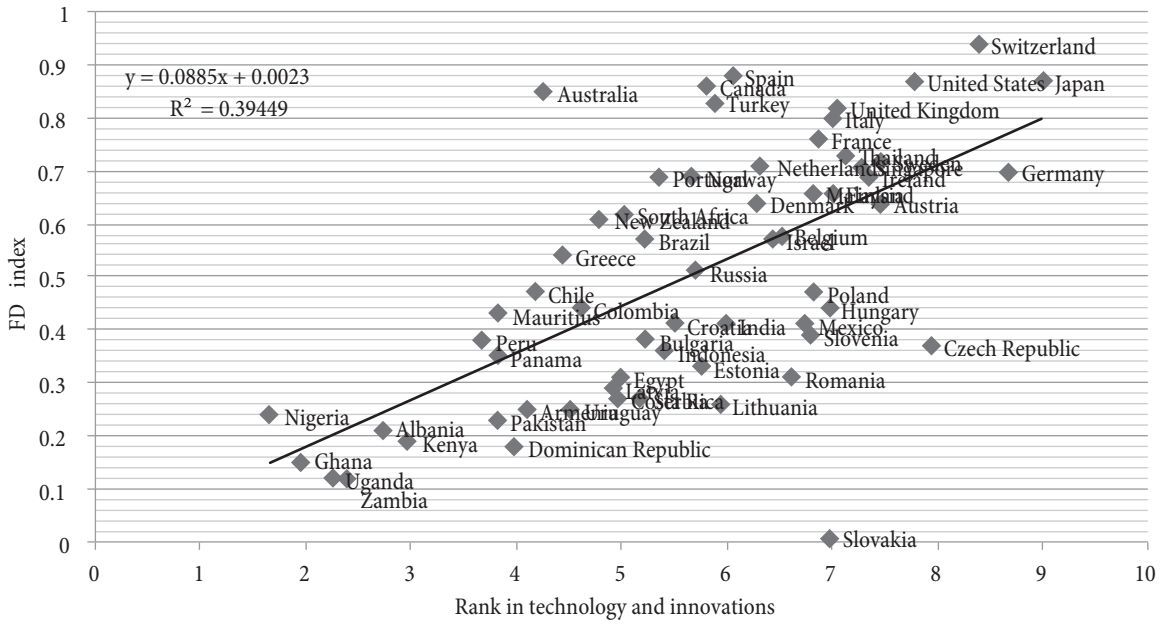
Source: Authors' calculations.

By using the Microsoft Excel programme, we have calculated the correlation coefficients and determinations for the following variables: X-axis – country rating in technology and innovation and Y-axis – financial market development (FD index), and X-axis – country rating in technology and innovation and Y-axis – country credit rating.

Results and discussion

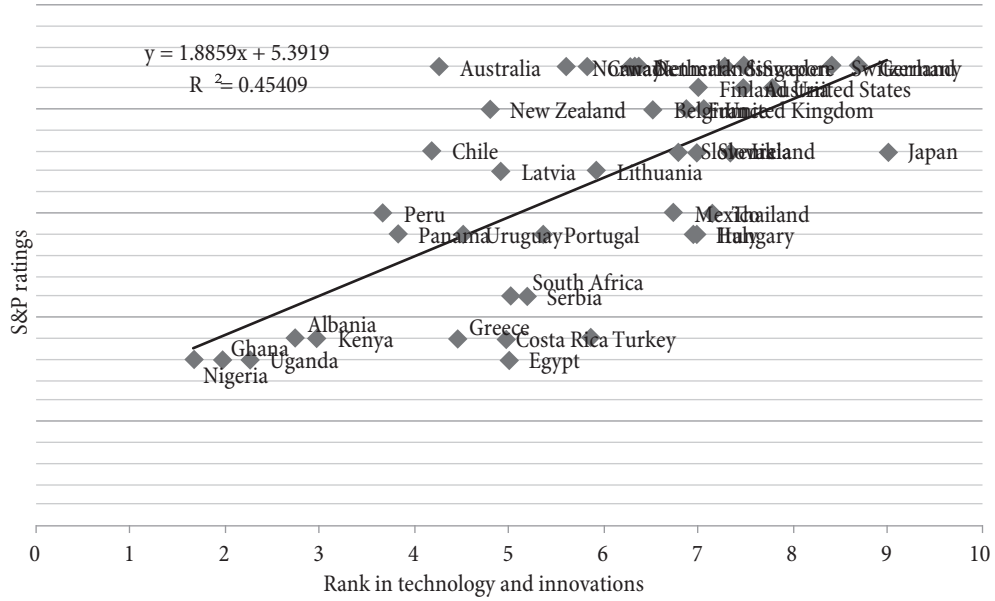
We can note that both functions are growing. The first function is y = 1,8859x + 5,3919, where the coefficient of determination $R^2 = 0.3945$ is in correlation with the two observed phenomena for 68.57% of the sample, whereas the second one is y = 1,9907x + 3,1292, where the coefficient of determination $R^2=0.4541$ is in correlation with the two observed phenomena for 45.41% of the sample. This means that 39.45% of the variance of the FD index is explained by the ranking in technology and innovations. Correlation (R) equals 0.6281. This means that there is a strong direct relationship between the two observed elements (Figure 2). In addition to this, there is strong relationship between technology and innovations and the credit rating of the country.

Figure 2: Overview of the relationship between development of technology and innovations and market development of a country



Source: Authors' calculations.

Figure 3: Overview of the relationship between market development and credit rating of a country



Source: Authors' calculations.

The research results indicate that there is a strong determination between the rating of a country in terms of technology and innovations and the development of financial market, i.e., that we could connect 39.45% of market development with the level of development of technology and innovation in the respective country.

Therefore, without a doubt, digitalisation and innovation have a major impact both on the development of the financial market and the credit rating of the country.

Conclusion

Our research has shown that there is a strong direct relationship between ranking in technology and innovations and the FD index. Correlation is 62.81%, and determination is 39.45%. In addition to this, our research has shown that there is an even stronger direct relationship between ranking in technology and innovations and the credit rating. Here, the correlation is 67.39%, and determination is 45.41%. Therefore, without a doubt, digitalisation and innovation have a major impact both on the development of the financial market and the credit rating of the country.

The Fourth Industrial Revolution requires the involvement of all market participants, as well as the mobilisation of all the people who have exhibited talent and knowledge for the future, with maximum support from the government to maximise their potential. The support must be both institutional, through investment in education, science, research and digitisation, and financial. If we look at the market of Bosnia and Herzegovina, we could talk about an insufficient level of technological innovation and digitalisation. We have proven in the paper that we can rightfully claim that there is a weak positive relationship between the development of technology and innovations in a country and the development of its financial market. On the other hand, we have demonstrated that there is virtually connection between the country's technology and innovation development and the country's credit rating. Therefore, we emphasise the need to introduce innovations and new technologies in the domestic financial market.

By analysing the current trends and indicators of the level of development of digitalisation of financial services, it is evident that financial intermediaries in the developing countries will be forced to change their business models and either adapt them to the accelerated market changes, or to form alliances with large technology companies, as well as with smaller companies that offer solutions complementary to the ones offered by the banks. In addition, they will have to act proactively towards regulatory authorities and reduce their operating costs so that they can compete in the market. From an organisational point of view, all future changes will be based on technologies and capabilities of financial intermediaries to quickly overcome new methods

of processing by constantly increasing amounts of data. Therefore, many financial intermediaries will partner up with fintech companies and make joint investments in technological projects.

In conjunction with the digitalisation process, it is also necessary to adequately regulate the financial framework in order to eliminate or mitigate systemic risks. First of all, it is necessary to protect clients and their data in the digital economy, to align the operations of companies that deal with similar transactions and to apply the same rules to all market participants. This implies that it is necessary to find the appropriate balance between competition, innovation, security, and client protection. It is strategically important that the impact of Industry 4.0 on the transformation of the financial sector must not jeopardise security at the expense of competition and innovation. From everything that was mentioned above, it is clear that Industry 4.0 has a major influence on the transformation of the financial sector, with clear understanding that certain constraints and the legal framework that might hinder further digitalisation of the financial sector must promptly be eliminated.

Financial markets of the future will certainly be marked by further digitalisation of banking products and services, which means that financial intermediaries that wish to be competitive in the market must invest in new technologies, which would certainly imply additional revenues they can count on, but also the costs of additional investments at this stage of transformation. The financial sector will develop towards open financial services, which will further affect all financial intermediaries and other participants in the financial industry, pushing them to further customise their businesses and services.

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COMPARATIVE ANALYSIS OF THE LEARNING ORGANIZATION ARTICLES IN SERBIAN AND AUSTRIAN ACADEMIC JOURNALS

Komparativna analiza članaka o učećoj organizaciji u srpskim i austrijskim akademskim žurnalima

Abstract

The author is comparing two small academic communities to test the time discrepancies in publishing of an academic discovery between the world's leading English language journals and those from peripheries. The chosen academic communities are Serbia and Austria, similar in size, with a shared fact that the main academic language is not the English language. However, the economic strength of those countries is quite different. For testing the time discrepancies, the author will test the time lag in discovering a management fad in those countries, comparing to the world's leading journal discoveries. One of detected management fads in the English language academic journals is the learning organization, with a typical peak in publishing in the year 1995. In this research, the peak was discovered in Austrian journals in the year 1997, and 15 years later in the Serbian ones. The author is arguing toward the tighter connections with the world academic community, as the *conditio sine qua non* for an advancement of small academic communities.

Keywords: *learning organization, management fads, Serbia, Austria, academic advancement.*

Sažetak

Autor poredi dve male akademske zajednice u cilju testiranja vremenske razlike publikovanja naučnog otkrića između vodećih svetskih žurnala na engleskom jeziku i onih sa periferija. Izabrane su akademske zajednice Srbije i Austrije, slične i po veličini i po tome što osnovni akademski jezik u njima nije engleski. Ipak, ove zemlje se veoma razlikuju po ekonomskoj snazi. U cilju testiranja te vremenske razlike, autor će testirati vremenski razmak u otkrivanju jednog prolaznog hita u menadžmentu, tzv. management fad-a, u tim zemljama i uporediti sa otkrićem u vodećim svetskim žurnalima. Jedan od detektovanih hitova u menadžmentu u akademskim žurnalima na engleskom jeziku je učeća organizacija ili organizacija koja uči, s tipičnim vrhuncem publikovanja u 1995. godini. U ovom istraživanju, vrhunac je otkriven u austrijskim žurnalima u 1997. godini, a 15 godina kasnije i u srpskim. Autor tvrdi da je sadržajnija saradnja sa svetskom akademskom zajednicom *conditio sine qua* non napretka malih akademskih zajednica.

Ključne reči: *učeća organizacija, prolazni hitovi u menadžmentu, Srbija, Austrija, naučni napredak.*

Introduction

The aim of this paper is to discover the eventual time lag between the discovery of a management fad in the world's leading academic journals, published in the English language, and in the small non-English speaking academic communities. As an example of a management fad, the learning organization concept will be used. From the author's stance as a critical realist, the scientometric analysis of academic journals in two small and similar-in-size non-English speaking countries was conducted, in Serbia and in Austria. Scientometrics is the quantitative study of science, a methodological approach in which the scientific literature itself becomes the subject of analysis, in a sense as a science of science. Scientometrics is an invaluable tool for measuring the impact of scholarly publications and the process of scientific knowledge production. Scientometrics studies usually focus on how concepts are being defined over time or in different domains. After defining the management fads and their life cycle, the author will present the results of other academics about the typical bell-shaped curve of the learning organization concept in English journals. In the empirical part of this paper, the time lag between the world community and two small communities of Serbia and Austria will be discussed. Afterwards, the content analysis of a Serbian journal will be conducted in order to debate some possible reasons for a critical long time lag between Serbian and the world's leading academic findings. *Content analysis* is a research technique for interpreting and coding textual material. It is a systematic, quantitative approach for analyzing and summarizing any form of content by counting various aspects of the content, in order to convert qualitative data into quantitative data.

