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C O N T E N T S
С А Д Р Ж А Ј

SCHOOL CLIMATE AND PART-TIME TEACHERS' JOB SATISFACTION: A STUDY INVOLVING A TALIS SAMPLE FROM SERBIA

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Abstract

This study aimed to determine part-time teachers' attitudes (based on a sample of respondents from the Republic of Serbia) (N=727) about school climate and job satisfaction; it also aimed to examine the nature, level, and intensity of the connection between these two complex variables. To examine such attitudes, we used several questionnaires on school climate and job satisfaction extracted from the Teaching and Learning International Survey (TALIS), 2013. Based on the instrument we utilised, the school climate could be categorised and studied as a two-component dimension reflecting two aspects of part-time teachers' school life: general school issues, and issues related to students' needs and well-being. We concluded that there is a significant correlation between part-time teachers' school climate and job satisfaction. School climate explains 27% of the job satisfaction variance, indicating the importance of the observed regression relationship.

Key words: part-time teachers, school climate, job satisfaction, TALIS 2013, Serbia.

ШКОЛСКА КЛИМА И ЗАДОВОЉСТВО ПОСЛОМ НАСТАВНИКА ЗАПОСЛЕНИХ НА ОДРЕЂЕНО ВРЕМЕ: ИСТРАЖИВАЊЕ НА УЗОРКУ ИСПИТАНИКА ИЗ *TALIS* СТУДИЈЕ У СРБИЈИ

Апстракт

Истраживање је имало за циљ да утврди ставове наставника запослених на одређено време (на узорку испитаника из Републике Србије) (N=727) о школској клими и задовољству послом, те да испита природу, ниво и интензитет везе између ове две комплексне варијабле. Користили смо неколико скала процене о школској клими и задовољству послом издвојених из Међународног истражи-вања о настави и учењу (*TALIS*), 2013. На основу резултата, школска клима би

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се могла проучавати као двокомпонентна димензија која одражава два аспекта школског живота наставника запослених на одређено време: општа школска питања и питања која се односе на потребе и добробит ученика. Закључили смо да постоји статистички значајна повезаност између школске климе и задовољства послом наставника запослених на одређено време. Школска клима објашњава 27% варијансе задовољства послом.

Кључне речи: наставници на одређено време, школска клима, задовољство послом, *TALIS* 2013, Србија.

INTRODUCTION

Part-time teachers face many challenges that full-time teachers do not; thus, they tend to have different teaching experiences. Therefore, it is essential for them to possess certain additional skills, abilities, knowledge, and resilience (personal and pedagogical flexibility) (Duggleby & Badali, 2007; Mitina, 2012), which can help them progress under continuously changing environmental conditions.

Studies have shown that the part-time teachers' teaching differs from that organised by classroom and full-time teachers, and that it has very special features (at all stages of organisation and planning) (Jenkins et al., 2003). These teachers are expected to adapt, reframe, and make concessions regarding prepared plans for different groups of students, classes, and schools, and thus they tend to describe this experience as emotionally exhausting. In literature regarding part-time teachers, two 'key' feelings are described as being a predominant part of such experiences for these teachers: helplessness and professional isolation (Duggleby and Badali, 2007).

Available literature on part-time teachers' experiences is surprisingly finite, but in all these studies there is a conclusion that most teachers labour under professional isolation and constant negative feelings (Lunay and Lock, 2006). There are authors who also specify part-time teaching as "a time of uncertainty, frustration, and dissatisfaction" (Pietsche and Williamson, 2009, p. 24).

Part-time teachers' roles are further complicated because these teachers describe themselves as 'marginalized employees' (Damianos, 1998). Marginalised employees are not incorporated into the official structures of the institution (organisation) and, by that, cannot give their contribution to achieving its desired (formal and informal) goals (Clifton and Rambarau, 1987).

A quick look at the study results regarding part-time teachers attests to the minimal representation of this topic in the extant related literature despite these teachers' vital everyday roles in the process of education. This daily routine turned out to be stressful for teachers (Driedger-Enns, 2014; Gershenson, 2012; Vorell, 2012) who may consequently have negative (self) perception (Cardon, 2002).

Part-time teachers are often 'denied' access to many parts of school life because they are not included in extracurricular activities, and formal-informal and hidden curriculums, all of which make the school an interesting and miraculous place (Damianos, 1998). In relevant narratives and auto-ethnographic research materials, part-time teachers have often reported experiencing feelings of alienation when they cannot participate in their students' school lives. Somewhat ironically, and as expected, they often tend to experience the greatest sense of alienation where their professional role is most challenged and undermined among their fellow full-time teachers.

Research on the relationship between school climate and job satisfaction shows that the relations between these constructs has several points of impact, especially as regards teachers' identification, retention, and recruitment and, by extension, the quality of learning outcomes (Zakariya, 2020). Some researchers have examined these two constructs through association with a mediator variable, in most cases self-efficacy (Aldridge and Fraser, 2016; Kasalak and Dagyar, 2020; Kašparova, Potužnikova and Janik, 2015; Malinen and Savolainen, 2016; Shaukat, Vishnumolakala, and Al Bustami, 2019; Skaalvik and Skaalvik, 2014; You, Kim, and Lim, 2016; Xia and Sun, 2018). However, the basic limitation to this line of research is that the "lack of cross-validation of the tested structural model on school climate, teacher self-efficacy and teacher job satisfaction coupled with inconclusive results on the relationships between these constructs have created knowledge gaps begging for more investigation" (Zakariya, 2020, p. 2).

The impact of school climate on self-efficacy and job satisfaction has also been examined, with diverse outcomes depending on different facets of the school climate (Malinen and Savolainen, 2016; Skaalvik and Skaalvik, 2011; Valdeman, van Tartwijk, Brekelmans and Wubbels, 2013; You et al., 2016). The direct influence of the school climate on job satisfaction has been examined in a few studies, with results confirming a prominent connection (negative and positive) between these two constructs (Aldridge and Fraser, 2016; Malinen and Savolainen, 2016).

As previously indicated, there is almost no research wherein a subsample of part-time teachers is extracted from the general sample of teachers in order to question the relation between the school climate and job satisfaction.

Considering these factors, our study aims to prepare a survey on attitudes regarding part-time teachers' assessment of the school climate and job satisfaction in the Republic of Serbia.

MATERIAL AND METHODS

Participants

The sample consists of 727 part-time teachers in the Republic of Serbia. The respondent sample was sourced from the available TALIS 2013 research database (the database is available in standard SAV (Sparse Allele Vectors) file extension). The total sample includes 3,857 teachers from 191 schools. The basic sample characteristics of the part-time teachers are listed in Table 1.

Table 1. Sample characteristics of the studied part-time teachers

Background questions	Part-time (71-90%)	Part-time (50-70%)	Part-time (≤ 50%)
Current employment status as a teacher	363	194	170
Female	238	122	93
Male	125	72	77
How old are you?	38.96	37.94	37.17
Year(s) working as a teacher at this school	6.98	5.83	5.24
Year(s) working as a teacher (total)	9.90	9.21	8.15
Year(s) working in other education roles	6.24	6.71	7.75
Year(s) working in other jobs	4.37	4.80	5.27

N= 727; Z= 1.936, p= 0.001

Measures

The TALIS 2013 collected data through a teacher questionnaire that contains 49 questions. Its questions are grouped into six thematic units: background data (demographic data, data on teacher education, and data on current employment), teachers' professional development, teaching, teaching in general, teacher feedback, and school climate and job satisfaction. This research depended on the survey type, and the following basic principles were followed while constructing the questionnaire: the importance of data in relation to educational policies, orientation based on indicators, validity of measurement, reliability and comparability of data, and interpretability of results (Andjelković and Petrović, 2018; OECD, 2014a). This present study utilised questions concerning demographic data, as well as data on school climate assessments and job satisfaction. The degrees of agreement regarding statements in relation to the questions in the school climate (nine items) and job satisfaction (ten items) sections from the same domain (school climate) were marked on a four-point Likert scale (1 – strongly disagree, 2 – disagree, 3 – agree, and 4 – strongly agree). Preliminary reliability analysis for the sample of surveyed part-time teachers showed the following Cronbach's alpha coefficient for the school climate assessment scale: $\alpha = 0.83$; furthermore, for the job satisfaction scale, the Cronbach's alpha value was $\alpha = 0.36$.

Procedure and Statistical Analysis

A sub-sample of part-time teachers was extracted from the publicly available database. For such a defined sample, the structure factor was examined on a scale that assessed attitudes regarding school climate and job satisfaction. We examined the invoice structure and the number of components obtained through exploratory factor analysis (EFA), parallel analysis (PA) (Horn, 1965), and confirmatory factor analysis (CFA). Considering the obtained results and the internal consistency indicators, which were unsatisfactory for the job satisfaction scale (α= 0.36), appropriate modifications were made (by reversing the scoring for items 3, 4, and 6). Subsequently, through correlation and regression analyses, we examined the nature and characteristics of the connections between the basic variables of interest. All statistical analyses were performed using SPSS 17.0, and LISREL 9.30.

RESULTS

The nine-item school climate scale was subjected to principal components analysis (PCA). The values of the Kaiser-Meyer-Olkin (KMO = 0.82) and the Bartlett test of sphericity (reaches statistical significance) indicate the factorability of the correlation matrix.