The management fads and their typical bell-shaped life cycle

In the marketing literature, there are three special categories of the product life cycles [18], and these are style, fashion, and fad. Fads are the fleeting fashions. They come quickly into the market, their acceptance cycle is short, they experience a peak in demand very early, and then demand quickly falls and disappears. Fads do not survive because they usually do not satisfy a strong need. Management fads [2] do not occur out of necessity, but by accident. Fads usually tend to have a little or short-term impact, both in the language of management techniques and on organizations. However, fads can sometimes have huge and even damaging impacts.

Although business consultants are labeled as guilty of producing most fashions and fads and the sale and application of these [25], the most prolific propagators of fads are, in addition to consultants, management gurus [11]. In fact, it is difficult to discern who is more interested in fads, whether the academics who write about them, the consultants who sell them, or the managers who use them. Management gurus, management consultants, business schools, and publishers are in the competition to create new techniques and approaches for managers [8]. In any case, managers, who are always eager for something new and innovative, are the target audience. There is no definitive list of management fads [4]. Besides the learning organization, which is in focus of this paper, these fads have also been recognized in the literature: cultural change programs, total quality management, business process reengineering [5], benchmarking [11], management by objectives [15], and knowledge management [14].

The decline of a management fad is usually associated with the development and popularity of a new one. The life cycle of a fad can be displayed in a bell-shaped curve and in five stages [17]. The first stage is the invention stage. The second stage, dissemination, is the wild-acceptance stage, the stage when the fad becomes very popular. In stage three, with acceptance at the top of the bell-shaped curve, a fad reaches its peak, but at this point, critics appear and argue that the fad cannot be a universal *panacea*. The fourth stage is the disenchantment stage when large audiences realize that problems exist with the fad. The last stage is a decline when the fad disappears from wide use and retains only a few staunch supporters still loyal to the fad. Other authors [21] suggest that fads follow a life cycle best understood in seven stages: (1) An academic article is written on a new discovery or theory; (2) The study is discussed, summarized and repeated;

(3) The concept is popularized in a bestseller book; (4) Management consultants carry the new techniques to their client base; (5) Managers embrace the fad and become champions of the concept; (6) Time passes and enthusiasm dims; and (7) New discoveries occur and consultants are turning to them. In actuality, the shapes of the life cycle curves for different management fads are not identical nor symmetrical and vary from country to country [8].

Scholars have discovered fads not only in the social sciences, but also in some disciplines of the natural sciences [1], but some authors [6] argue that in organization theory fads are prevalent. The last decade of the 20th century saw the arrival of a *plethora* of management tools and theories, often conflicting, and the question arises [20]. Is contemporary, management theory nothing more than an accumulation of contradictory fads? Can universal management principles be extracted from the accumulated mass of information? Do the classical writers have words of wisdom to impart to the manager of the 21st century? In so doing, this paper traces a trajectory of management drought by examining the place of the seminal work of Chester I Barnard of the classical school of thought, in the light of contemporary trends and problems: and debates the currency of fundamental management principles. [ABSTRACT FROM AUTHOR]\nCopyright of South African Journal of Business Management is the property of Association of Professional Managers in South Africa and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use. This abstract may be abridged. No warranty is given about the accuracy of the copy. Users should refer to the original published version of the material for the full abstract. (Copyright applies to all Abstracts.: Is modern management theory nothing more than an accumulation of contradictory fads? That accumulation of fads forces practicing managers to check through trial-and-error the value and application of management theories. More and more, fads seem to be getting a negative reputation and it is a common view that the fads are a waste of time with little or no quantifiable benefit.

The roots and the life cycle of the learning organization concept in the English speaking journals

The roots of the learning organization concept can be traced back to 1947 [16]; however, a leading promoter of this concept is Peter Senge. In his book The Fifth Discipline: The Art and Practice of the Learning Organization, Senge [23] laid the foundations of the learning organization in the 1990s. After The Fifth Discipline, the learning organization quickly became a fad in management. In 1995, five years after the publication of Senge's book, the learning organization reached its peak as a fad [19], measured by the learning organization's hits in the Proquest database. In the coming years, interest in the learning organization began to fall sharply, but that interest has been offset by a sharp increase in inquiries into knowledge management [14]. During the same period, while academic interest in knowledge management remained at a high level, there appeared to be, in stark contrast, a significant decline of interest in it among global consultancies and professional service firms.

A similar conclusion was reached from a scientometric analysis of knowledge management and intellectual capital academic literature of 2,175 articles in 11 major peer-reviewed journals (3,109 unique authors from 1,450 unique institutions) from 1994-2008, led by Serenko [24]. The knowledge management discipline has attracted the attention of a tremendous number of individual contributors from a variety of both academic and non-academic institutions, but, on the other hand, the top five universities and academics generated only 4.8 percent, and 2.5 percent of the total research output, respectively. Pragmatic field studies and experiments constitute only 0.33 percent of all output. As a result, the practical relevance and applicability of the scholarly research were questioned and, therefore, the author [24] concluded that there is a great danger that knowledge management and intellectual capital may lose its practical side and become a pure scholarly discipline. The same conclusion was reached by Grant [12]. An extensive bibliographic review was carried out over a 20-year period, from 1990 to 2009, to determine patterns in the discourse. Next, the

actual patterns of diffusion of knowledge management in five professional services firms were examined. While the bibliometric analysis demonstrated that knowledge management has sustained a high level of interest over the last 10 years and is not seen to present the typical characteristics of a management fad, actual practice in the field differs from what is recommended in the literature. The greatest concerns of this research are the increasing polarization between practitioners and researchers in the field of the knowledge management.

The idea of a learning organization should be abandoned because this imaginative idea has not only "run out of steam", but it never had any [13]. The learning organization has failed to meet three objectives which are essential for any well-founded theory [13]: (1) a clear definition, (2) practical operational advice which managers can use, and (3) tools and assessment instruments to measure their achievements. The concept of the learning organization ignores the ways of rewarding and punishing in the organization, because it does not recognize the fact that managers reward those who contribute to the success and punish those who cause the damage, both cases measurable in financial form [3]. The popularity of the learning organization did not last very long due to the way in which process of learning in the learning organization was understood and enacted [10]. The emphasis was on individual learning and individual change, but the organization itself, its management structure and business practices, remained unchanged.

The analysis of the learning organization concept in Serbian and Austrian academic journals

This empirical section presents an analysis of the articles which cover the topic of the learning organization in two different European countries, Austria and Serbia. The aim of the previous section was to present a substantial number of evidence that the learning organization is recognized as a fad in the English language journals. The English language is widely accepted as an official world language in the social science. If something is recognized as a scientific truth in a leading language, it should be recognized as such in other languages as well. The emphasis will be on the Serbian academic journals. Serbia is one of the poorest European countries and it is still not a member of the EU. The main language in this country and in the academic community is Serbian. As a control group, Austria is chosen – similar in size, German language as main academic language, wealthy state, but a Western country, in contrast to Serbia from the East.

This longitudinal research was conducted first in April 2013 and consequently updated in April 2016, May 2017, September 2018 and August 2019. The current year is excluded from the results. The methodology is the scientometric analysis in the first round and the content analysis in the second one. Scientometrics is the quantitative study of science, a methodological approach in which the scientific literature itself becomes the subject of analysis, in a sense as a science of science. Scientometrics is an invaluable tool for measuring the impact of scholarly publications and the process of scientific knowledge production. Scientometrics studies usually focus on how concepts are being defined over time or in different domains. *Content analysis* is a research technique for interpreting and coding textual material. It is a systematic, quantitative approach for analyzing and summarizing any form of content by counting various aspects of the content, in order to convert qualitative data into quantitative data. The epistemological approach is the critical realism. The aim of this empirical research is to test the typical bell-shaped curve of a management fad in Serbian and Austrian papers and to establish the current trend in publishing the articles which cover the topic of the learning organization.

For Serbian papers, the basis and the tool of research was the Serbian national citation index [SCIndeks], and for Austrian papers the search engine of the Austrian Library Network. The Serbian national citation index, SCIndeks, can be found on the internet at http://scindeks.ceon.rs. SCIndeks is developed to serve as an add-on to the international (WoS) citation indexes. It indexes locally published journals classified as periodicals of a scientific character. In addition to basic article descriptions, SCIndeks contains abstracts and references/citations (metadata) for all articles. There are 1,140,882 references from 78,530 articles, 35,567 of which are available as full text,

published in Serbian journals from the year 2000 on, in humanities from 1996 on, and in social sciences from 1991 on. SCIndeks was developed and is maintained by the Center for Evaluation in Education and Science (CEON/CEES), a non-governmental, not-for-profit organization, in cooperation with the National Library of Serbia. The search engine of the Austrian Library Network can be found on the internet at http://search.obvsg.at/primo_library/libweb/action/search.do. It provides a broad search for literature in the holdings of the Austrian Library Network member libraries and beyond. Indexed content consists of 10 million title records and 7.2 million journal holdings. More than 80 mostly scientific libraries contribute actively to the central catalog of the Austrian Library Network. The literature tab contains all literature published since 1980. It is actively maintained by the network of Austrian academic institutions, led by the Austrian National Library. Thousands of papers are available for download, but unlike the Serbian SCIndeks, not all articles contain an abstract, which affects this research.

In order to extract the articles that cover the subject of learning organization in the Serbian national citation index (SCIndeks), the whole database was searched by using the search field "in article titles, abstracts, and keywords" and by using the following terms: (1) učeća organizacija (Serbian); (2) organizacija koja uči (Serbian); (3) learning organisation (British standard) and (4) learning organization (American standard). Serbian terms represent the same concept, but for the security reasons, the English terms were used as well, because many of the articles contain an abstract in English. From the database were allocated 267 articles (učeća organizacija: 8, organizacija koja uči: 30, learning organisation: 15, and learning organization: 214), which in the article title, abstract or keywords contain the term "learning organization". The search was restricted to the "economics" discipline, because this discipline includes articles from the field of management, which is the focus of this research. Thus, the number of articles was narrowed and when the duplicates were removed because of a duplication of terms, the number of articles was reduced to 74. From that number of 74 articles, as some journals are only available in English, 8 articles, or 10.81 percent, were published in English only. The articles were sorted for further analysis by the year of publication (Table 1).

The results indicated that the highest number of the research articles on learning organization were published in the years 2011 and 2012. That was the peak, the maximum point of a typical bell-shaped curve of a management fad. Before and after the years 2011 and 2012, data indicated far less number of the published articles.

The graphical representation of results indicates a positive trend in publishing (Figure 1), with an equation $y = 0.01614x + 3.2807$. The years 2011 and 2012 are the years with the maximum number of papers published, eight per year. Clearly, the results indicate that the number of articles that emphasize the learning organization concept was absolutely increased before 2011 and 2012, with a sharp fall in the year 2013 and onwards. Therefore, it could be concluded that learning organization is recognized as a management fad in the Serbian language academic journals even 17 years after it had been recognized as a fad in the English language academic journals. However, this concept is still a topic of interest among the Serbian academics because the positive trend is determined. It is interesting that there is not a single paper about the subject of this study from the period when learning organization

Table 1: Number of Serbian articles covering the concept of learning organization per year

Year	Number of hits
2000	1
2001	1
2002	3
2003	3
2004	3
2005	6
2006	5
2007	6
2008	3
2009	4
2010	6
2011	8
2012	8
2013	3
2014	2
2015	2
2016	3
2017	4
2018	3
TOTAL	**74**

was a well-established fad in the English literature, but this period was the same period when UN sanctions against Milošević's Yugoslavia banned any academic cooperation between Serbia and the West.

In order to find the articles which cover the subject of learning organization in the search engine of the Austrian Library Network, the "Literature section" of the database was searched by using the search field "Any" (which covers title, subject, abstract, keywords, classification and full text) and by using the following terms: (1) lernende Organisation (German); (2) learning organisation (British standard) and (3) learning organization (American standard). Further, the search was restricted to "Media type: Article only", in order to attain the compatibility of data with Serbian research.

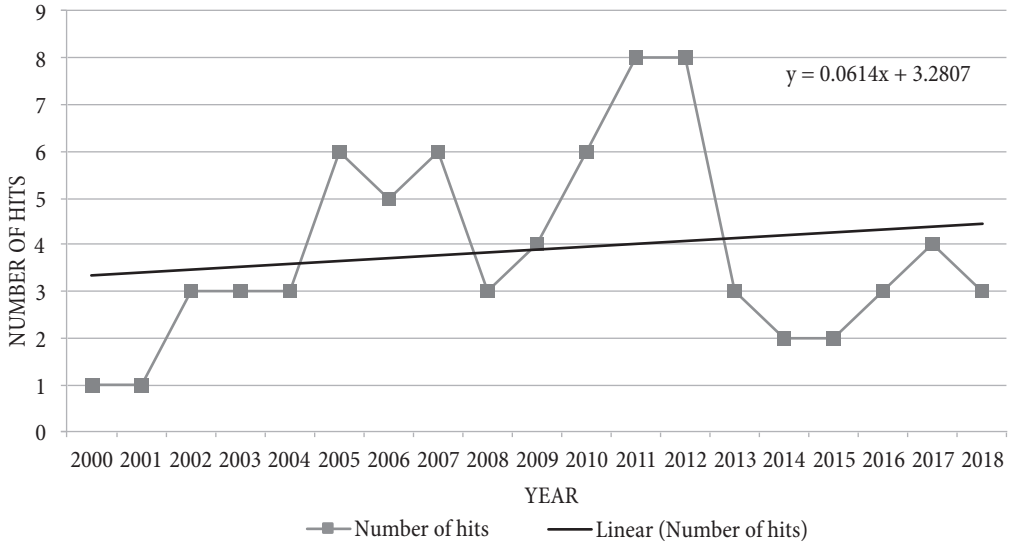
When the duplicates from the database were removed (lernende Organisation: 70; learning organisation: 63; and learning organization: 74 – before the duplicates removal), a total of 207 articles were allocated which in the article title, subject, abstract, keywords, classification or full text contain the term "learning organization".

Finally, when the papers which obviously do not cover the management discipline were removed (mainly from the pedagogy field, but also one about the synagogue in Vienna: Über die virtuelle Rekonstruktion von Wiener Synagogen), the number of articles was reduced to 71. The articles for the analysis were sorted by the year of publication (Table 2). The results pointed to the year 1997 as the year with the highest number of research articles (10) which cover the

Table 2: Number of Austrian articles covering the concept of learning organization per year

Year	Number of hits
1987	2
1988	0
1989	0
1990	0
1991	0
1992	0
1993	2
1994	2
1995	3
1996	1
1997	10
1998	4
1999	2
2000	3
2001	0
2002	3
2003	3
2004	4
2005	1
2006	2
2007	4
2008	5
2009	2
2010	3
2011	3
2012	4
2013	1
2014	2
2015	2
2016	0
2017	1
2018	2
TOTAL	**71**

Figure 1: Number and trend line of the 'learning organization' hits in Serbian journals per year



concept of the learning organization. The peak of a typical bell-shaped management fad curve was reached in Austria just two years after its top in English academic setting, but 15 years before Serbia. From the abovementioned 71 articles, as some journals are only available in English, 23 articles, or 32.39 percent, have been published in English only (Table 3), three times more than in Serbia.

The graphical representation of results indicates a positive trend in publishing (Figure 2). The peak was in 1997. However, the number of papers after the peak is still higher than in the previous period. The conclusion is that in the Austrian journals learning organization was recognized once as a management fad, but also that the production of new papers with the learning organization concept is still evident. This positive trend line is less steep than among Serbian scholars, because the Austrian 0.0295x + 1.7319 is less than Serbian 0.01614x + 3.2807; if x is replaced with 1, the results are 1.8 and 3.3, respectively.

Figure 2: Number and trend line of the 'learning organization' hits in Austrian journals per year

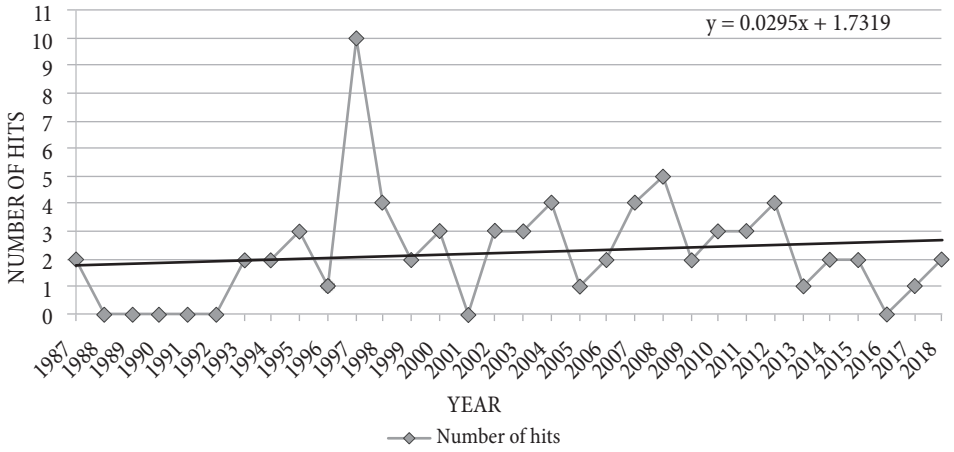


Table 3: The scientometric analysis of Austrian articles covering the learning organization concept

No.	ARTICLES	YEAR	ENGLISH
1	Intermediäre Dienstleistungen; Mesch, Michael; In: Wirtschaft und Gesellschaft. - Wien, 1987. - 13. 1987, H. 2, S. 185	1987	
2	Wissen, Arbeitsteilungen und Strukturwandel; Skolka, Jiri; In: Wirtschaft und Gesellschaft. - Wien, 1987. - 13. 1987, H. 2, S. 245	1987	
3	Organization Dynamics: A Learning Organization; Davies, Donald E.; In: Gruppendynamik / Gerhard Schwarz ... (Hg.). - Wien, 1993. - S. 167-	1993	YES
4	Self-Organization of Communication in Distributed Learning Classifier Systems; Ono, N; Rahmani, A T; In: Artificial neural nets and genetic algorithms / R. F. Albrecht, ... (eds.). - Wien [u.a.], 1993. - S. 361-	1993	YES
5	New Roles for the Engineer in the Learning Organization Perspective; Blandin, Bernard; In: Perspectives of continuing professional development / organisers: University Extension Centre, Vienna University of Technology ... Ed.: Manfred Horvat .... - Wien, 1994. - S. 299-	1994	YES
6	THE LEARNING ORGANIZATION ; Grantham, Charles; In: Informatics, organization and society / Savvas A. Katsikides (Ed.). - Wien [u.a.], 1994. - S. 228-	1994	YES
7	Die Bundeswehr als 'lernende Organisation'; Petersen, Jendrik; In: Der Soldat in einer Welt im Wandel / Uwe Hartmann ... (Hg.). - München [u.a.], 1995. - S. 153-	1995	
8	Ein Ansatz zur Steigerung der Reorganisationsgeschwindigkeit von Unternehmen: die Lernende Organisation ; WILDEMANN, Horst; In: Zeitschrift für Betriebswirtschaft. - Wiesbaden, 1995. - 1995/Erg.h. 3, S. 1-23	1995	
9	Internationale Entwicklungen im Bereich des New Public Management und der wirkungsorientierten Verwaltungsführung - Übersicht und Vergleich; Haldemann, Theo; In: Wirtschaft und Gesellschaft. - Wien, 1995. - 21. 1995, H. 3, S. 425 - 445	1995	
10	EMP and EMAC Conference - An example of a new learning organisation for innovative technology transfer into small and medium industry; Seitzer, Dieter; In: Educating the engineer for lifelong learning / organisers: University Extension Centre, Vienna Univ. of Technology ... Eds.: Francesco Maffioli .... - Vienna, 1996. - S. 363-	1996	YES
11	CONFERENCE ADDRESS: 'Multi-organisation partnerships and learning for growth' Lloyd, David A.; In: Public and private sector partnerships / edited by Luiz Montanheiro .... - Sheffield, 1997. - S. 1-	1997	YES
12	Das Gesundheitsfördernde Krankenhaus als Lernende Organisation; Lobnig, Hubert ; Nowak, Peter ; Pelikan, Jürgen M.; In: Gesundheitsförderung - eine Strategie für Krankenhäuser im Umbruch / Alice Grundböck ... (Hg.). - Wien, 1997. - S. 195-	1997	
13	Das Unbewußte im Unternehmen: zur Praxis psychodynamischer Organisationsberatung; LOHMER, Mathias; In: Organisationsentwicklung. - Zürich, 1997. - 16(1997)3, S. 20-30	1997	
14	Experimentarium Wien - ein strategisches Konzept für ein interaktives Zukunftsmuseum (Berichte und Dokumente); Schmee, Josef; In: Wirtschaft und Gesellschaft. - Wien, 1997. - 23. 1997, H. 3, S. 383	1997	
15	Flexible und lernende Organisation. Vom strategischen Management zum Chancenmanagement; Albach, Horst, 1931-; In: Umbruch und Wandel / Carsten P. Claussen .... - München ; Wien, 1997. - S. 321-	1997	