Table 2. Component matrix for school climate factor analysis

Items	Components	
	1	2
This school provides staff with opportunities to participate in school decisions.	0.836	
This school provides students with opportunities to participate in school decisions.	0.806	
This school promotes a culture of shared responsibility for school issues.	0.770	
This school provides parents with opportunities to participate in school decisions.	0.739	
There is a collaborative school culture that is characterized by mutual support.	0.726	
Most teachers in this school believe that students' well-being is important.		0.871
Most teachers in this school are interested in what students have to say.		0.821
In this school, teachers and students usually get along well with each other.		0.771
If a student needs extra assistance, the school provides it.		0.576
Cronbach's alpha	$\alpha = 0.86$	$\alpha = 0.79$

The first factor explains 50.03% of the variables related to school climate, and we interpreted it as being related to school issues. The sec-

ond factor explains an additional 14.83% of such variables, and we interpreted it as being related to student issues. Parallel analysis (PA) (Horn, 1965) confirmed this two-factor solution.

We identified a problem in the internal consistency analysis of the scale, through which the variable *job satisfaction* was being classified. The obtained Cronbach's alpha reliability coefficient was unsatisfactory ($\alpha = 0.36$). When items 3, 4, and 6 were reversed, satisfactory results were obtained. Factor analysis indicated the existence of two factors, and parallel analysis indicated the justification of a one-factor solution. In the two-component solution, we obtained another factor that contained only one item. We accepted the solution obtained through parallel analysis (after eliminating another factor that contained one item from the scale). This factor explains 43.96% of the variables related to job satisfaction, and this was a completely accurate result. The Cronbach's alpha coefficient for such a one-component solution was $\alpha = 0.737$. We rejected the item "I would like to transfer to another school if that were possible". Interestingly, this subscale indicated a statistically significant difference between the responses of full-time and part-time teachers ($\chi^2 = 61.843$, df = 36, p = 0.005).

Furthermore, to test this solution (by comparing it with the previous model), we conducted a confirmatory factor analysis (CFA) of the goodness-of-fit model that was constructed this way. The results also showed that the model that lacked this item from the job satisfaction measurement scale (with two components from the school climate measurement scale) had a good fit: χ^2 (31.66), p-value (0.002), Root Mean Square Error of Approximation (RMSEA) (0.159), Goodness-of-Fit Index (GFI) (0.909), Adjusted Goodness-of-Fit Index (AGFI) (0.788), Standardized Root Mean Square Residual (SRMR) (0.506), Normed Fit Index (NFI) (0.898), Non-Normed Fit Index (NNFI) (0.879), and Comparative Fit Index (CFI) (0.923).

Table 3. Component matrix for job satisfaction factor analysis

Items	Components	
	1	2
All in all, I am satisfied with my job.	0.844	
If I could decide again, I would still choose to work as a teacher.	0.794	
About your job/I enjoy working at this school.	0.748	
I would recommend my school as a good place to work.	0.737	
The advantages of being a teacher clearly outweigh the disadvantages.	0.695	
About your job/I regret that I decided to become a teacher.	-0.648	
About your job/I am satisfied with my performance in this school.	0.578	
About your job/I wonder whether it would have been better to choose another profession.	0.525	
I think that the teaching profession is valued in society.	0.502	
I would like to transfer to another school if that were possible.		0.680
Cronbach's alpha coefficient.	α=0.73	

Thus, we obtained two factors related to school climate, and one factor related to job satisfaction. The obtained factors were correlated, and the matrix is listed in Table 4.

Table 4. The inter-factors correlation matrix

	School Issues	Student Issues	Job satisfaction
School Issues	1		
Student Issues	0.552[**]	1	
Job satisfaction	0.503[**]	0.486[**]	1

[**]: Correlation is significant at the 0.01 level (two-tailed).

Unexpectedly, the obtained correlations between job satisfaction and student issues were lower compared to the correlations between job satisfaction and school issues. However, when job satisfaction was lower, the mean values for student issues were higher than the mean values for school issues. Our assumption was based on analyses conducted in previous studies (Bekingalar, 2015; Belmonte, 2006; O'Connor, 2009), which suggested that part-time teachers had sufficient opportunities and time at their disposal to participate in school life because they tend to have volatile and incomplete work engagements. Therefore, part-time teachers' primary orientation involved students. However, our data showed that this was the case only for part-time teachers who had lower job satisfaction (Figure 1).
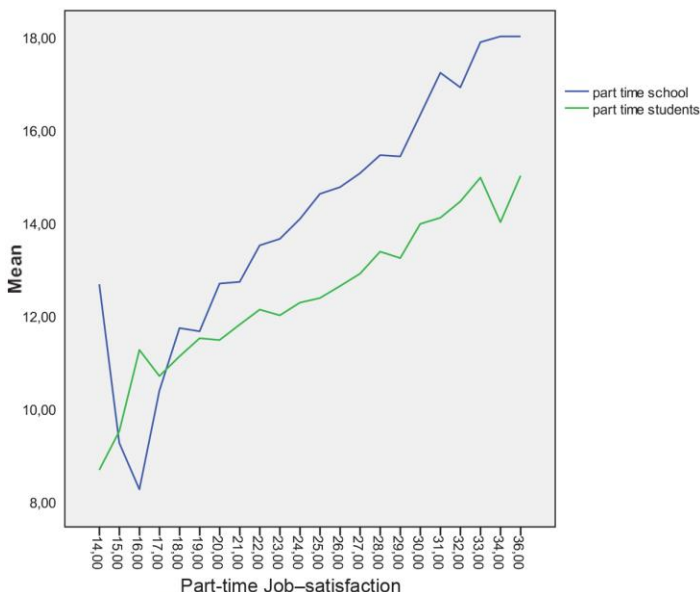
Figure 1. The means for school climate components and job satisfaction: line diagram

The school climate assessment results based on gender were compared with the t-test of the independent samples. No significant difference was indicated between the results of man (M= 14.71, SD= 2.79) and woman female (M= 14.56, SD= 2.65) (t= 156, p= 0.11). The obtained difference between the mean values (mean difference= 0.14; 95% confidence interval= 0.034–0.037) was very small (eta squared = 0.003). The t-test of the independent samples also compared the results of the job satisfaction assessments for man and woman. There was no significant difference in terms of results between man (M= 25.50, SD= 3.26) and woman (M= 25.58, SD= 3.24) (t= 0.722; p= 0.47). The obtained difference between the mean values (mean difference= 0.08; 95% confidence interval= 0.30510 to 0.30564) was very small (eta squared= 0.0007). The responses of man and woman respondents did not differ when assessing school climate and job satisfaction.

Statistically significant differences were observed in the other independent variables. The results are listed in Table 5.

Table 5. Results of the differences between the independent variables

Variables	Factors	χ^2	df	p
How old are you?	School issues	823.957	574	0.000[*]
	Student issues	422.802	369	0.028[*]
	Job satisfaction	894.433	779	0.002[*]
Year(s) working as a teacher at this school	School issues	611.696	420	0.000[*]
	Student issues	394.975	270	0.000[*]
	Job satisfaction	674.604	540	0.000[*]
Year(s) working as a teacher (total)	School issues	770.051	490	0.000[*]
	Student issues	343.912	288	0.013[*]
	Job satisfaction	778.647	648	0.000[*]
Year(s) working in other jobs	School issues	312.036	286	0.139
	Students issues	214.096	176	0.026[*]
	Job satisfaction	404.080	374	0.137

[*]p≤0.05

Furthermore, we compared full-time and part-time teachers in terms of their assessments regarding all three obtained components of the relevant variables (school issues, student issues, and job satisfaction). We did not find any statistically significant differences in terms of school climate components, but we found statistically significant differences with regard to job-satisfaction estimates. There was a statistically significant difference in terms of job satisfaction assessments between full-time teachers (M = 25.53, SD = 3.20) and part-time teachers (M = 25.48, SD = 3.58) (t = 0.233, p = 0.025). The difference between the mean values of the features according to group belonging (95% confidence interval = 0.40 to 0.43) was significant (eta squared = 0.18).

We used standard multiple regression to investigate how well the two given school climate measures predicted part-time teachers' job satisfaction (i.e., what school climate component better predicted job satisfaction). The following value was obtained when evaluating the model: $R^2=0.267$. Our model explains 26.7% of the variance in job satisfaction. While assessing this indicator's statistical significance, an ANOVA test was conducted, and the following results were obtained: F= 649.64, p= 0.000 (the model reached statistical significance). A comparison of both components' contributions showed that the second school climate component (student issues, β= 0.313) individually contributed more toward explaining job satisfaction than the first school climate component (school issues, β= 0.268). However, both components represent a statistically significant and unique contribution to the equation (p= 0.000). The semi-partial correlation coefficient of the first school climate component (school issues, first subscale) was SemP= 0.218; thus, this component uniquely explained 4% of the variance in job satisfaction values. For the second school climate component (student issues, second subscale), the obtained value, SemP= 0.255, uniquely explained 6.5% of the variance in job satisfaction.