No.	ARTICLES	YEAR	ENGLISH
16	Informationstechnik als Erfolgsfaktor der lernenden Organisation; BONIN, Hinrich E.G.; In: Verwaltung und Management. - Baden-Baden, 1997. - 3(1997)3, S. 155-158	1997	
17	Leistungsmessung und Erfolgsmaßstäbe im öffentlichen Sektor; Rossmann, Bruno; In: Wirtschaft und Gesellschaft. - Wien, 1997. - 23. 1997, H. 2, S. 171	1997	
18	Technologieprognosen und Technologiepolitik; Tichy, Gunther; In: Wirtschaft und Gesellschaft. - Wien, 1997. - 23. 1997, H. 2, S. 171	1997	
19	Towards a Learning Organisation: A Combination of Reengineering and SSM; Petkov, D. ; Petkova, O.; In: IDIMT'97 / Susanne Hofer ... (eds.). - Wien [u.a.], 1997. - S. 95-	1997	YES
20	Wie läßt sich eine "Lernende Verwaltung" etablieren?; HAßELMANN, Uwe ; KÖNIG, Rainer; In: Innovative Verwaltung. - Düsseldorf, 1997. - 1997/4, S. 30-33	1997	
21	Experimentierende Evaluation und Lernende Organisation; Scherrer, Wennemar; In: Experimentierende Evaluation. - Weinheim [u.a.], 1998. - S. 9 - 10	1998	
22	Lernende Organisation und Experimentierende Evaluation; Heiner, Maja; In: Experimentierende Evaluation. - Weinheim [u.a.], 1998. - S. 11 - 53	1998	
23	Towards a learning organization: making developmental agencies more participatory from the inside; In: Who changes?. - London, 1998. - S. 145 - 152	1998	YES
24	Von der Bürokratie zur lernfähigen Organisation; EHLERS, Ulrich; In: Verwaltung und Management. - Baden-Baden, 1998. - 4(1998)1; S. 32-35	1998	
25	Flexible Beschäftigte - ein neuer ArbeitnehmerInnentypus?: Betriebliche Flexibilisierung im Spannungsfeld zwischen Anpassungsleistung an restriktive Arbeitsbedingungen und neuen Qualifikationsanforderungen; Krenn, Manfred; In: Wirtschaft und Gesellschaft. - Wien, 1999. - 25. 1999, H. 1, S. 71	1999	
26	Institutionen und technischer Fortschritt: Rezension von: Maxine Berg, Kristine Bruland (Hrsg.), Technological Revolutions in Europe. Historical Perspectives, Edward Elgar, Cheltenham 1998, 352 Seiten ; Butschek, Felix; In: Wirtschaft und Gesellschaft. - Wien, 1999. - 25. 1999, H. 2, S. 243	1999	
27	Action Learning - The Cornerstone for Building a Learning Organization; Marquart, Michael J.; In: Führungsstärke oder Charisma? / Rudolf O. Zucha (Hrsg.). - Frankfurt am Main ; Wien [u.a.], 2000. - S. 163-	2000	YES
28	Lebenslanges Lernen in Österreich - Ansätze und Strategien im Lichte neuerer Forschung; Lassnigg, Lorenz; In: Wirtschaft und Gesellschaft. - Wien, 2000. - 26. 2000, H. 2, S. 233 - 260	2000	
29	Regionale Innovationssysteme im europäischen Vergleich: Ergebnisse des REGIS-Projekts; Tödtling, Franz; Kaufmann, Alexander; In: Wirtschaft und Gesellschaft. - Wien, 2000. - 26. 2000, H. 3, S. 425 - 444	2000	
30	Designing and Using a Course in Organization Design to Facilitate Corporate Learning in the Online Environment; Gibbons, Tracy C.; Brenowitz, Randi S.; In: Handbook of online learning / ed. by Kjell Erik Rudestam and Judith Schoenholtz-Read. - London, 2002. - S. 355-	2002	YES
31	Ist die 'europäische Beschäftigungsstrategie' nach fünf Jahren am Ende?: Zur Evaluierung des Luxemburg-Prozesses 1998-2002 (Teil 1); Schweighofer, Johannes; In: Wirtschaft und Gesellschaft. - Wien, 2002. - 28. 2002, H. 4, S. 489	2002	
32	Steps towards a New International Financial Architecture (Kommentar); Bhaduri, Amit; In: Wirtschaft und Gesellschaft. - Wien, 2002. - 28. 2002, H. 4, S. 573	2002	YES
33	Den Schwung verloren: Österreichs Wirtschaftsentwicklung 1750-1830 : Rezension von: Hermann Freudenberger, Lost Momentum. Austrian Economic Development 1750s-1830s, Böhlau Verlag, Wien u.a. 2003, 301 Seiten; Mesch, Michael; In: Wirtschaft und Gesellschaft. - Wien, 2003. - 29. 2003, H. 3, S. 485	2003	
34	Die Bibliothek als lernende Organisation: Das Fortbildungskonzept der Stadtbibliothek Freiburg; Kraß, Ulrike; In: Die Bibliothek zwischen Autor und Leser / hrsg. von Hannelore Benkert .... - Frankfurt am Main, 2003. - S. 348-	2003	
35	Neue Lernkultur mit e-learning; Kleestorfer, Erika; In: Organisationsentwicklung, 2003. - 2003/1, S. 17-23	2003	
36	Ausländische Direktinvestitionen: Segen oder Fluch? Zur Rolle von Direktinvestitionen für die wirtschaftliche Entwicklung mittelosteuropäischer EU-Beitrittsländer; Zschiedrich, Harald; In: Wirtschaft und Gesellschaft. - Wien, 2004. - 30. 2004, H. 1, S. 45	2004	
37	Lernende Organisation, Wissensmanagement und Lernkulturentwicklung - schöne Worte oder mehr?: Überlegungen aus organisationstheoretischer Sicht; Wilkesmann, Uwe; In: Zeitschrift für Berufs- und Wirtschaftspädagogik. - Stuttgart, 2004. - 100. 2004,3, S. [383] - 397	2004	
38	Routine in der wissenschaftlichen Weiterbildung?! E-Learning im Master-Studiengang Organization Studies; Oelker, Birgit; Asselmeyer, Herbert; Wolff, Stephan; In: Campus 2004 / Doris Carstensen ; Beate Barrios (Hrsg.). - Münster [u.a.], 2004. - S. 416-	2004	
39	The changing organization of spatial planning in Vienna: learning lessons from the organisation of planning in the UK in the context of the shift from government to governance?; Hamedinger, Alexander, 1968-; Aus: EURA/UUA Conference "City Futures", Chicago, Ill., 2004	2004	YES
40	Vom Leidbild zum Leitbild: Fachbereiche als Lernende Organisation; Jungkind, Wilfried, 1954- ; Willems, Christian; In: Kompetenzen in der Hochschullehre. - Rinteln, 2005. - S. 366 - 393	2005	
41	A classification scheme to determine medical necessity: A knowledge organization global learning application; Pajarillo, Edmund JY; In: Knowledge organization for a global learning society / [International Society for Knowledge Organization, ISKO]. Ed. by Gerhard Budin .... - Würzburg, 2006. - S. 339-348-	2006	YES
42	The Global Learning Society and the Iterative Relationship between Theory and Practice in Knowledge Organization Systems; Beghtol, Clare; In: Knowledge organization for a global learning society / [International Society for Knowledge Organization, ISKO]. Ed. by Gerhard Budin .... - Würzburg, 2006. - S. 159-164-	2006	YES
43	Converging agendas in education policy - Lifelong learning in the World Bank and the International Labour Organization; Jakobi, Anja P.; In: New arenas of education governance. - Basingstoke, 2007. - S. 95 - 114	2007	YES

No.	ARTICLES	YEAR	ENGLISH
44	Die Europäische Union als Wissensgesellschaft; Hödl, Erich; In: Wirtschaft und Gesellschaft. - Wien, 2007. - 33. 2007, H. 4, S. 529	2007	
45	Gender Mainstreaming als Organisationsentwicklung und Lernprozess. Vom politischen Auftrag zur gemeinsamen Vision einer Organisation; Paseka, Angelika, 1957-; In: Gender Mainstreaming und Weiterbildung - Organisationsentwicklung durch Potentialentwicklung. - Leverkusen, 2007. - S. [85] - 100	2007	
46	Sind Cluster lernfähig?: Rezension von: Christian Hartmann, Die Lernfähigkeit von Clustern. Eine theoretische und empirische Betrachtung, Leykam, Graz 2006, 246 Seiten ; Kirisits, Marcel; In: Wirtschaft und Gesellschaft. - Wien, 2007. - 33. 2007, H. 3, S. 459	2007	
47	Das lernende Unternehmen: Test; Garvin, David A.; Edmondson, Amy C.; Gino, Francesca; In: Harvard Business Manager. - Hamburg, 2008. - 2008, 11, S. 76 - 88	2008	
48	Evaluation und organisationale Lernprozesse; Rech, Jörg; In: Zeitschrift für Sozialmanagement. - Weimar, 2008. - 6(2008)1, S. 69 - 91	2008	
49	Incompatibility in Knowledge-Organization. On Productive Negativisms in Learning Processes; Mitgutsch, Konstantin; In: Kompatibilität, Medien und Ethik in der Wissensorganisation / hrsg. von H. Peter Ohly .... - Würzburg, 2008. - S. 194- ;	2008	YES
50	Überbetriebliche Arbeitsteilung: Auslagerung von Unternehmensfunktionen und die Folgen für Arbeit und Beschäftigung; Flecker, Jörg ; Holtgrewe, Ursula; In: Wirtschaft und Gesellschaft. - Wien, 2008. - 34. 2008, H. 3, S. 307	2008	
51	Wider den Appell. Zum Lissabon-Prozess und andere Anmerkungen, Kommentar; Schibany, Andreas; In: Wirtschaft und Gesellschaft. - Wien, 2008. - 34. 2008, H. 4, S. 563	2008	
52	Herausforderungen an die „Lernende Organisation" in der Wissensgesellschaft (2001); Willke, Helmut; Kalcsics, Monika; In: Eine Konferenz der anderen Art / Hrsg. v. Stefan Vater. Unter Mitarb. v. Laura R. Rosinger. - Frankfurt am Main ; Wien [u.a.], 2009. - S. 104-	2009	
53	Organisationskultur und lernende Organisation; Kasper, Helmut; Loisch, Ursula ; Mühlbacher, Jürgen ; Müller, Barbara; In: Personalmanagement, Führung, Organisation / hrsg. von Helmut Kasper; Wolfgang Mayrhofer. - Wien, 2009. - S. 309-	2009	
54	Die Bedeutung der Evaluation polizeilicher Einsätze für die Bundespolizei als lernende Organisation; Riedl, Johann; In: FH-Studiengang Polizeiliche Führung / hrsg. von Karlheinz Dudek, Karl-Heinz Grundböck und Gerald Haider. - Linz, 2010. - S. 291-	2010	
55	Integrating Motivational Aspects into the Design of Informal Learning Support in Organizations; Kunzmann, C.; Schmidt, A.; Braun, V.; Czech, D.; Fletschinger, B.; Kohler, S.; Lüber, V.; In: Proceedings of I-KNOW '09 / 9th International Conference on Knowledge Management and Knowledge Technologies. Eds. I-KNOW: Klaus Tochtermann .... - Graz, [2010]. - S. 37-	2010	YES
56	Neue Politikfelder für eine Renaissance der Arbeitszeitpolitik. Eine Annäherung mit Hilfe internationaler Beispiele; Schönauer, Annika; Flecker, Jörg; In: Wirtschaft und Gesellschaft. - Wien, 2010. - 36. 2010, H. 3, S. 349-374	2010	
57	Learning Organisations: Learning to Learn – The Learning Organisation in Theory and Practice; Shevitz, Susan L.; In: International handbook of Jewish education / ed. by Helena Miller .... - Dordrecht [u.a.], 2011. - S. 843-	2011	YES
58	Die Arbeitsmarktpolitik als überforderter Problemlöser der Bildungspolitik; Kirisits Marcel; In: Wirtschaft und Gesellschaft. - Wien, 2011. - 37. 2011, H. 2, S. 335-345	2011	
59	Wiedereinstieg & Weiterbildung. Weiterbildungsmotivation und Realisierungschancen von (formal) gering qualifizierten Wiedereinsteigerinnen; Leitner, Andrea; Latcheva, Rossalina; Wroblewski, Angela; In: Wirtschaft und Gesellschaft. - Wien, 2011. - 37. 2011 H. 2, S. 315-334	2011	
60	In zehn Schritten zu einem Leitbild der 3. Generation: Ziele ; Strunk, Andreas; In: Sozialwirtschaft. - Baden-Baden, 2012. - 22(2012), 6, S. 34 - 35	2012	
61	A Learning Organization? Die britische Armee und ihre Lehren aus den Counterinsurgency-Einsätzen in Afghanistan und im Irak; Strohn, Matthias; In: Auftrag Auslandseinsatz / im Auftr. d. Militärgeschichtl. Forschungsamtes hrsg. v. Bernhard Chiari. - Freiburg i. Br.; Wien [u.a.], 2012. - S. 285-	2012	
62	Learning in organisations: The case for a code of ethics in education; Zuzeviciute, Vaiva; Bukantaite, Daiva; Kraskauskaite, Dalia; In: Decoding the meanings of learning at work in Asia and Europe / Lynne Chisholm ... (eds.). - Innsbruck, 2012. - S. 107-	2012	YES
63	Connection between individuals and organisations through workplace learning; Hirata, Kenji; Ibuchi, Nanae; In: Decoding the meanings of learning at work in Asia and Europe / Lynne Chisholm ... (eds.). - Innsbruck, 2012. - S. 55-	2012	YES
64	Von Sammelnden und Suchenden: Die PH Salzburg beschreitet neue Wege in der LehrerInnenbildung und verteht sich dabei selber als lernende Organisation; Giger, Silvia; In: PH.Script. - Salzburg, 2013. - 6.2013, S. 3 - 6. - (PH.Script)	2013	
65	Knowledge Organization for Learning; Soergel, Dagobert; In: Knowledge organization in the 21st century / organized by the Polish Chapter of ISKO and the Institute of Information and Library Science, Jagiellonian University in Kraków. Ed. by Wiesław Babik. - Würzburg, 2014. - S. 22-	2014	YES
66	Knowledge organization in a digital learning environment in the experiences of pedagogy students; Kamińska, Aneta; Pulak, Irena; In: Knowledge organization in the 21st century / organized by the Polish Chapter of ISKO and the Institute of Information and Library Science, Jagiellonian University in Kraków. Ed. by Wiesław Babik. - Würzburg, 2014. - S. 532-	2014	YES
67	Similarities and Differences of Health-Promoting Leadership and Transformational Leadership; Dunkl, Anita; Jiménez, Paul; Šarotar Žižek, Simona; Milfelner, Borut; Kallus, Wolfgang K.; In: Nase Gospodarstvo, 2015. - 61 (2015), 4, S. 3-13. - ISSN 2385-8052 - De Gruyter, 2015	2015	YES
68	Schmerzhafte Offenheit; Kegan, Robert; In: Harvard Business Manager. - Hamburg, 2015. - 2015, Spezial 2015, S. 64 - 75	2015	
69	Stärken stärken: Professionalisierung durch Ressourcenorientierung: eine Potenzialanalyse an Praxisschulen; Ctibor-Petrik, Susanne [VerfasserIn]; Grössing, Helga [VerfasserIn]; Gullner, Barbara [VerfasserIn]; Hofmann-Reiter, Sabine [VerfasserIn]; Kulhanek-Wehlend, Gabriele [VerfasserIn]; In: Forschungsperspektiven / PH Wien, Wien, 2017, 9 ; Seite [119] - 141 .	2017	
70	Wie eine Lernende Organisation lernt: Erfahrungen aus einem Ausbildungsprojekt; Hirnschal, Ernst [VerfasserIn]; In: Unternehmenskultur in der Praxis, Wiesbaden, [2018], S. 439- ; 2018	2018	
71	Eine Justizvollzugsanstalt als lernende Organisation; Koop, Gerd [VerfasserIn]; In: Das Gefängnis auf dem Prüfstand / Bernd Maelicke, Sefan Suhlig (Hrsg.), Wiesbaden: Springer ; 2018, Seite 457- . - ; 2018	2018	
	TOTAL		**23**