DISCUSSION AND CONCLUSION

Although researchers have not yet reached any consensus regarding the definite numbers and structures of school climate components and aspects (Burke and Litwin, 1992; Halpin and Croft, 1963; Jevtić and Milošević, 2022; Kopelman et al., 1990; Schneider, 1972; Đorđić and Damjanović, 2016), in recent meta-analyses (Chirkina and Khavenson, 2018; Cohen et al., 2009; Zullig et al., 2010), scholars have frequently proposed the following sub-components for the concept of the school climate: (1) Relations between school agents; (2) Physical environment (the characteristics of the classroom and the school); (3) Individual factors (the feeling of being a part of the school, and school discipline); and (4) Organisational culture (norms, rules and expectations) (Chirkina and Khavenson, 2018, p. 144). In the present study, which utilised a selected sample of part-time teachers, a two-component school climate structure was obtained, and it contained aspects in which the abovementioned sub-components were intertwined (without the physical environment aspect). This structure depends on the choice of instrument. This study's instrument was taken from the TALIS survey, and it has certain drawbacks that have already been identified in literature (Chirkina and Khavenson, 2018; Cohen et al., 2009; Zullig et al., 2010). In this and similar instruments that can be taken from the Program for International Student Assessment (PISA) survey, socially desirable answers may distort the picture. Such instruments cannot describe the school climate by using the school and teaching objectives, school characteristics, and organisational processes.

These school properties cannot be estimated directly. It is possible to mix certain aspects of the informal and hidden curricula, and the school and organisational climates; furthermore, we should strive to mix these aspects.

The highest average values for the school climate assessment regarding the school issues component were obtained for items where opportunities for participating in school-level decision-making were assessed. Slightly lower values that were not statistically significant were obtained for items that assessed cultures of shared responsibility with regard to school issues, and for collaboration and mutual support among teachers. In the student issues component, the highest average values were obtained for items that assessed the appreciation for students' opinions, as well as the willingness to provide students with additional assistance.

In the available literature, unlike the school climate, part-time teachers' job satisfaction is well-studied. However, the literature yields few studies on part-time teachers. By contrast, full-time teachers' job satisfaction has been extensively investigated. Skaalvik and Skaalvik (2015) found that teachers identified the contributors to their job satisfaction to be students, changing work environments, opportunities for cooperation, and independence. Bolger and Nir (2012) found that the predictors for high teacher job satisfaction are status and recognition. Shoshani and Eldor (2016) examined the relationships among job satisfaction, teacher learning climate, commitment, and teachers' subjective well-being, and connected these to the provision of positive learning environments for students; therefore, these factors were linked to greater opportunities for student success. Akkaya and Akyol (2016) investigated the connection between job satisfaction and teachers' locus of control, finding a significant relationship between them, including a positive relationship between teachers satisfaction as a whole and their internal locus of control (teachers' subjective feeling that they could make necessary changes). Cucchiara et al. (2015) found that teachers' job satisfaction is affected by school reform efforts. The positive or negative direction of this effect was dictated by the teachers' perception of some school-level factors such as administrative support and climate (Cucchiara et al., 2015). Collie et al. (2015) confirmed that other school-level initiatives can also impact teachers' job satisfaction. They revealed a connection between teachers' perceptions of social emotional learning (SEL) and their job satisfaction (Collie et al., 2015). Scholenko (2018) found that the most common satisfaction sources for part-time teachers are students, co-workers, and the nature of the teachers' work. The respondents also indicated that student behaviour, communication, and pay were their most common dissatisfaction sources.

Statistically significant correlations were obtained for both school climate aspects; this finding aligns with the research of Shoshani and Eldor (2016), and Cucchiara et al. (2015). Moreover, regression analysis showed

that both school climate components explained 26.7% of the variance in job satisfaction. A comparison of full-time and part-time teachers showed that these two groups differed in terms of job satisfaction assessment. More specifically, full-time teachers had a significantly higher average score on the job satisfaction assessment compared to part-time teachers.

The present study has multiple implications, and its findings could influence education policymakers. Although they are often found on the periphery of school culture, part-time teachers form a fifth of the teacher population in the Republic of Serbia. Even so, their professional status has not been thoroughly researched. This study focused on two specific aspects of professional status (school climate and job satisfaction); however, these form only a part of part-time teachers' professional identity, which has not yet been fully researched in the Republic of Serbia, or globally. Therefore, these findings imply the importance of paying attention to part-time teachers in the Republic of Serbia. Furthermore, based on our research results regarding all aspects of professional life, customised professional development programmes should be designed for schools.

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ШКОЛСКА КЛИМА И ЗАДОВОЉСТВО ПОСЛОМ НАСТАВНИКА ЗАПОСЛЕНИХ НА ОДРЕЂЕНО ВРЕМЕ: ИСТРАЖИВАЊЕ НА УЗОРКУ ИСПИТАНИКА ИЗ *TALIS* СТУДИЈЕ У СРБИЈИ

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Резиме

Готово да нема истраживања у којем се из општег узорка наставника издваја подузорак наставника запослених на одређено време како би се истражио однос између самопроцена школске климе и задовољства послом. Узимајући ово у обзир, циљ нашег истраживања је био да испитамо ставове наставника који раде на одређено време у Републици Србији о школској клими и задовољству послом. Узорак је екстрахован из базе добијене са међународног истраживања о наставницима TALIS 2013.

Група наставника запослених на одређено време у овој студији била је углавном млађа од наставника са пуним радним временом. Скоро сваки пети наставник из узорка свих наставника је радио по неком уговору на одређено време; просечна старост таквих наставника била је 38 година, а просечно искуство рада у настави девет година у школи у којој тренутно раде. Већина таквих наставника имала је у просеку шест година наставничког искуства на другим сличним наставничким пословима и просечно пет година искуства у другим професијама.

Добили смо статистички значајне корелације између две компоненте школске климе (школска питања и питања у вези са радом са ученицама и њиховој добробити) на узорку наставника који раде на одређено време. Након поређења групе наставника са непуним радним временом и групе наставника са пуним радним временом, утврдили смо да нема статистички значајних разлика у погледу процене између ове две групе испитаника. Брига за добробит ученика, као издвојени фактор, боље предвиђа задовољство послом наставника на одређено време него аспект школска питања. Поређење доприноса обе компоненте објашњавању зависне променљиве показало је да друга компонента школске климе (брига за ученике и њихову добровит) ($\beta = 0{,}313$) појединачно више доприноси

објашњавању задовољства послом него прва компонента школске климе (општа школска питања) (β = 0,268). Обе компоненте су дале статистички значајан и јединствен допринос једначини (p = 0,000). За оба аспекта школске климе добијене су статистички значајне корелације. Регресиона анализа је показала да обе компоненте школске климе објашњавају 26,7% варијансе задовољства послом. Поређење наставника запослених на одређено време и наставника запослених на неодређено време показало је да се ове две групе разликују у погледу процене задовољства послом. Наставници запослени на неодређено време су имали значајно већи просечан резултат на процени задовољства послом у поређењу са наставницима запосленим на одређено време.

Овај преглед анализа и резултата истраживања и са њим повезане увиде треба посматрати као пролегомену за педантнији рад, а не као свеобухватан одговор на питања о феноменологији праксе и професионалног живота наставника запослених на одређено време.

THE IMPACT OF ENVIRONMENTAL TAXES ON THE REDUCTION OF PLASTIC BAG CONSUMPTION IN THE REPUBLIC OF SERBIA

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Abstract

The problem that plastic bags cause to the environment is one of the most significant environmental problems. Not much attention is paid to this problem on the territory of the Republic of Serbia, and there is a gap where scientific research is concerned. In addition to mitigating this gap, the aim of this paper is to identify the basic factors which reduce the consumption of light (disposable) plastic bags using exploratory factor analysis. The results of the conducted analysis show that the development of environmental awareness, the availability of alternatives, social norms, and economic instruments that could be implemented in the future have a positive impact on the change in consumer behaviour on the territory of the Republic of Serbia when it comes to the use of plastic bags.

Key words: plastic bags, fee, environmental awareness, economic instruments.

УТИЦАЈ ЕКОЛОШКИХ ПОРЕЗА НА СМАЊЕЊЕ ПОТРОШЊЕ ПЛАСТИЧНИХ КЕСА У РЕПУБЛИЦИ СРБИЈИ

Апстракт

Проблем који пластичне кесе представљају по животну средину је један од значајнијих еколошких проблема. Овом проблему се на територији Републике Србије не придаје довољно пажње, а нарочито недостају научна истраживања на ову тему. Поред ублажавања наведеног проблема, циљ овог рада је идентифико-вање основних фактора који утичу на смањење потрошње лаких (једнократних) пластичних кеса применом екплоративне факторске анализе. Спроведеном ана-лизом је утврђено да на промену понашања потрошача на територији Републике Србије у односу на потрошњу пластичних кеса позитиван утицај имају развој

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еколошке свести, достуност алтернатива, друштвене норме, као и економски инструменти који би могли да буду имплементирани у будућности.

Кључне речи: пластичне кесе, накнада, еколошка свест, економски инструменти.

INTRODUCTION

Plastic bags are the most commonly used product for packaging, and the main reasons why this is the case are their resistance to moisture, their strength, their price, and the facts that they are lightweight and can be reused. It is estimated that around 500 billion plastic bags are used worldwide each year, which means that more than a million bags are used every minute. In the last ten years, more plastic was produced than during the entirety of the last century (Wilts et al., 2020).

Considering that the protection of the environment is one of the basic segments of the development policy of all countries in the world, the problem of the use of plastic bags is a challenge that all countries face. In higher-income countries, plastic bags, except those that are bio-degradable, are completely banned, but appropriate economic instruments are generally also present. In contrast, in middle- and lower-income countries, the fight against this problem is usually solved by introducing an appropriate environmental tax, most often in the form of fees for plastic bags. Countries with lower incomes are extremely slow in solving this problem, mainly due to the accumulated problems in the field of economy and social policy.

In addition, plastic bags are extremely harmful to the environment, from the beginning to the end of their life cycle. The production of plastic bags requires a lot of energy, which usually comes from the use of fossil fuels. Among other things, in its simplest form, plastic is produced from crude oil. The excessive use of fossil fuels in the production of plastics, and thus plastic bags, leads to the creation of the greenhouse effect, i.e. the rise in the average temperature on Earth, and sea and ocean levels (Schuyler et al., 2018; Vince & Hardesty, 2017).

The negative effect of plastic bags on the environment is reflected in the fact that they decompose slowly, and very often end up in nature due to negligent disposal, or due to wind. Animals ingest these bags, which leads to them developing various diseases, or dying. Also, when plastic bags end up in the soil, they decompose gradually, which has a negative impact on plants and the quality of water. People use animal meat and plants in their diet, drink water, and catch fish, which transmits these negative external effects to humans and their health.

In the Republic of Serbia, as in most countries of the world, except in those where light plastic bags are completely banned, this problem is still present. Of the economic instruments available in the fight against this environmental problem, Serbia employs fees for plastic bags (Stojanović,

2016; Stojanović, 2017), and a ban on the use of all plastic bags aside from those that are biodegradable. However, due to insufficient control, the selective application of the ban, and its application only in certain cities, these instruments do not yield satisfactory results in practice, because non-biodegradable bags are still used in many places, such as markets.

Despite the importance of this topic, it is not sufficiently covered in the Republic of Serbia, especially from the aspect of preserving the health of the environment, and protecting biodiversity and human health. For this reason, this paper aims to point out the importance of this problem, and to identify which factors affect consumers when it comes to the use of plastic bags. The paper also aims to answer the question of what effects introducing new fees for plastic bags would have on consumer behaviour, i.e. whether the fee would cause consumers to stop using plastic bags, and start using paper bags or other bags as an alternative.

LITERATURE REVIEW

For many years, the basic instrument used to combat the negative externalities caused by economic and human activities on planet Earth has been the 'command and control' instrument (Ekins, 1999). However, over time, due to accumulated environmental problems, it has become clear that this instrument alone is not efficient enough to provide a healthy environment. So, today, economic instruments are present in all countries of the world, with the goal of effecting a change in people's behaviour towards the environment (Stojanović, 2017). In addition to numerous other instruments, environmental taxes, most often in the form of fees, are enforced in order to reduce the use of plastic bags, due to their negative impact on the environment.

The production and use of plastic bags cause negative external effects on the environment. These negative external effects are the basis for the introduction of levies on their production and import. Therefore, in the Republic of Serbia, the taxpayers who pay the fee are producers, i.e. importers. Biodegradable bags, for which no fee is paid, are an exception (*Zakon o naknadama za korišćenje javnih dobara*, Art. 129). The fee paid by the manufacturers aims to make these bags more expensive. However, it should be noted that these fees are not prescribed at a high level in our country, which does not drastically increase the price of plastic bags. In part, this source of revenue belongs to local government units, while the rest flows into the budget of the republic. Taking into account that this source of revenue is earmarked, these funds are intended to solve problems in the field of environmental protection. However, it is not possible to clearly see what these funds are used for at the municipal level or at the national level, which certainly makes solving the problem of plastic bags even more complicated (Stojanović, 2016).

In addition to the fees introduced in some cities in the Republic of Serbia, a ban on the use of non-biodegradable plastic bags is enforced, but there are cases where an exemption from this ban is made, which allows the use of light plastic bags. Some of these cities are Belgrade, Novi Sad, Vranje, and the Doljevac municipality. Although bans and fees are present in Serbia, insufficient control, numerous exemptions, and the use of bags banned in the EU but allowed in Serbia (which are not subject to these fees) make this problem extremely complex. In order to give recommendations for mitigating and solving this problem in Serbia, we will first present the views of experts dealing with this topic through a review of the available literature, which serves as the basis for the conducted research.

There is evidence in the available literature to support the notion that economic instruments, in the form of environmental taxes, give results when it comes to environmental protection (Stojanović, 2017; Dias Soares, 2011; International Institute for Labour Studies, 2009). However, the focus of this paper is specifically on those economic and other available instruments that are used, or that can be used with the aim of solving the problem. In the domestic literature, this issue is almost entirely neglected, even by economists. It is touched upon by ecologists and technologists, but extremely poorly. When it comes to foreign literature, the papers on this topic are more thorough, and we will present the main results of foreign authors, which we will use as a guide in researching this topic in Serbia.

Asarai et al. (2008) concluded that environmental taxes imposed in Taiwan are not efficient enough to reduce the consumption of plastic bags in that country. When it comes to South Africa, a study was conducted with the aim of determining whether fees for plastic bags reduce their consumption (Hasson et al., 2007). The results of the research showed that the impact of fees on the consumption of plastic bags is effective in the short term, while this effect is gradually lost in the long term.

Many researchers on this topic have come to the conclusion that economic instruments are very effective in combating the problem of plastic bags, and their negative impact on the environment (Convery et al., 2007; Dikgang & Visser., 2012; Muralidharan & Sheehan, 2016). In Ireland, in 2009, the environmental tax paid on plastic bags was increased from 0.15 euros to 0.44 euros, which led to an annual drop in the consumption of plastic bags from 328 to 21 pieces per capita (Earth Policy Institute, 2014). Also, the introduction of mandatory payment for plastic bags in stores in England, amounting to five pence per bag, led to a reduction in their use by as much as 95% (Smithers, 2020). This confirms one of the basic economic postulates, which tells us that the elasticity of demand for low-priced goods is low (Stigler, 1966). However, with the growth of the price of goods, there is a change in elasticity and, thus, with the growth of the price of plastic bags, consumers turn to alternatives.

In a study conducted in Botswana, Mogomotsi et. al. (2019) came to the conclusion that economic instruments in the field of plastic bag consumption have yielded results, but are not strong enough to solve this problem in the long run.

What is also important when it comes to the problem of the irrational use of plastic bags and ecology in general is the development of environmental awareness, and the possibility of its further development. Some authors have pointed out that the simultaneous development of environmental awareness and the use of economic tools give the best results in solving the problem of reducing the consumption of plastic bags. They pointed out that, in addition to the presence of economic instruments, social norms, the development of environmental awareness, and the availability of substitutes in retail have an impact on consumers' decisions to use plastic bags. These authors used factor analysis in their research (Hansla et al., 2008; Lee & Lim, 2020; Hoang et al., 2018; Le, 2018; Hoang, 2016; Vu et al., 2012).

Thomas et al. (2019) conducted an analysis of the fee for plastic bags introduced in England, and came to the conclusion that such a fee had a positive impact on consumer behaviour. However, they also pointed out that, in addition to compensation, environmental awareness also has an impact on the reduction of plastic waste in England.

Van et al. (2021) analysed which factors influence the use of plastic bags in Malaysia. The results of their research showed that environmental awareness and 'command and control' instruments do not have a statistically significant impact on consumers, but that economic instruments and available substitutes have a positive effect on reducing the consumption of plastic bags. Also, Luong (2013) found that environmental awareness is an extremely important factor influencing consumer behaviour when choosing between single-use plastic bags and alternative solutions.

Tong and Duong (2021) used factor analysis to investigate which factors have the greatest impact on solving the problem of plastic bags. In their analysis of a sample comprising 291 respondents, they concluded that environmental awareness, social norms, and consumer attitudes have an impact on reducing the consumption of plastic bags in Vietnam, while the availability of substitutes and present environmental taxes on this issue do not have an effect on consumer behaviour.

METHODOLOGY AND HYPOTHESES

In order to respect the existing attitudes and research, and to find out what the situation is on the territory of the Republic of Serbia, a survey was conducted in the period between February and March 2022. The aim of the survey was to get answers to the questions posed in the survey, which would enable us to conduct a factor analysis in order to determine

the most important factors in solving the problem of plastic bags in the Republic of Serbia. We wanted to determine whether the solution to this problem is influenced by the development of environmental awareness, the availability of substitutes, social norms or economic instruments, or all of them together. Taking previous research into consideration (Tong et al., 2021; Mogomosi et al., 2019; Vu et al., 2012; Le, 2018; Muralidharan et al., 2016; Hansla et al., 2008; Lee et al., 2020; Hoang et al., 2018), the following hypotheses were defined:

(1) consumer attitudes and social norms in Serbia have a positive impact on reducing the consumption of plastic bags;

(2) the availability of substitutes in retail stores in Serbia has a positive effect on the decline in the consumption of plastic bags;

(3) concerns about the quality of the environment have a positive impact on reducing the consumption of plastic bags; and

(4) economic instruments have a positive impact on the decline in the consumption of plastic bags.