Table 4: The content analysis of Serbian articles covering the learning organization concept

No.	ARTICLES	YEAR	POSITIVE	NEGATIVE	NEUTRAL	THEORETICAL	PRACTICAL
1	Korporativni univerziteti kao savremena paradigma profesionalnog razvoja zaposlenih. Đekić Marija, Ravić Nenad. Megatrend revija, vol. 15, iss. 2, pp. 159-176, 2018	2018			YES	YES	
2	Sociološki aspekti uloge menadžmenta pri promenama u obrazovanju. Vidaković Mira. Ekonomija: teorija i praksa, vol. 11, iss. 4, pp. 47-65, 2018	2018			YES	YES	
3	Značaj kompatibilnosti sistema upravljanja znanjem sa savremenim modelima elektronskog učenja u organizacijama koje uče. Švonja Julija D. Poslovna ekonomija, vol. 12, iss. 1, pp. 238-255, 2018	2018	YES			YES	
4	Dinamika odnosa upravljanja znanjem i inovativnosti kao relevantnih faktora organizacione efikasnosti. Kolarić Borislav. Ekonomski izazovi, vol. 6, br. 12, str. 93-104, 2017	2017			YES	YES	
5	Organizaciono učenje - izazovi hotelskog sektora Srbije. Jovičić-Vuković Ana, Gagić Snježana, Erdeji Irma. Poslovna ekonomija, vol. 11, br. 2, str. 133-149, 2017	2017	YES			YES	
6	Percepcija i stavovi studenata prema obrazovanju na daljinu. Đurica Nina, Soleša Dragan. Ekonomija: teorija i praksa, vol. 10, br. 3, str. 1-15, 2017	2017			YES	YES	
7	Triple E - primer evropske akreditacije kvaliteta kvalifikacija u bankarstvu. Sredojević Slađana. Bankarstvo, vol. 46, br. 3, str. 112-129, 2017	2017			YES	YES	
8	Organizational factors, organizational culture, job satisfaction and entrepreneurial orientation in public administration. Karyotakis Konstantinos M., Moustakis Vassilis S. The European Journal of Applied Economics, vol. 13, br. 1, str. 47-59, 2016	2016			YES	YES	YES
9	Storiteling kao savremeni instrument izgradnje informaciono - bezbednosne korporativne kulture. Arsenijević Olja, Trivan Dragan, Milošević Milan. Ekonomika, vol. 62, br. 4, str. 105-114, 2016	2016			YES	YES	
10	Veličina tržišta kao determinanta nacionalne konkurentnosti Republike Srbije. Stanković Ljiljana, Popović Ana. Marketing, vol. 47, br. 3, str. 191-205, 2016	2016			YES	YES	
11	Korporativno preduzetništvo, organizaciono učenje i implementacija znanja. Erić-Nielsen Jelena. Ekonomski horizonti, vol. 17, br. 3, str. 203-217, 2015	2015			YES	YES	
12	Organizacije bazirane na upravljanju znanjem. Manev Gjorgji, Jakimovski Jorde. Škola biznisa, br. 1, str. 34-46, 2015	2015	YES			YES	
13	Odlike menadžmenta u savremenim kompanijama. Marković Jovica, Pavlović Marko. Ekonomija: teorija i praksa, vol. 7, br. 2, str. 86-113, 2014	2014			YES	YES	
14	Znanje i intelektualni kapital - izvori konkurentske prednosti srpske poljoprivrede. Vasiljević Zorica, Savić Bojan. Ekonomski vidici, vol. 19, br. 1, str. 11-24, 2014	2014	YES			YES	
15	Komparativna analiza konkurentnosti sektora malih i srednjih preduzeća Republike Srbije i Bosne i Hercegovine. Beganović Admir I. Poslovna ekonomija, vol. 7, br. 2, str. 151-174, 2013	2013			YES	YES	
16	Teritorijalni inovacioni sistemi i njihov uticaj na privredni razvoj. Novaković Igor. Ekonomika, vol. 59, br. 1, str. 162-169, 2013	2013			YES	YES	
17	Učenje u virtuelnoj organizaciji. Micić Radmila. Ekonomika, vol. 59, br. 4, str. 56-65, 2013	2013	YES			YES	
18	Evolucija i razvoj inovativne organizacije. Đorđević Branislav. Ekonomika, vol. 58, br. 1, str. 1-10, 2012	2012			YES	YES	
19	Izbor merila i optimalna vrednost inovacija u Srbiji. Marković Sanja, Arsić Ljiljana, Micić Radmila. Inovacije i razvoj, br. 1, str. 27-38, 2012	2012			YES	YES	
20	Jačanje kompetencija ljudskih resursa u cilju smanjenja nezaposlenosti. Urošević Snežana, Pejčić Bojana, Kokeza Gordana. Ekonomski vidici, vol. 17, br. 3, str. 421-436, 2012	2012	YES				YES
21	Kontinualno učenje, poboljšanje i inovacije - case study: ENTEL. Raković Radoslav. Kvalitet i izvrsnost, vol. 1, br. 5-6, str. 23-27, 2012	2012			YES		YES
22	Učeća sportska organizacija kao izraz novog preduzetništva u sportu. Nešić Milan, Nešić Branimir. Poslovna ekonomija, vol. 6, br. 1, str. 443-462, 2012	2012	YES			YES	
23	Strategija smanjenja troškova uvođenjem e-učenja u visokoškolskim obrazovnim institucijama. Ilić Biljana, Jovanović Violeta. Serbian Journal of Management, vol. 7, br. 1, str. 131-148, 2012	2012	YES			YES	
24	Uticaj organizacione kulture na organizacionu strukturu. Micić Radmila. Ekonomika, vol. 58, br. 2, str. 59-67, 2012	2012	YES				YES
25	Strategija smanjenja troškova uvođenjem e-učenja u visokoškolskim obrazovnim institucijama. Ilić Biljana, Jovanović Violeta. Serbian Journal of Management, vol. 7, br. 1, str. 131-148, 2012	2012			YES		YES
26	Brendiranje i korporativna kultura. Claessens Roger. Bankarstvo, vol. 40, br. 7-8, str. 104-121, 2011	2011			YES	YES	
27	Premošćavanje jaza učenja na tržištu visokog obrazovanja - e-learning i državna subvencija. Adel Ben Youssef, Le Texier Thomas, Ludovic Ragni. Economic Analysis, vol. 45, br. 3-4, str. 1-11, 2011	2011			YES	YES	
28	Procena veština i znanja stečenih tokom konsalting intervencije. Mihailović Branko, Simonović Zoran, Paraušić Vesna. Ekonomika, vol. 57, br. 2, str. 102-111, 2011	2011			YES	YES	
29	Promene sistema ljudskih resursa pri realizaciji menadžmenta poslovnih procesa. Zakić Nebojša, Vukotić Svetlana. Ekonomika, vol. 57, br. 2, str. 137-145, 2011	2011			YES	YES	
30	Promene tradicionalne ka novoj paradigmi menadžmenta. Ničić Milica, Miletić Slavomir, Jovanović Duško. Ekonomika, vol. 57, br. 3, str. 74-83, 2011	2011	YES			YES	

No.	ARTICLES	YEAR	POSITIVE	NEGATIVE	NEUTRAL	THEORETICAL	PRACTICAL
31	Uticaj faktora organizacionog ponašanja i organizacione strukture na produktivnost zaposlenih u preduzeću Kraš. Đokić Aleksandar, Macura Rajko, Vujović Slavoljub. Ekonomika, vol. 57, br. 3, str. 15-24, 2011	2011			YES		YES
32	Uticaj nacionalnih kultura na stil liderstva u internacionalnim organizacijama. Krasulja Nevena, Gujanica-Radojević Ivana, Cvetanović Dušan S.. Ekonomika, vol. 57, br. 3, str. 33-47, 2011	2011	YES			YES	
33	Znanje i perspektiva organizacionog učenja kao faktor inovativnosti i unapređenja performansi lanca snabdevanja. Cvetković Miodrag. Poslovna politika, vol. 40, br. 1-2, str. 58-62, 2011	2011	YES			YES	
34	Liderstvo u organizaciji koja uči. Micić Radmila. Ekonomika, vol. 56, br. 3, str. 45-54, 2010	2010	YES			YES	
35	Menadžment znanja. Stanojević Dražena. Anali Ekonomskog fakulteta u Subotici, br. 23, str. 207-217, 2010	2010	YES			YES	
36	Model organizacije koja uči u radiodifuznoj industriji Republike Iran. Najafbagy Reza, Doroudi Homa. Serbian Journal of Management, vol. 5, br. 2, str. 213-225, 2010	2010	YES				YES
37	Obrazovne institucije kao organizacije koje uče - potreba za promenom paradigme. Zovko Vatroslav, Šimović Vladimir, Nježić Zoran. Anali Ekonomskog fakulteta u Subotici, br. 23, str. 15-21, 2010	2010	YES			YES	
38	Strategic innovation throughout reorganization of existing business-production model in the context of developing complex ICT structure with high standards. Šimović Vladimir, Nježić Zoran, Zovko Vatroslav. Strategic Management, vol. 15, br. 2, str. 32-38, 2010	2010			YES	YES	
39	Unapređenje poslovne konkurentnosti razvojem klastera. Stanković Ljiljana, Đukić Suzana. Ekonomika preduzeća, vol. 58, br. 3-4, str. 131-139, 2010	2010			YES	YES	
40	Implications of the balanced scorecard on organizational behaviour. Janićijević Nebojša. Strategic Management, vol. 14, br. 1, str. 3-15, 2009	2009			YES	YES	
41	Knowledge management and intellectual capital management coupled to quality management system lead to business success. Živojinović Stevan, Stanimirović Andrej. International Journal for Quality Research, vol. 3, br. 1, str. 17-25, 2009	2009	YES			YES	
42	Menadžment, marketing koncept i intelektualni kapital. Mihajlović Dragan, Trandafilović Igor, Vidanović Marija. Marketing, vol. 40, br. 1, str. 45-49, 2009	2009	YES			YES	
43	Razvoj ljudskih resursa kao strateški faktor konkurentske prednosti preduzeća. Vemić-Đurković Jelena. Facta universitatis - series: Economics and Organization, vol. 6, br. 1, str. 59-67, 2009	2009	YES			YES	
44	Menadžment ljudskim resursima kao deo poslovne izvrsnosti. Petronijević Miloš. Kvalitet, vol. 18, br. 11-12, str. 68-72, 2008	2008			YES	YES	
45	Pravo na grešku - učeća organizacija prema zahtevima standarda ISO 9004:2008. Kukrika Milan. Kvalitet, vol. 18, br. 9-10, str. 51-52, 2008	2008	YES			YES	
46	Procesni pristup i demokratski menadžment. Perović Milan J.. Kvalitet, vol. 18, br. 7-8, str. 9-12, 2008	2008	YES			YES	
47	Kreiranje učešća organizacije kao jedan od savremenih izazova menadžmenta. Đukić Maja. Ekonomika, vol. 53, br. 5-6, str. 61-67, 2007	2007	YES			YES	
48	Menadžment organizacije u lancu snabdevanja sa dinamičnim efektom organizacionih pravila. Vodopivec Robert, Krstov Ljupčo. Facta universitatis - series: Economics and Organization, vol. 4, br. 2, str. 91-107, 2007	2007	YES			YES	
49	Obuka i razvoj zaposlenih i učeća organizacija. Vemić Jelena. Facta universitatis - series: Economics and Organization, vol. 4, br. 2, str. 209-216, 2007	2007	YES			YES	
50	Ocenjivanje upravljanja operativnim rizicima u bankarstvu koji potiču od informacionih i komunikacionih tehnologija. Đurković Jovica, Ristić Živan, Trninić Jelica, Prokić Mirjana. Strategijski menadžment, vol. 12, br. 3-4, str. 2-5, 2007	2007			YES	YES	
51	Upravljanje rizicima implementacije koncepta Six Sigma. Anđelković-Pešić Marija. Strategijski menadžment, vol. 12, br. 3-4, str. 140-143, 2007	2007			YES	YES	
52	Uticaji strategijskog reagovanja na rizike - simulacija tržišnog učešća i pozicioniranja. Jovović Radislav. Strategijski menadžment, vol. 12, br. 3-4, str. 92-97, 2007	2007			YES	YES	
53	Human resources and high performance in Romanian companies. Preconceptions and realities. Abrudan-Pop Denisa. Strategijski menadžment, vol. 11, br. 1-2, str. 70-75, 2006	2006			YES	YES	
54	Kreiranje učeće organizacije kao jedan od savremenih izazova menadžmenta. Đukić Maja. Poslovna politika, vol. 35, br. 9, str. 62-65, 2006	2006	YES			YES	
55	New dimensions of management in Romanian organizations: High performance organizations. Abrudan-Pop D., Novac E.. Serbian Journal of Management, vol. 1, br. 2, str. 115-121, 2006	2006	YES			YES	
56	Permanentni razvoj ljudskih resursa - uslov razvoja preduzeća. Radovanović Vladimir. Kvalitet, vol. 16, br. 9-10, str. 95-97, 2006	2006			YES	YES	
57	Poslovno-tehnološke osnove menadžmenta znanja. Banjanin Milorad K., Petrović Latinka. Poslovna politika, vol. 35, br. 4, str. 58-62, 2006	2006	YES			YES	
58	Europa znanja - organizacija koja uči i sustav upravljanja kvalitetom. Avelini-Holjevac Ivanka. Kvalitet, vol. 15, br. 3-4, str. 38-41, 2005	2005	YES			YES	
59	Praktična primena modela izvrsnosti. Trajković Vladimir. Kvalitet, vol. 15, br. 5-6, str. 40-42, 2005	2005			YES	YES	
60	QMS/TQM/CIE novi pristup upravljanju procesima. Perović Milan J.. Kvalitet, vol. 15, br. 11-12, str. 35-38, 2005	2005			YES	YES	
61	Razvoj zaposlenih kao osnova organizacionog razvoja. Pržulj Živka. Strategijski menadžment, vol. 10, br. 1-2, str. 65-68, 2005	2005			YES	YES	