The survey that was conducted was anonymous and filled in by the respondents in writing, and in electronic form. Afterwards, the results were combined and summarised in the programme. The results of 177 respondents were collected, but 170 of them were included in the analysis. Seven respondents handed in incomplete surveys, and were excluded from the analysis. Only respondents from the territories of those cities and municipalities where light plastic bags are not banned were included in the survey. The survey itself was designed in two parts. In the first part, the respondents answered questions about gender, age, level of education, and the city, i.e. the municipality in which they live. In the second part of the questionnaire, the respondents answered 25 questions, i.e. they gave their opinion on the importance of the given statements on a five-point Likert-type scale (1- absolutely disagree, ..., 5 - absolutely agree) (Scott & Gerald, 2005; Tong et al., 2021). The survey was created in accordance with research on this topic conducted by researchers around the world (Mogomotsi et al., 2019; Tong et al., 2021; Convery et al., 2007; Dikgang et al., 2012; Muralidharan et al., 2016).

Regarding statements 19, 21, 22, 23 and 24 (Table 2), the respondents received a written explanation of the possibility of a new fee being introduced. Namely, the new fee, amounting to 10 RSD per bag, would be introduced on all plastic bags, light bags, as well as biodegradable bags. The final price of the bags would depend on the retailers, so in addition to the fee of 10 RSD, the price would also include the procurement costs of those bags, which depend on the manufacturer, as well as the trade margin. In order to reduce the costs of collecting these fees, fees (environmental taxes) would be charged to the manufacturers or importers of plastic bags, and the fee itself would be passed on to final consumers. The funds that would be collected through this fee would be part of

the income of a special fund, from which the producers of biodegradable bags would be subsidised.

In order to test the defined hypotheses on the basis of the respondents' answers, the software package SPSS was used, within which exploratory factor analysis was conducted. The application of factor analysis itself was conducted on the model of the previous research on this topic, which includes an analysis of the impact of environmental awareness, social norms, and the availability of alternatives, in addition to economic instruments (Mogomotsi et al., 2019; Tong et al., 2021; Dikgang et al., 2012; Muralidharan et al., 2016; Van et al., 2021). In addition to the arithmetic mean and standard deviation, the Bartlett test and the KMO (Kaiser-Mayer-Olkin) test were used to test the collected data. After determining the key factors and applying the Varimax method, regression analysis was applied in order to give us an answer to the question of whether the independent variables have a statistically significant impact on the dependent variable. Finally, ANOVA analysis was performed to determine whether the obtained result was statistically significant.

RESEARCH RESULTS

The Demographic Description of the Sample and Descriptive Statistics

As shown in Table 1, of the total of 170 respondents, 71 respondents (47.76%) are women, while 99 respondents (58.24%) are men. When it comes to the age structure of the respondents, the largest number of the respondents is between 26 and 45 years of age (35.29%), while the smallest number of the respondents is under 18, and over 56 (5.88% and 11.77%, respectively). Regarding the educational structure of the respondents, the largest number of respondents has completed high school (80 respondents, or 47.06%), and the smallest number of them has primary school (5 respondents, or 2.94%).

Descriptive statistical analysis allowed us to calculate the arithmetic mean and the standard deviation for all statements in the questionnaire. The results of descriptive statistics are shown in Table 2. The respondents' average assessment of the stated findings in the questionnaire ranges between 3.56 and 4.40. The lowest grade was given to the tenth statement, which refers to the impact of radio broadcasts on the awakening of environmental awareness, aimed at reducing the consumption of light plastic bags.

Table 1. Description of the research sample

Demographic characteristics	Frequency	%
Gender	170	100.00
Male	99	58.24
Female	71	41.76
Age	170	100.00
Until 18	10	5.88
19-25	54	31.77
26-45	60	35.29
46-55	26	15.29
56 and more	20	11.77
Education	170	100.00
Primary school	5	2.94
Secondary education	80	47.06
Higher school	42	24.71
Faculty education	32	18.82
Master/PhD	11	6.47

Source: Authors' calculations based on the SPSS software package

Table 2. Descriptive statistics

Statement	Arithmetic mean	Standard deviation
1. The existing system of fees for disposable plastic bags, which is charged by the manufacturer or importer, does not reduce their consumption.	4.09	0.754
2. Parental example is important in reducing the consumption of plastic bags.	4.01	0.973
3. The education of primary school children about the harmfulness of plastic bags to the environment is important.	4.06	0.881
4. Defining adequate regulations at the state level, and implementing and adequately controlling them can solve this problem.	4.04	0.812
5. The education of high school children about the harmfulness of plastic bags to the environment is important.	3.96	1.037
6. Educating students about the harmfulness of plastic bags is important for solving this problem in the future.	3.85	1.087
7. This topic needs to be covered more by scientists.	4.01	0.928
8. Seminars and workshops on this topic have an impact on reducing the consumption of plastic bags.	3.83	1.012
9. Educational television programmes can have a positive impact on environmental awareness, and can reduce the consumption of plastic bags.	3.94	0.960
10. Radio broadcasts can have a positive impact on environmental awareness, and can reduce the consumption of plastic bags.	3.56	1.157

11. This topic should be more represented in the newspaper.	4.12	1.016
12. Institutes that examine the quality of plastic bags should regularly inform the public about it.	3.86	0.991
13. Plastic bags, in addition to their impact on the environment and health, have a negative impact on the visual experience of the environment.	3.87	1.016
14. Excessive consumption of disposable plastic bags creates a big problem when it comes to environmental quality.	4.09	0.895
15. In Serbia, environmental awareness is not sufficiently developed.	3.90	0.968
16. The retail stores in which I shop offer biodegradable bags.	4.36	0.784
17. The retail stores in which I shop offer paper bags as an alternative.	4.32	0.770
18. The retail stores in which I shop offer linen bags.	4.26	0.882
19. The introduction of a fee of 10 RSD per plastic bag would reduce their consumption[1].	4.40	0.784
20. Funds raised through the new fee should, in part, be used to subsidise manufacturers of biodegradable bags, which use chemicals that are less harmful to the environment.	3.80	1.067
21. Funds from the new fee that would be introduced per piece of plastic bag should be transferred into special-purpose funds.	3.92	0.997
22. The decision on the amount of the fee should be made at the state level, not at the city level.	3.99	0.936
23. There is no alternative to light plastic bags in the shops of smaller retailers.	4.28	0.725
24. Ordinary and moral norms are not enough to solve the problem of plastic bags.	4.40	0.784
25. Reducing the consumption of light plastic bags is necessary.	4.05	1.070

Source: Authors' calculations based on the SPSS software package

Statements 20 and 24 have the highest marks, and they refer to the introduction of a new fee that would burden consumers with the aim of reducing the consumption of light plastic bags. Where the lowest degree of disagreement among the respondents is concerned, it appears in statement 1, and amounts to 0.754. The highest degree of disagreement is seen in statement 10.

The Results of Factor and Regression Analyses

Factor analysis was used in this paper, with the aim of reducing a large number of statements to a smaller number of factors, i.e. grouping them into appropriate factors. It was done with the objective of explaining

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[1] Respondents were given an explanation of what this fee is, as well as how it can be collected and used.

and determining the influence of the independent variables on the dependent variable via regression analysis. Additionally, the objective was to determine the statistical significance of this influence.

As part of the first step of factor analysis, we tested the assumptions for the justification of its application. It was determined that the application of factor analysis for this type of research is adequate because the following conditions are satisfied:

(1) statements were measured on the Likert scale; and

(2) in order to apply factor analysis, the number of observations should be five times higher than the number of statements. In our case, the number is seven times higher. The justification for the application of factor analysis was verified by applying the Kaiser-Meyer-Olkin indicator and the Bartlett test, whose values are shown in Table 3.

Table 3. The results of the Kaiser-Meyer-Olkin and Bartlett tests

Kaiser-Meyer-Olkin test	0.922
Bartlett test	2955.765
Df	276
Sig.	.000

Source: Authors' calculations based on the SPSS software package

The value of the Kaiser-Mayer-Olkin test, as can be seen in Table 3, is 0.922. This value is significantly higher than the recommended value of 0.5. Bartlett's test, which is also shown in Table 3, indicates that there is a statistically significant correlation between the variables ($\chi2=2955,765$; $p=0,000<\alpha=0.05$). The conducted tests show that it is justified to apply factor analysis in order to single out common factors.

The answers received from the respondents, based on the defined statements and their assessment on the Likert scale, were subjected to the analysis of the main components. The number of these components was determined based on Kaiser's criteria.

Kaiser's criterion implies that only those factors that have a characteristic value greater than one will be included after the rotation of factors. By analysing the main components, this research found that there are four factors that have a characteristic value greater than one. These four factors explain a total of 67.723 variances, which can be seen in Table 4.

After the factor analysis of the most important components was performed, the factors were rotated using the Varimax method. Based on the implemented Varimax methodology, only those factors that have factor weights greater than 0.5 were taken into account in further analysis.