No.	ARTICLES	YEAR	POSITIVE	NEGATIVE	NEUTRAL	THEORETICAL	PRACTICAL
62	Uloga i značaj učenja u procesu strategijskog menadžmenta. Janošević Stevo. Strategijski menadžment, vol. 10, br. 1-2, str. 3-7, 2005	2005	YES			YES	
63	Usklađivanje nematerijalne aktive s internim procesima i strategijom preduzeća. Jovović Radislav. Strategijski menadžment, vol. 10, br. 1-2, str. 105-110, 2005	2005	YES			YES	
64	Politika bezbednosti rada u zdravstvenim ustanovama - poseban osvrt na bezbedan rad MRI centara. Jakovljević Biljana, Stevanović Jasmina, Pendić Rajko, Jakovljević Bojana, Pendić Zoran. Kvalitet, vol. 14, br. 9-10, str. 86-90, 2004	2004	YES			YES	
65	Učenje na daljinu i nove mogućnosti obrazovanja za kvalitet zaposlenih. Papić Ljubiša, Ristić Miroslava R., Milunović Sida. Kvalitet, vol. 14, br. 1-2, str. 93-96, 2004	2004			YES	YES	
66	Utjecaj zainteresiranih strana na uspješnost organizacije. Mileković Rudolf. Kvalitet, vol. 14, br. 11-12, str. 50-53, 2004	2004			YES	YES	
67	Intelektualni kapital i uravnoteženi pokazatelji uspeha. Marković Nenad. Kvalitet, vol. 13, br. 1-2, str. 88-91, 2003	2003	YES			YES	
68	Obuka i usavršavanje zaposlenih kao elemenat strategije razvoja organizacije. Zubanov Violeta. Strategijski menadžment, vol. 7, br. 4, str. 99-102, 2003	2003	YES			YES	
69	Osnova znanja kompanije. Orlić Ranko. Poslovna politika, vol. 32, br. 6, str. 45-48, 2003	2003	YES			YES	
70	Kombinovanje modela dobivenih tehnikama data mining. Ristić Živan, Balaban Neđo. Strategijski menadžment, vol. 6, br. 4, str. 14-20, 2002	2002			YES	YES	
71	Regionalna strategija integracije realnog sektora u EU - želje, mogućnosti i iluzije - slučaj Vojvodine. Adžić Sofija. Ekonomist, vol. 55, br. 3, str. 93-103, 2002	2002			YES	YES	
72	Značaj nove paradigme menadžmenta. Đorđević Branislav. Ekonomski pogledi, vol. 2, br. 1-2, str. 15-30, 2002	2002	YES				YES
73	Neke dimenzije i izazovi upravljanja promenama u procesu transformacije preduzeća. Janošević Stevo. Strategijski menadžment, vol. 5, br. 1, str. 56-60, 2001	2001			YES	YES	
74	Znanje u funkciji strategije organizacije koja uči. Đorđević Branislav. Strategijski menadžment, vol. 4, br. 2, str. 39-44, 2000	2000	YES			YES	
	TOTAL		**36**	**0**	**38**	**67**	**8**

Further, with a positive trend in publishing new papers on the learning organization concept in Austrian and Serbian academic journals, the logical next step is to test the quality of these papers. Unfortunately, the much larger Austrian database does not provide abstracts or full text for all articles. However, as the Serbian database does provide abstracts and full text, the next step was a content analysis of all Serbian papers' abstracts, in order to determine two issues (Table 4). The first issue was to discover if a critical approach is addressed by Serbian scholars. The answer on that issue would be the numbers of articles which presented the learning organization as an obsolete concept. The second issue is to determine how many articles had the practical benefit of the Serbian business community.

Of 74 articles in total, two articles (published in English) are focused on Romania, one on Greece (also published in English), one (published in Serbian) on Iran, not Serbia, and two articles were published by a Belgian and a French author, but in the Serbian language. With the aim to cover all articles which contribute to the development of the management science in Serbia, all these articles were included in the analysis. The largest number of articles were published in the journals Kvalitet (12), Ekonomika (12), and Strategijski menadžment (11). There is no single author who excels in the observed subject and noted is a maximum of three hits per author.

First, the articles were sorted according to the author's attitude about the learning organization: either an affirmative attitude (positive articles) or a critical attitude (negative articles). However, not all of these articles were exclusively devoted to the learning organization but also to other aspects of knowledge management. Therefore, a number of articles that have a neutral attitude toward the learning organization concept were discovered. From the abstracts of these articles, one could not determine whether the authors' attitudes about the learning organization concept were positive or negative. As can be seen from the table (Table 4), the content analysis of the abstracts of all articles showed that almost half of all articles positively evaluated the concept of the learning organization, 36 of 74, or 49%. There were 38 articles that have neither a positive nor a negative attitude. Finally, not even one article had a critical attitude toward the learning organization.

Second, the articles were sorted as to whether they are only theoretical in nature, or whether they include a business case and therefore are more practically applicable. The number of articles that cover only the theoretical aspects

of the researched subject is extremely high, 67 of 74 or even 90%. It should be noted (Table 4) that four of the eight remaining practical articles had an affirmative approach to the subject of this study, the learning organization.

Discussion of results and conclusion

The empirical research of the Serbian and Austrian management journal papers provided the evidence that learning organization is recognized as a fad among their respective academic communities. Shapes of the curves for different management fads are neither identical nor symmetrical and vary between countries. The peak of a typical bell-shaped curve of a management fad in Austria was in the year 1997, but in Serbia the peak was in the late years of 2011 and 2012. However, although the curve shapes are different, both Austrian and Serbian long trends in publishing the papers on learning organization are positive. Therefore, it could be noted that the learning organization, although declared as a fad, is not fading away. Why is Serbia lagging in the academic research more than Austria? 32 percent of Austrian journals were published in English, which is a three times higher result compared to the Serbian 11 percent. That could serve as a good indicator of a tighter connection between Austrian i.e., German speaking academics and the world dominated English speaking academic researchers. English is a world-leading academic language, and maintaining a tight connection with the English speaking academic community, especially publishing in the English language, is the *conditio sine qua non* for the non-English speaking academics for staying on track with the world's leading research.

The critics of the learning organization concept in the English language journals have been present for more than two decades, but Serbian authors still glorify that concept. It was discovered that not even one article from Serbia had a critical attitude toward the learning organization. Further, the content analysis of the Serbian articles detected a small number of practical articles. Why does Serbia display this trend of positive reception? Maybe there is a link between Serbia's bad economic situation and Serbia's weak academic research in management? The gap in education achievement is definitely pushing downward Serbia's long-term growth [22]. Serbia has been in the economic transition since 1989, but still, Serbian current GDP is only two-thirds of the GDP from the beginning of the transition [9]. With a weak GDP, Serbia is not able to finance its researchers as richer countries are able to do. Moreover, as Serbian Center for Democracy [7] warns, Serbia finances its science with just 0.35% of its small GDP, opposite to EU's 1.8% or USA's 3%. Finance is more important than romance for the science, but not only money drives the world. Serbian scholars should abandon the failed concepts as the learning organization one, and they should help their society to establish a better business environment, based on the contemporary proven academic findings.

However, there is one limitation of this research. SCOPUS search, using the same words as in this research, has resulted in 641 papers in Austria and 152 papers in Serbia only for the year 2018. It seems that after all the learning organization (LO) is not a fad that is fading away. Obviously, the LO concept found its extension in other scientific disciplines. Finally, organizational learning and knowledge creation deserve attention. It may be of central importance in efforts to manage change and achieve better performance in organizations. The idea of learning merits attention and such attention should overcome the limitations of the idea of the learning organization. Business organizations are complex and intricate systems, very vulnerable to the impacts of uncertain and unpredictable changes in the turbulent environment of today. Simplified recipes, such as prescriptive theories as a learning organization, are not helpful to modern organizations.

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COSTING SYSTEM AS AN INSTRUMENT FOR ENHANCING ENVIRONMENTAL PERFORMANCE OF ENTITIES IN AGRIBUSINESS

Obračun troškova kao instrument unapređenja ekoloških performansi entiteta u agrobiznisu

Abstract

Acquiring and preserving competitive advantage requires companies to closely monitor and analyze their business costs and take timely corrective actions. The fact that business sustainability requires the consideration of not only economic aspects, but also the social and environmental dimensions of business, has created the need in cost management to understand the implications of business operations for the broader environment of entities. The greatest number of modern techniques and methods of cost calculation and analysis put primary focus on the costs that arise from the production phase. From the perspective of global competition, taking into consideration the imperative of maintaining sustainable business in the long run, the obtained information is not sufficient for the needs of designing, implementing and revising competitive strategies. This is particularly significant for entities operating in the fields of agriculture and agribusiness, whose activities, as it is well known, have a significant impact on the environment and its degradation. The aim of the paper is to point out the importance of creating cost accounting information that goes beyond the traditionally understood operating costs in order to quantitatively encompass and give a monetary presentation of environmental business aspects, which are very important in a modern business environment for capturing, analyzing, managing and improving the overall performance of an entity. For those purposes, the paper considers true cost accounting and points to the specificity of its application in agribusiness entities.

Keywords: *true cost accounting, environmental management accounting, environmental performance, sustainability, agribusiness sector.*

Sažetak

Sticanje i očuvanje konkurentske prednosti zahteva od preduzeća da pažljivo prate i analiziraju troškove svog poslovanja i blagovremeno preduzimaju korektivne akcije. Okolnost da održivost poslovanja zahteva respektovanje ne samo ekonomskih aspekata, već i socijalnu i ekološku dimenziju poslovanja, iznedrila je potrebu da se u naporima upravljanja troškovima sagledaju implikacije poslovanja na šire okruženje entiteta. Najveći broj savremenih tehnika i metoda obračuna i analize troškova primarni fokus stavljaju na troškove koji nastaju u fazi proizvodnje. Iz perspektive globalne konkurencije i imperativa održivog poslovanja u dugom roku, dobijene informacije nisu dovoljne za potrebe koncipiranja, implementacije i revizije konkurentskih strategija. Ovo je posebno značajno u domenu poslovanja entiteta iz poljoprivrede i agrobiznisa čije aktivnosti, kao što je poznato, imaju značajan uticaj na životnu sredinu i njeno degradiranje. Cilj rada je da ukaže na značaj kreiranja informacija od strane računovodstva troškova koji izlaze izvan okvira tradicionalno shvaćenih troškova poslovanja. Ovo iz razloga kako bi se kvantitativno obuhvatili i monetarno iskazali ekološki aspekti poslovanja, koji u savremenom poslovnom ambijentu imaju izuzetan značaj za potrebe obuhvatanja, analize, upravljanja i unapređenja sveukupnih performansi entiteta. Za navedene potrebe u radu se razmatra „true cost accounting" i ukazuje na specifičnosti primene navedenog koncepta u entitetima u agrobiznisu.

Ključne reči: *true cost accounting, ekološko upravljačko računovodstvo, ekološke performanse, održivost, agrobiznis sektor.*

Introduction

One of the central issues concerning sustainability of modern companies is the issue of environmental implications, i.e. the impact of their activities and products on the environment. Since agriculture and the associated processing industry are seen as one of the main culprits for environmental degradation and the intensification of climate changes, companies in the agricultural and agribusiness sectors have to place a special emphasis on environmental management in their agendas. This is because the business of these entities both directly and indirectly affects the quality of land, water and air. Irrational and irresponsible use of numerous chemicals, such as fertilizers, herbicides and insecticides, the application of which is an integral part of the agricultural production process, as well as greenhouse gas emissions, significantly reduce the quality of land and water resources. That is why it is fully justified to pose the question whether it is possible to ensure unhindered satisfaction of the growing needs of human population in the near future.

The cited negative environmental implications of agricultural activity and related processing industries have economic consequences that are covered by and monitored through numerous environmental indicators and costs. When it comes to costs, it is a category which is not always easy to notice and which has been growing in recent years due to increasingly rigid environmental laws and regulations. In addition, it should be added the activities and campaigns of numerous non-governmental organizations and environmental movements, why all producers aiming at sustainable and competitive business pay considerable attention to the environmental dimension of their business.This is not only because of the significant economic implications for the entity itself, but also because of the imperatives of preserving the environment and achieving the goal of sustainable development of society [34, p. 25].

The aim of this paper is to point out the contemporary costing systems whose implementation can contribute to the improvement of the environmental dimension of the company. In this regard, the paper describes the specifics of true cost accounting whose key feature is that it encompasses environmental costs that traditional cost accounting systems do not recognize.

Environmental management accounting

Companies have a significant impact on the economy and society as a whole, which suggests that sustainable development of society is not possible without sustainable development of companies. The company's contribution to the goal of sustainable development presupposes the existence of adequate information as the starting point for the development of competitive strategies. If such information does not exist, the activities of the company will not be in accordance with the stated objective. Hence, it is necessary to accept and implement the concept of environmental management accounting whose techniques enable the creation of necessary information and the performance of activities based on them, which will not only improve the environmental performance of the company, but also contribute to its sustainable development. Companies disclose environmental information to signal that they detected environmental disturbances [4, p. 347]. The information on environmental performance will not be useful for strategic plans and decisions unless they are closely related to corporate sustainability. This is because corporate sustainability implies not only the sustainable development of a single company, but also its contribution to the sustainable development of the economy and society as a whole [35, p. 114].

Environmental management accounting (EMA) includes internal costs arising from the impact of company's products, services and activities on the environment, i.e. costs borne by the enterprise and included as such in the cost accounting system. External costs that have not acquired internal character are not considered. It is the responsibility of the state and its agencies to integrate these costs into corporate accounts through instruments such as environmental taxes and pollution control. However, the importance of perceiving external environmental costs is enshrined in the fact that they can acquire internal character within a short period of time by means of a specific regulation. In that sense, the management should understand the environmental implications of certain

decisions and actions in order to choose alternatives that create value both for the environment, through the reduction of pollution and reparation of damage incurred, and for the enterprise. According to the IFAC guidelines, environmental management accounting includes [12, p. 17]:

1. Eco-efficiency – reflects the achieved cost savings and their associated contribution to resolving environmental issues;
2. Strategic position – points to the way in which the enterprise incorporates environmental program into its long-term plans and business strategy;
3. Efficiency of compliance with corporate and environmental regulations.

EMA generates information on environmental performance and measures the costs of using resources and associated waste, as well as other environmental costs. It also encompasses and quantitates the amounts of resources and waste, expressing them in units of measurement. As such, EMA can occur in two forms. One of them is monetary environmental management accounting – MEMA, which considers and encompasses the environmental aspects of corporate activities expressed in monetary units and generates information for management purposes, such as deciding to invest in capital projects that improve the environment, cost management, etc. Additionally, MEMA is based on conventional management accounting that has been expanded and adapted to incorporate environmental aspects of corporate activity. For proper cost evaluation, in addition to financial information, management accounting must also collect and process nonfinancial information, such as the type and amount of materials used, the number of labor hours and other costs incurred. Another form of MEMA is used for physical environmental management accounting – PEMA. PEMA is especially focused on the information on the use of energy, water and materials, as well as generated waste and emissions that have a direct impact on the environment [20, pp. 20-21].

According to Bennett et al., the value of environmental management accounting can be recognized in at least three areas [4, pp. 20-21]:

- by directing management's attention to issues in the area of efficiency and effectiveness of environmental management, which contributes to higher quality of decisions;
- external value exists in terms of reducing the impact of business on the external environment as a result of better decisions and increased efficiency, and
- environmental management accounting supports the integration of monetary and physical information about the environment and incorporates them into the decision-making process. In this way, the management takes into account environmental issues that are economically crucial and, accordingly, creates an environmental management program.

Indicators of environmental performance and environmental costs

Environmental performance reflects the impact of activities, processes, use of materials and energy and products of an enterprise on the nearest environment, i.e. natural capital. There is a wide range of indicators related to the environmental dimension of sustainable development, and the practice has so far shown that, from the management perspective, greater significance has been given to physical than to monetary information.

Different bodies that treat these issues recommend different standards, and below will be shown environmental standards which are part of the Global Reporting Initiative Standards (effective from July 1, 2018).The aim of these standards is to provide guidelines for the preparation of information indicating the impact of the enterprise on the nearest environment, including soil, water, air and ecosystem. In this regard, when reporting, enterprises need to respect a number of standards, some of which are the following [17]:

- *GRI 301 - Materials* refers to the information on the material (type and quantity) that has been used for the production and packaging of products and the provision of services, both from nonrenewable resources, such as minerals, metals, oil, gas, and renewable ones, such as wood, water, etc. The company should disclose whether recycled or new materials have been used, as well as the impact of their use on the environment;

- *GRI 302 - Energy* refers to the energy used inside and outside the enterprise, used energy sources (renewable and nonrenewable), intensity of use, measures taken to reduce energy consumption. Efficient use of energy and commitment to renewable energy sources support efforts to improve environmental performance;
- *GRI 303 - Water and Effluents* covers the issue of use of water resources by the observed enterprise, as well as the wastewater resulting therefrom. The enterprise should devote efforts to achieving sustainable water management, as well as remedying the damage incurred;
- *GRI 304 - Biodiversity* entails reporting on efforts aiming at the preservation of biodiversity, i.e. plant and animal species, genetic diversity and natural ecosystems. At the same time, this ensures food safety and improves both the health and welfare of population;
- *GRI 305 - Emissions* refers to direct and indirect air emissions (greenhouse gas, ozone-depleting substance, nitrogen oxides, sulfur oxides). Disclosure is important because of adverse impacts on the climate, ecosystem, natural habitats, air quality, agriculture, human and animal health. The enterprise should indicate incurred emissions and efforts towards their reduction and repair of the damage caused;
- *GRI 306 - Effluents and Waste* refers to the handling and disposal of waste, the discharge of chemicals, petroleum and other materials, contaminated sites, the extent and type of pollution generated;
- *GRI 307 - Environmental Compliance* covers the organization's compliance with environmental laws and regulations (international declarations, conventions and treaties, as well as national, subnational, regional, and local regulations);
- *GRI 308 - Supplier Environmental Assessment* refers to the fact that an organization might be exerting impact either through its own activities or as a result of its business relationships with other parties. This implies that the company needs to prevent and mitigate negative environmental impacts within the supply chain.

When selecting key indicators of environmental business aspects, the enterprise starts from the indicators that are relevant to the target group of stakeholders, as well as to the needs of environmental risk management and improvement of environmental performance. Rodrigue et al. (2013) found that a firm's environmental strategy is aligned with its set of environmental performance indicators [31, p. 313]. According to Thomas (2015), integration of sustainability metrics into core processes helps the company to identify opportunities for improved allocation of resources, as well as for waste elimination and efficiency [36].

In a traditional sense, the management of an enterprise faces the economic challenge of maximizing returns on engaged resources. Analogously, the challenge of sustainable management is to achieve optimal environmental and economic performances at the same time. Observing these aspects led to the emergence of combined indicators that address these two dimensions. Eco-effectiveness (ecological effectiveness) refers to the extent of success in reducing company's impacts on the environment. This indicator is expressed in terms of absolute amounts of CO2 emissions, ecological footprints, and total mass of materials or energy. Eco-efficiency is defined as the relation between economic (monetary) criteria and physical (ecological) criteria. In other words, this indicator shows additional environmental impact per unit of created value [5, p. 7]. Fige and Hahn (2013) showed that companies needed to use economic and environmental capital more efficiently in order to gain competitive advantage [16, p. 174].

In order to "achieve more with less" or to create the current level of value by engaging a smaller amount of resources or greater value with an unchanged amount of engaged resources [13, p. 3], an important aspect of eco-efficiency is the productivity of engaged resources. It is interesting that the Division for Sustainable Development Goals of the United Nations has also considered inefficient use of materials and energy to be ecological costs. In order to achieve eco-efficiency, efforts are being made to avoid wastage of resources, generating as little waste and emissions as possible.

When it comes to environmental costs at the level of enterprise, these are the costs arising from the activities

undertaken to prevent and reduce the negative effects, as well as eliminate the resulting environmental damage, caused by the processes and products of the enterprise. Precisely due to the fact that environmental and economic performances are closely related and that environmental costs, which in recent years have shown a growing trend, have a direct impact on the level of profit and, thus, on other economic indicators, it is first necessary to identify ecological costs in the total corpus of costs in an enterprise and point out the types of costs that can occur in this category. This is particularly important, first of all, for the management of the enterprise which not only manages the costs, but also defines certain strategies towards achieving sustainable development of the enterprise. There is no uniform classification of environmental costs in literature. Some authors, as well as various regulatory bodies from the domain of environmental management, provided various categorizations of these costs, and below will be shown a rather comprehensive cost classification defined by Hansen et al. [19, p. 512]:

- costs of prevention (selection of environmentally aware suppliers, installation of equipment, adjustment of product design and change of production technology, recycling of products, costs of ISO 14001 certification);
- costs of detection (inspection of products and processes, development of systems for measuring environmental performances, laboratory analysis, measurement of contamination level);
- internal costs of environmental failures (costs of operation and maintenance of equipment for pollution control, treatment and disposal of toxic waste, spoilage that remains after recycling);
- external costs of environmental failures (cleaning of contaminated soil and water, compensation for environmental injuries caused by ecological excesses of the enterprise, loss of customers due to unfavorable environmental performances).

On the basis of the above-cited classification, it is possible to see the correlation between certain categories of environmental costs. Thus, for example, higher costs of prevention will result in avoidance and reduction of costs of internal and external gaps and vice versa, the costs of remedying the resulting consequences of environmental damage would be even higher if the management of the enterprise was not proactive and ignored the importance of prevention of ecological risks. Additionally, based on the size of certain categories of environmental costs, many stakeholders can gain insight into ecological awareness and the importance that the management of the enterprise attaches to the ecological dimension of business. The research shows that the pressure by stakeholders significantly affects the green operation practices, which in turn leads to improvement of environmental performance [38, p. 6403].