Table 4. Analysis of the most important components of factor analysis

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumu-lative %	Total	% of Variance	Cumu-lative %	Total	% of Variance	Cumu-lative %
1.	11.770	49.010	49.010	11.770	49.010	49.010	7.368	30.723	30.723
2.	1.908	7.945	56.955	1.908	7.945	56.955	3.696	15.416	46.139
3.	1.509	6.283	63.238	1.509	6.283	63.238	2.869	11.966	58.105
4.	1.077	4.485	67.723	1.077	4.485	67.723	2.306	9.618	67.723
5.	0.944	3.931	71.654						
6.	0.776	3.231	74.885						
7.	0.728	3.031	77.916						
8.	0.627	2.611	80.527						
9.	0.580	2.415	82.942						
10.	0.471	1.961	84.903						
11.	0.430	1.791	86.694						
12.	0.412	1.716	88.410						
13.	0.381	1.586	89.996						
14.	0.338	1.407	91.403						
15.	0.315	1.312	92.715						
16.	0.269	1.120	93.835						
17.	0.251	1.045	94.880						
18.	0.225	0.937	95.817						
19.	0.218	0.908	96.725						
20.	0.207	0.862	97.587						
21.	0.175	0.729	98.316						
22.	0.148	0.618	98.934						
23.	0.136	0.566	99.500						
24.	0.120	0.500	100.000						

Source: Authors' calculations based on the SPSS software package

Table 5. The results of applying the Varimax method for factor rotation

	Components			
	1	2	3	4
Educational television programmes can have a positive impact on environmental awareness, and can reduce the consumption of plastic bags.	0.813			
Institutes that examine the quality of plastic bags should regularly inform the public about it.	0.802			
Plastic bags, in addition to their impact on the environment and health, have a negative impact on the visual experience of the environment.	0.796			
In Serbia, environmental awareness is not sufficiently developed.	0.788			

Seminars and workshops on this topic have an impact on reducing the consumption of plastic bags.	0.785			
Educating students about the harmfulness of plastic bags is important for solving this problem in the future.	0.779			
The education of high school children about the harmfulness of plastic bags to the environment is important.	0.722			
The education of primary school children about the harmfulness of plastic bags to the environment is important.	0.716			
Excessive consumption of disposable plastic bags creates a big problem when it comes to environmental quality.	0.695			
Radio broadcasts can have a positive impact on environmental awareness, and can reduce the consumption of plastic bags.	0.626			
This topic needs to be covered more by scientists.	0.604			
This topic should be more represented in the newspaper.	0.551			
The introduction of a fee of 10 RSD per plastic bag would reduce their consumption.		0.841		
Funds from the new fee that would be introduced per piece of plastic bag should be transferred into special-purpose funds.		0.809		
Funds raised through the new fee should, in part, be used to subsidise manufacturers of biodegradable bags, which use chemicals that are less harmful to the environment.		0.798		
The decision on the amount of the fee should be made at the state level, not at the city level.		0.593		
The existing system of fees for disposable plastic bags, which is charged by the manufacturer or importer, does not reduce their consumption.				
The retail stores in which I shop offer paper bags as an alternative.			0.833	
The retail stores in which I shop offer biodegradable bags.			0.828	
The retail stores in which I shop offer linen bags.			0.511	
There is no alternative to light plastic bags in the shops of smaller retailers.				
Parental example is important in reducing the consumption of plastic bags.				0.836
Defining adequate regulations at the state level, and implementing and adequately controlling them can solve this problem.				0.600
Ordinary and moral norms are not enough to solve the problem of plastic bags.				

Source: Authors' calculations based on the SPSS software package

After the rotation was performed, we obtained a matrix on the basis of which we could determine the value of the factor weight for each

factor. We added to the first factor those statements that have a factor weight greater than 0.55, which is twelve statements in total. This can be seen in Table 5.

The first factor, i.e. the statements assigned to the first factor, refers to the development of environmental awareness. Four findings are joined to another factor, which refers to economic instruments for reducing the consumption of light plastic bags. The third factor is accompanied by three statements with factor weights greater than 0.5, and relates to the existence of alternative solutions for lightweight plastic bags. Two statements were assigned to the last factor, and they refer to the impact of social norms on the use of light plastic bags. Statements with factor weights less than 0.5 were not assigned to any of the four factors listed.

After the defined statements were included in the four factors, a regression analysis was performed. The aim of conducting regression analysis is to determine whether independent variables have a statistically significant effect on the dependent variable. In our case, the dependent variable is the last statement, which reads "Reducing the consumption of light plastic bags is necessary". The four defined factors, on the other hand, represent independent variables, and our goal was to determine whether all independent variables have a statistically significant impact on the dependent variable.

Table 6. The results of regression analysis

Model	The correlation coefficient (R)	Coefficient of determination (R^2)	Adjusted coefficient of determination	Standard error value	DW statistics
1.	0.529[a]	0.280	0.270	0.902	
2.	0.648[b]	0.420	0.416	0.813	
3.	0.683[c]	0.466	0.458	0.780	
4.	0.691[d]	0.477	0.469	0.769	2.009

Source: Authors' calculations based on SPSS software package

Looking at Table 6, it can be concluded that all four independent variables remained in the defined regression model, and that they have a satisfactory statistical significance. The coefficient of determination that shows what percentage of the variability of the dependent variable explains the independent variables is 0.477 in our case. This means that the dependent variable, which implies behaviour related to the reduction of light plastic bags, is influenced by all four of the defined factors: development of environmental awareness, availability of substitutes for light plastic bags, social norms, and economic instruments.

Table 7. ANOVA analysis

		Sum of squares	Number of degrees of freedom	Mean of square	F - statistics	Significance
1.	Regression	52.134	1	52.134	65.249	.000[a]
	Residual	134.278	168	0.799		
	Amount	186.412	169			
2.	Regression	77.576	2	38.788	62.061	.000[b]
	Residual	108.836	167	0.652		
	Amount	186.412	169			
3.	Regression	85.903	3	28.634	46.333	.000[c]
	Residual	102.509	166	0.618		
	Amount	188.412	169			
4.	Regression	90.103	4	22.526	37.795	.000[d]
	Residual	98.309	165	0.596		
	Amount	188.412	169			

Source: Authors' calculations based on the SPSS software package

In order to determine the statistical significance of the obtained results, an ANOVA analysis of variance was performed. Sneder's F-statistic is 37.795 in our case, with a significance level of p (F) = 0.000 $<\alpha = 0.05$. This result shows that the coefficient of determination differs from zero, and that the regression effect of all four independent variables on the dependent one is statistically significant.

DISCUSSION AND RECOMMENDATIONS FOR FUTURE RESEARCH

Based on the analysis conducted on the territory of the Republic of Serbia, we were able to reach significant conclusions when it comes to the problem of reducing the consumption of plastic bags. All the hypotheses defined in this paper were confirmed, as shown in Table 8.

Table 8. Paper hypotheses and their proof

Hypotheses	Accepted / Rejected
Consumer attitudes and social norms in Serbia have a positive impact on reducing the consumption of plastic bags.	Accepted
The availability of substitutes in retail stores in Serbia has a positive effect on the decline in the consumption of plastic bags.	Accepted
Concerns about the quality of the environment have a positive impact on reducing the consumption of plastic bags.	Accepted
Economic instruments have a positive impact on the decline in the consumption of plastic bags.	Accepted

Source: Authors' findings

Defined social norms have a great influence on consumer behaviour, as well as the attitude that consumers have towards plastic bags. This claim has also been proven by Hansla et al. (2008), Lee et al. (2020), Hoang et al. (2018), Le (2018) Hoang (2016), Vu et al. (2012), and Tong et al. (2021). Therefore, legal regulations, the control of their application, and customary and moral norms have a great influence on the decision to use light plastic bags (disposable plastic bags), and generally on issues related to environmental protection. So, in order to reduce the consumption of plastic bags, in addition to the introduction of clear regulations and their controlled application, moral norms must be introduced through parental education and example. This is especially illustrated by the results shown in Table 2, wherein the average score of the respondents' answers in relation to parental example is 4.01.

Substitutes in the form of biodegradable bags, paper bags, and linen bags have an impact on consumer decisions about which bags to use in Serbia, although they do not represent a permanent solution to this problem. Such results have been obtained worldwide by Vu et al. (2012), Hoang et al. (2018), and Le (2018), while Tong et al. (2021), who conducted their analysis in Vietnam, did not obtain positive results in regard to this hypothesis.

The third hypothesis, which states that "Concern for the quality of the environment has a positive impact on reducing the consumption of plastic bags", refers to the level of the development of environmental awareness necessary to solve the problem of plastic bags, as well as the need for the further development of environmental awareness. Through our analysis, it was proven that the level of environmental awareness has a positive impact on reducing the consumption of light plastic bags. Education at all levels, the scientific processing of this topic, and the journalistic promotion of this topic can have a positive impact on the development of environmental awareness. Through numerous studies, authors around the world have obtained identical results about the impact of environmental awareness on the consumption of plastic bags (Hansla et al., 2008; Lee et al., 2020; Luong, 2013; Hoang, 2016; Long & Duong, 2021).

The last hypothesis of this paper refers to the impact of economic instruments which could be implemented in the Republic of Serbia in the future. Namely, the existing fees do not have a great impact on the price of bags and, thus, they do not greatly impact their consumption. Retailers charging for bags also did not affect consumers too much, considering that the amount charged is not large. Smithers (2020) and the Earth Policy Institute (2014) in Ireland and England have proven that charging bags at higher prices has an impact on consumers. On the other hand, in developing countries, the small amounts in imposed environmental taxes that do not significantly increase the price of bags generally have little impact on consumer behaviour (Long & Duong, 2021).