Some types of environmental costs have already been covered and analyzed by accountants and the management, e.g. waste disposal and waste management costs, the costs of installing and operating control systems that reduce emissions to water and air, waste water treatment, etc. On the other hand, there are costs that are still invisible to the accounting profession, such as external costs that arise in the long run, followed by the costs arising from disposal of waste to the local community, pollution of drinking water sources and air by legal emissions, after-sales costs, occurring when the product is in the customer's possession due to the disposal of unwanted packaging, the distortion of reputation of the pollutant enterprise in business circles and the local community, potential costs and the like [22, p. 813]. In other words, it is necessary to invest in recycling, reusing and other waste management activities [37, p. 15]. Hence, it is imperative for the management to be aware of various forms of environmental costs. By identifying, analyzing and reducing them, the enterprise can achieve significant savings that can be used for investments in more productive purposes, such as technology that will contribute to cleaner production and other innovative ventures [8]. The corporate social responsibility performance is correlated with financial performance [24, p. 56]. According to Lisi (2015), improvement of environmental performance contributes to the corporate economic well-being [23, p. 41].

Managing environmental costs and covering them by accounting are important not only for the purpose of planning, controlling and undertaking corrective actions and making other efforts to avoid the escalation of environmental risks and ensure competitive and sustainable operations of the enterprise, but also in order

to support the global goal of sustainable development of the society as a whole. Moreover, Martin and Moser (2016) point out that potential investors respond positively to green investments and companies' disclosures of social benefits of such investments [26, p. 239].

Environment-oriented costing systems

Traditional costing systems do not recognize environmental costs as a separate category, but generally include them in overhead costs. In addition, one part of these costs remains completely invisible, which is why the management does not have an accurate insight into the actual costs of individual products and therefore into the total costs of doing business. Also, the calculated unit costs of a product do not represent a reliable basis for defining the policy of selling prices, calculating the results, or making business decisions. With the clear tendency of growing importance of environmental issues, which consequently lead to an increase in the share of ecological costs in total costs, there was a need for more accurate information not only about the costs incurred, but also about the potential costs and savings and additional sources of revenue based on the ecological aspects of business. This information represents necessary support for the cost-benefit analysis, budgeting, product design corrections, decisions on the use of alternative materials, changes in business processes and other business, investment and financial decisions. Additionally, an environmental cost-benefit analysis ..."can support participative environmental planning by fostering stakeholder dialogue and increasing acceptance through increasing transparency in the decision-making process" [9, p. 294].

Eco-efficiency indicators arise from contemporary cost accounting approaches [28, p. 889]. In practice, a number of costing methods focused on encompassing environmental costs have been developed, and the method for calculating environmental costs, which is relatively recent, is considered to be comprehensive and suitable for use in all manufacturing enterprises, including those from the field of agriculture and agribusiness.

True cost accounting (TCA) is a method that includes all fixed and variable costs necessary to produce and distribute a product unit. Observed in the context of business sustainability and environmental challenges, the framework of this method, compared to traditional cost accounting approaches, has been expanded to include goods that cannot be acquired on the market, such as environmental assets [6]. What also differentiates TCA from other methods is the inclusion of both internal and external influences that the company exerts through its operations and realized output, as well as provision of more precise information for decision-making [29, p. 200].

According to IFAC, external environmental costs include depletion of natural resources, noise, residual air and water emissions, long-term waste disposal, uncompensated health effects, change in local quality of life [20, p. 36]. In other words, the concept of natural capital is respected when covering and analyzing costs. TCA recognizes four tiers of costs: Tier 0 – direct costs only; Tier 1 – Tier 0 plus indirect costs (overheads); Tier 2 – Tiers 0 and 1 plus legal liability costs; and Tier 3 – Tiers 0 through 2 plus intangible costs and benefits [25, p. 189].

The specificity of TCA is reflected in the attempt to express the costs of environmental services in monetary units. This will allow that the environmental key performance indicators should be viewed in a cause-and-effect relationship with realized financial performances. Additionally, TCA envisages observing environmental impacts and related costs not only at the level of individual enterprises, but also at the level of the entire supply chain [27, p. 18].

From the perspective of agricultural and agribusiness entities, particularly interesting are the external influences manifested through contamination of watercourses and soil, as well as the GHG emissions into the atmosphere, all of which have a feedback effect not only on the crops and sustainability of production in the associated processing industry, but also on the entire living world. According to a study conducted by the FAO in 2012, the amount of external costs incurred on the basis of global production of maize, wheat and soybean is 1.7 times higher than the value of achieved production [32]. Also, the research shows that environmental costs comprise 30-50% of the farmgate price [33]. This led to the idea that polluters should bear the costs of impact of their business on the ecosystem, above all the costs arising from the influence that they can

control. Expressing environmental impacts of farming in monetary units allows stakeholders to see and evaluate the real costs of production [10, p. 597]. Annaert et al. (2017) show that the farm-specific practices have a key impact on the total sum of environmental costs [1, p. 527]. Companies strive to leave the impression on stakeholders that they operate in a sustainable way [11, p. 355].

The key steps in applying TCA include: defining the cost objective (a particular product, process, whole or part of the business, all activities in an entity), specifying the scope of the analysis (entity or supply chain), identifying and measuring impacts and costing the external impact. Certainly, the biggest challenge in applying TCA is identifying and quantifying external influences [3, p. 63].

Since environmental costs increase total business costs, which is most often reflected in the level of sales prices, in accordance with the basic economic principle – efficient use of limited resources, the buyers of a specific product will be encouraged to opt for producers who have adopted the cleaner production concept, i.e. whose business activities reduce the impact on the immediate surroundings. Thanks to lower environmental costs, they will be able to offer products at competitive prices. In order for the external costs incurred by the business activity of an enterprise to be fully covered, it is necessary to consider this issue through the prism of the life cycle, since it is necessary to include the costs of subsequent activities preconditioned by the creation of primary activities. The goal is to identify the materials and energy which impact the environment. For example, in addition to the costs of procuring fertilizers and pesticides, it is necessary to include external costs of production, transport and application of these agents [2, p. 15].

The life cycle analysis monitors environmental impacts at the level of a single product or process upstream and downstream the supply chain. This enables determining the precise location in the supply chain from which an environmental impact has arisen. In this respect, TCA is viewed in literature as a financially significant life cycle analysis [3, p. 61].

In practice, the estimation of the amount of external costs is accompanied by a number of challenges that reflect on the objectivity of established values – costs that will arise in the future as the consequence of the impact. Some costs are incurred outside the reach of the enterprise, which is why it is difficult to express them in monetary units [18, p. 576]. Hence, some authors choose to include only the influences that arise from the enterprise's processes and products that directly generate financial expenditures (costs of prevention and elimination of damage arising from compliance with the standards and legislation in the field of health care and ecology), suggesting that there should be not considered the potential costs that may beinitiated by the emergence of certain future events. This certainly reduces the scope of the displayed costs that the enterprise caused by its operations, but also ensures the objectivity of the included values [2, p. 35].

Total cost measurement is based on a top-down approach – it starts from the overall impact, i.e. environmental pollution caused by a particular enterprise or supply chain, and then the estimated amount is related to certain causes that are subject to monitoring (for example, the use of pesticides, fuel, water, transport, etc.). The abovementioned causes are further broken down to determine what gives rise to the highest level of emissions in order to control and take corrective actions [14, p. 51].

The costs that can be objectively assessed are the costs arising from practices that degrade the environment and consequently impair human health. Thus, for example, the costs of watercourse contamination are estimated at the level of expenditures incurred as the result of efforts to regain the quality of water which does not endanger the health of users. In other words, it does not include the costs of repairing damage done to watercourses that are not directly used for human consumption. The costs arising from the elimination of air emissions leading to the occurrence of climate changes which have an impact on health are subject to assessment and inclusion in total external costs. Furthermore, the costs of remediation of erosion and damage caused by soil contamination are also included, as well as the costs of strengthening biodiversity, restoring disturbed ecosystems and habitats and eliminating the damage caused by application of pesticides and nitrates harmful to human health [2, p. 38].

The advantage of TCA is in the fact that it does not require significant changes in the existing cost accounting

system of an entity. In addition, TCA provides the opportunity that environmental costs should be monitored by their drivers. Also, TCA encourages integrating the principles of sustainable development into the decision-making process. The key limitation of this method is that its application is rather complex and requires engagement of a number of experts who will evaluate the effects of an enterprise's impact on the environment and enable certain nonfinancial indicators to be expressed in monetary units. Proper implementation of TCA provides significant potential for improvement of the enterprise's environmental performance [27, p. 13]. It is also necessary to point out that the environmental impact of entities from the domain of agriculture and agribusiness depends to a considerable extent on the adopted and implemented agrarian and environmental policies in a country or region. Namely, the quality of water, air and soil, climate change management, conservation of natural habitats and biodiversity, all rely on the activities of enterprises that depend on the incentives and sanctions that the relevant legislation foresees [30, p. 26]. Finally, viable business assumes environmentally acceptable practices not only at the level of the enterprise, but also at the level of the entire supply chain [15, p. 812].

Conclusion

The issues of corporate and social sustainable development and related environmental performance management in modern business conditions have been put into strategic context, representing both an opportunity and a limitation for the operations of an enterprise. Bearing in mind that agriculture and agribusiness have significant implications for the environment, it is necessary that the management of enterprises in this sector pay special attention to the environmental performance and its impact on sustainability of business operations. The impact of environmental issues on business operations is manifested through imposition of increasingly rigorous standards and legal regulations, as well as through associated pressure from numerous stakeholders on the enterprise to improve its environmental performance. Hence, the strategies that respect the ecological dimension of business, reflected in the prevention and reduction of environmental damage, are a good way to improve the financial performance of an enterprise. Environmental management accounting and cost accounting systems that recognize the importance of environmental costs in total operating costs provide significant information support necessary for defining the strategies and ways of managing the ecological aspects of business. This paper discusses one of the contemporary costing concepts that attempt to capture external environmental costs, with particular reference to the specificity of its application in the field of agriculture and agribusiness. Its purpose is to create information that will enable the development of environmental and business strategies as an instrument for the accomplishment of the overall objective of corporate and social sustainable development.

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DEVELOPMENT OF GREEN ECONOMY AND COMPETITIVENESS OF EU COUNTRIES: MACRO-LEVEL EMPIRICAL ANALYSES

Razvijenost zelene ekonomije i konkurentnost EU zemalja – empirijska analiza na makro nivou

Annex 1. Raw Values of the Individual Indicators

Country name	GT (mil. EUR)	CM (%)	SRE (%)	TR (tonne)	3rd sub-index of GCI
Austria	7,973.6	8.6	33.0	3,124,073	5.14
Belgium	8,334.23	16.9	8.0	6,619,411	5.07
Bulgaria	1,167.82	2.7	18.0	216,462	3.28
Croatia	1,390.87	2.4	27.8	216,909	3.46
Czech Republic	3,281.3	6.9	15.0	856,109	4.07
Denmark	10,621.56	9.8	29.6	368,610	5.14
Estonia	533.1	11.0	26.3	114,578	4.08
Finland	5,909.74	7.3	38.7	186,278	5.65
France	43,661	17.8	14.7	3,882,296	4.84
Germany	58,177.37	10.7	13.8	11,366,205	5.59
Greece	6,522.96	1.4	15.3	557,843	3.46
Hungary	2,690.98	5.4	14.6	550,141	3.60
Ireland	4,641.24	1.9	8.7	91,836	4.81
Italy	58,174.99	18.5	17.1	6,331,576	4.22
Latvia	853.59	3.1	38.7	307,552	3.61
Lithuania	633.88	3.8	23.6	176,839	3.93
Netherlands	22,255	26.7	5.5	4,915,224	5.36
Poland	10,562.1	12.5	11.5	1,396,079	3.65
Portugal	3,933.9	2.4	27.0	1,694,945	4.06
Romania	3,516.57	1.7	24.8	141,439	3.32
Slovakia	1,349.44	4.8	11.7	383,410	3.49
Slovenia	1,452.67	8.4	21.5	1,041,595	3.88
Spain	19,382	7.7	16.1	6,899,891	4.14
Sweden	9,535.75	6.7	52.5	1,358,874	5.46
United Kingdom	55,672.85	14.9	7.0	696,311	5.15

Source: Eurostat

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