The current rate of light plastic bag consumption in the Republic of Serbia also confirms the fact that the existing system of fees (environmental taxes) does not have a large impact on the decline in consumption. Also, retailers charging for plastic bags has led to a slight decline in the consumption of plastic bags, but the funds collected by retailers are not used to achieve environmental goals. For that reason, we made a proposal in the survey, and explained how to introduce and use a new fee of 10.00 RSD per plastic bag. Based on the -answers to question 19 (Table 2), the respondents decided they would change their behaviour if this fee were introduced, i.e. to use a certain alternative, which is environmentally friendly.

The results of the analysis also show that, among other factors, fees (environmental taxes) have an impact on consumer behaviour. We can suggest that the Government of the Republic of Serbia consider the possibility of introducing the environmental tax proposed in our research.

The proposed fee of 10.00 RSD would be paid for light plastic bags as well as biodegradable bags, but manufacturers of biodegradable bags would be subsidised. The reason we decided to include biodegradable bags in the fee is the fact that the chemicals added to biodegradable bags are still harmful to the environment, even if they degrade faster than ordinary bags (Pilić, 2020). However, bags that can be broken down by microorganisms (Pilić, 2020), which should certainly appear on our market in the future primarily with consideration to environmental issues, should certainly be excluded from the fee system because such bags are environmentally friendly and acceptable.

Almost no research on this topic has been done in Serbia, so we think that, in the future, it should become the focus of interest of economists, ecologists, and technologists. The recommendation for future researchers on this topic is to perform an analysis of the effect that the ban on consumer behaviour concerning light plastic bags has in the cities, where the ban decision was made. Also, future papers could analyse the behaviour of plastic bag manufacturers and the behaviour of retailers in the event of the introduction of a new fee (environmental tax), which is proposed in this paper.

Some limitations came to light as this research was being conducted. Namely, one of the limitations is the possibility of obtaining different results on a sample comprising different people. The insufficient cooperation of competent institutions and institutes in submitting the required data related to the quality of biodegradable bags on our market and, in general, the consumption of plastic bags are also a serious problem in analysing this issue. The domestic researchers' insufficient interest in environmental taxes and their impact on the environment should certainly not be neglected and forgotten.

CONCLUSION

The problem of protecting and improving the quality of the environment is an integral part of the development strategies of countries around the world, including the Republic of Serbia. Among the issues that should be resolved in order to protect the environment is the issue of plastic bag consumption, especially the consumption of light, i.e. disposable plastic bags. Their production and consumption in enormous quantities, and their reckless disposal and slow decomposition have led to numerous environmental and health problems. Therefore, countries with higher levels of income place great importance on this problem. In middle- and lower-income countries, this problem is not considered important enough due to the numerous problems of economic and social nature.

Fees for plastic bags are imposed in Serbia, but their impact on plastic bag consumption is extremely small. The reason this impact is inconspicuous is the low amount prescribed by the fee, along with a lack of transparency. The fee charged by some traders is part of their income, and it is not used for environmental purposes. Additionally, the application of bans in certain cities, selective application with the presence of numerous exceptions, and insufficient control do not contribute to solving this problem.

This problem is more complex in Serbia because the environmental awareness of its citizens is not sufficiently developed. In many smaller places, stores do not carry substitutes for light plastic bags. Also, children do not acquire enough knowledge about the importance of a healthy environment through the educational system; even scientists from various fields do not pay enough attention to this topic. For this reason, this paper identifies the basic factors that would help solve this problem.

The results of the conducted statistical analysis showed that the development of environmental awareness, social norms, the availability of substitutes, and the introduction of a new fee which would burden consumers could contribute to solving the problem of plastic bags in the Republic of Serbia. There must also be an increase in the level of transparency during the introduction of new solutions, and the same should apply to the process of their implementation and the control of their implementation. Any kind of environmental tax should not be seen as no more than a burden by economic entities and persons on the territory of our country. People should be aware that environmental taxes are intended to change their behaviour, i.e. to make their behaviour environmentally friendly. By changing their behaviour, they will not be burdened with environmental taxes. Simply put, if people use linen bags, they will not have to pay the fee for plastic bags.

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УТИЦАЈ ЕКОЛОШКИХ ПОРЕЗА НА СМАЊЕЊЕ ПОТРОШЊЕ ПЛАСТИЧНИХ КЕСА У РЕПУБЛИЦИ СРБИЈИ

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Резиме

Проблем заштите и унапређења квалитета животне средине је саставни део развојних стратегија како земаља широм света тако и Републике Србије. Једно од питања које са циљем заштите животне средине треба решити је питање потрошње пластичних кеса, и то пре свега лаких, односно једнократних пластичних кеса. Разлог због којег је овај проблем од изузетно битног значаја је штетност коју ове кесе имају по животну средину и здравље људи. Њихова производња и потрошња у енорминим количинама, као и несавесно одлагање и спора разградња су довели до бројних еколошких и здравствених проблема. У нашој земљи су у циљу решавања овог проблема у примени накнаде за пластичне кесе, али њихов утицај на потрошњу је изузетно мали. Разлог због којег је овај утицај готово неприметан је низак износ прописане накнаде. Уз то, проблематично је и недовољна транспарентност. Накнада коју део трговаца наплаћује представља део њиховог прихода и не користи се у еколошке сврхе. Такође, примена забрана у појединим градовима, селективна примена уз присуство бројних изузетака и недовољна контрола не доприносе решавању овог проблема. У Републици Србији је проблем сложенији и због тога што еколошка свест грађана није довољно развијена. У радњама у многим мањим местима нема алтернатива за лаке

пластичне кесе. Такође, деца кроз образовни систем не стичу довољно знања о значају здраве животне средине, а ни научници из различитих области овој теми не посвећују довољно пажње. Из тог разлога, у раду су идентификовани основни фактори који би помогли да се дати проблем реши. Резултати спроведене статистичке анализе су показали да развој еколошке свести, друштвене норме, достуност алтернатива и увођење нове накнаде којом би потрошачи били оптерећени могу да допринесу решавању проблема пластичних кеса на теритрорији Републике Србије.

THE TEXTILE INDUSTRY TRADE COMPETITIVENESS OF SELECTED EUROPEAN TRANSITION COUNTRIES

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Abstract

The paper analyses the textile industry trade competitiveness of nine European transition economies (Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Hungary, North Macedonia, Romania, Serbia and Slovenia), in parts and in its entirety, by using the following indicators: Revealed comparative advantage (RCA), Competitiveness growth index (RCA1), Index of net business performance (RCA2), and Michaely index (MI). The analysis focuses on the period between 1995 and 2018. The results of the analysis show that the textile industry of Northern Macedonia is internationally competitive, and that most countries have revealed comparative advantages. The textile industry contributed to the surplus in trade balance in North Macedonia, Bulgaria and Romania, while North Macedonia, Romania, Bulgaria, Croatia, Bosnia and Herzegovina and Serbia achieved some level of production specialisation. It was also confirmed that these countries had statistically different levels of trade competitiveness. The top level of production finalisation accounted for the greatest average value of competitiveness indicators.

Key words: development, trade competitiveness, textile industry, Serbia, countries in transition.

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ТРГОВИНСКА КОНКУРЕНТНОСТ
ТЕКСТИЛНЕ ИНДУСТРИЈЕ
ОДАБРАНИХ ЕВРОПСКИХ ЗЕМАЉА У ТРАНЗИЦИЈИ

Апстракт

У раду се у целини и деловима испитује трговинска конкурентност текстилне индустрије девет европских транзиционих економија (Босна и Херцеговина, Бугарска, Хрватска, Чешка, Мађарска, Северна Македонија, Румунија, Србија и Словенија) коришћењем индикатора: Откривена компаративна предност (РЦА), Индекс раста конкурентности (РЦА1), Индекс нето пословних перформанси (РЦА2) и Михаели индекс (МИ). Анализа се фокусира на период између 1995. и 2018. године. На основу добијених вредности може се закључити да је текстилна индустрија Северне Македоније међународно конкурентна, те да су у већини земаља откривене компаративне предности. Позитиван допринос текстилне индустрије формирању активног трговинског биланса констатован је само у Северној Македонији, Бугарској и Румунији, док су Северна Македонија, Румунија, Бугарска, Хрватска, Босна и Херцеговина и Србија оствариле одређени степен специјализације производње. Такође, потврђено је постојање статистички значајних разлика у достигнутом степену трговинске конкурентности између ових земаља, са највишом просечном вредношћу свих показатеља конкурентности на највишем степену финализације производње.

Кључне речи: развијеност, трговинска конкурентност, текстилна индустрија, Србија, земље у транзицији.

INTRODUCTION

The textile industry is a manufacturing activity with a long tradition. Clothing and other textile products (industrial textiles, household textiles, etc.) belong to the group of the oldest products that man began to produce. It started to develop immediately after the First Industrial Revolution.

The significant contribution of the textile industry to the economic development of Great Britain, the United States of America and many Asian countries in the nineteenth and twentieth centuries is indisputable. Moreover, even though the textile industry is described as a low-accumulative and labour-intensive area of production, its participation in creating the total value of production is noticeable in quite a few economically highly developed countries.

Until 2005, this area of production was one of the most protected production activities in the world through the system of trade quotas, which enabled economically advanced countries to shape the nature of business transactions within the textile industry in global relations. Unfortunately, this was often at the expense of economically less developed countries. The abolition of trade quotas and the strong wave of globalisation of production have brought significant changes to the world textile industry (Adhikari & Yamamoto, 2007). There has been an affirmation of multinational textile companies that carry out various business activities

in many countries using the comparative advantages of individual countries to improve production competitiveness and overall business. Many well-known companies in the textile industry have undergone a system of subcontracting – outsourcing or relocating their labour, environmental, and/or cost-intensive activities to countries with lower operating costs and more liberal regulation. This, in turn, marked the relocation of production and employment from developed to less developed countries (e.g., from the US, Japan, Germany, Italy and France to China, India, Tunisia, Morocco, Poland, Turkey, Romania, Bulgaria, Serbia). These processes are accompanied by the disappearance of old, well-known companies and the emergence of new fast-growing companies in the textile industry, mostly in countries with dynamic development.

The paper presents an explanation of the trade competitiveness of the textile industry of nine countries with a socialist background (B&H, Bulgaria, Croatia, the Czech Republic, Hungary, North Macedonia, Romania, Serbia and Slovenia), and focuses on the period between 1995 and 2018. The goal of the paper is to analyse the trade competitiveness of the mentioned economies, which showed varying degrees of success while transitioning from socialist to market economy, and had a very pronounced process of deindustrialisation.

Some of these countries are among the most successful transition economies (Czech R., Slovenia and Hungary). Others became successful as a result of joining the EU (Croatia, Bulgaria, Romania), while Bosnia and Herzegovina, N. Macedonia, and Serbia can be marked as countries of the so-called delayed transitions.

Two research hypotheses were set: (H1) the trade competitiveness of the textile industries of the analysed countries is substantially different; and (H2) the manifested differences are a significant part of the result of the reached level of finalisation of production in the textile industries of these countries.

THE CONCEPT OF INDUSTRY COMPETITIVENESS

Competitiveness is a popular, but also a broadly defined concept. In economic theory and practice, there is no single understanding and interpretation of this concept, and the scope of competitiveness analysis varies from individual entities to countries and regional economic integrations.

Competitiveness can be a dynamic, multifactorial, and hierarchical issue (Jovović, 2017). It can be seen at distinct levels, starting from small businesses, industrial clusters, supply chains of economies, and economic branches, all the way to national economies and individual regional units (Fischer & Schornberg, 2007).

The export competitiveness of the industry sector is a function of many factors. The quality of products and accompanying services, customer satisfaction, and employee satisfaction in this production sector are just some of them (Rybakovas, 2009) In other words, the competitiveness of the industry implies its ability to successfully compete in order to achieve sustainable growth within the global environment (Lall, 2001; Esterhuizen, Rooyen & D'Haese, 2008).

Due to the fact that competitiveness is viewed as the attributes and qualities of an economy that allow for a more efficient use of factors of production (Schwab, 2019, p. 2), and as a factor in changing the structure of the economy, economies strive to improve the competitiveness of industry and, on that basis, increase the well-being of the population in their countries (UNIDO, 2013, p. xviii)

As industry competitiveness involves the macroeconomic assessment of the competitiveness of certain sectors of the economy, there is an overlap in the observation of national competitiveness and the competitiveness of individual sectors. The competitiveness of the country shows its ability to produce goods whose realisation increases the level of the well-being of the population in conditions of free competition (Despotović et al., 2021, p. 576). Jucevicius and Ribakovas (2010, p. 391) believe that national competitiveness is largely determined by the quality of the economic performance of certain industrial sectors, that is, the competitiveness of companies operating in certain industrial branches, i.e. the ability of individual companies to compete and, on the basis of this, increase their market share, profit and growth (Krstić et al., 2016, p. 1037)

According to Cvetanović, Nikolić and Cvetanović (2019, p. 211) the competitiveness of the sector refers to the ability of companies operating within the observed area to compete on the domestic, and especially the world market. Additionally, it refers to the readiness of the state to ensure favourable business conditions for domestic companies that are not inferior to similar industrial companies in other countries.

LITERATURE REVIEW

Textile industry trade competitiveness is a contemporary research issue in various foreign (Rout & Saini, 2021; Dhiman et al., 2020; Kiron, 2020; Bambang & Sukadwilinda, 2020; Guan et al., 2019; Kathuria, 2018; Assadzadeh et al., 2013; Singh & Lal, 2013; Chi, 2010; Shafaei, 2009; Kilduff & Chi, 2007, etc.) and domestic (Gligorijevic & Corovic, 2020; Corovic, Gligorijevic & Manasijevic, 2019; Corovic, Jovanovic & Ristic, 2013; Halilbasic, Brkic & Bosic, 2015; Raicevic & Corovic, 2010) papers, in which a similar methodological approach has been applied. Authors Rout, Gordhan and Saini (2021) conducted a study of "the trade competitiveness of India's man-made fiber-based textile and apparel sec-

tor for the period 2010-2019" by using the Index of Revealed Comparative Advantage, Trade Intensity Index, and Export Similarity Index. Bambang and Sukadwilinda (2020) did an "Analysis of Export Competitiveness Textile and Apparel Indonesia, China, India" using the Herfindahl approach, Trade Specialisation, Releveled Comparative Advantage and Constant Market Share. Guan et al. (2019) researched "International competitiveness of Chinese textile and clothing industry" using the 'Diamond Model', in which trade competitiveness revealed comparative advantage, and international competitiveness' impact on market share is observed through the estimated coefficients of explanatory variables: raw materials, labour, capital, demand, related industries, strategies and policies. Chi (2010) utilised Ordinary-least-square regression under a gravity model framework and the calculated relative difference index to study the impacts of major economic and political factors on the US technical textile export to its 15 major trading partners between 1996 and 2006. Similarly, for their research on the competitiveness of Serbia's textile industry, Corovic, Jovanovic and Ristic (2013) used the simplified national export profile and the Balassa index of revealed comparative advantage, and for the research "Competitiveness of the Textile Industry of the Republic of Serbia on the EU Market", Gligorijević and Ćorović (2020) used a Trade Performance Index group of indicators.

AN OVERVIEW OF THE ECONOMIC DEVELOPMENT AND EXPORT OF THE TEXTILE INDUSTRIES IN THE SELECTED COUNTRIES IN THE PERIOD BETWEEN 1995 AND 2018

The relatively rapid economic growth of the analysed countries was accompanied by a pronounced trend of deindustrialisation in the period between 1995 and 2018 in most countries (Serbia, North Macedonia, Croatia, Romania and Slovenia). Unlike these countries, Bosnia and Herzegovina, the Czech Republic and Hungary strengthened their Manufacturing and increased its share in the economy, i.e., its contribution to GDP (table 1).

Slightly different trends were noted regarding the importance of Textiles and clothing in creating value added in manufacturing. At the beginning of the period, North Macedonia and Slovenia had the highest share of Textiles and clothing in the creation of value added in manufacturing (above 14%). A slightly smaller participation was present in Romania, Bosnia and Herzegovina, and Croatia (around 12%), and the least participation was recorded in Bulgaria (11.77%), Hungary (8.07%), the Czech Republic (7.24%), and Serbia (6.13%). At the end of the observed period (in 2018 for all countries except for the Czech Republic - 2013), the largest share of Textiles and clothing in value added in manufacturing was recorded by North Macedonia (18.87%), Bosnia and

Herzegovina (12.59%), Bulgaria (10.45 %) and Romania (10.15%), followed by Serbia (7.32%) and Croatia (5.08%), while the smallest share of Textiles and clothing in value added in manufacturing was measured in the Czech Republic (2.54%), Slovenia (2.35%) and Hungary (2.11%). The situation is more favourable with regard to the export of textile industry products, because all observed countries achieved an increase in exports compared to 1998 (Graph 1).

Table 1. Share Manufacturing in GDP and Textiles and clothing in manufacturing in 1995-2018

	Growt of GDP (in constant 2010 US$)		Manufacturing, value added (% of GDP)			Textiles and clothing (% of value added in manufacturing)		
	y/y (in %)	CAGR[1] (in %)	1995	2018	% change	1995	2018	% change
B&H	593	8.8	11.44	13.23	1.79	12.54[3]	12.59	0.05
Bulgaria	102.4	3.1	-	-	-	11.77[4]	10.45	-1.32
Croatia	85.6	2.7	18.54	12.52	-6.02	12.44	5.08	-7.36
Hungary	85.7	2.7	18.19	18.64	0.45	8.07	2.11	-5.97
N.Macedonia	78	2.5	18.66	12.60[2]	-6.06	14.67	18.87	4.20
Romania	136.5	3.8	23.87	18.71	-5.16	12.71	10.15	-2.57
Serbia	124.7	3.6	23.47	14.51	-8.96	6.13[5]	7.32	1.19
Slovenia	76.2	2.5	21.57	20.43	-1.15	14.35	2.35	-12.00
Czech R.	73.2	2.4	21.53	23.08	1.55	7.24[6]	2.54[7]	-4.70

Note: [1]Compound annual growth rate; [2]data refer to 2017; [3]data refer to 2010; [3,6] data refer to 1996; [5]data refer to 2002; and[7]data refer to 2013.
Source: Authors' calculation based on World Bank database
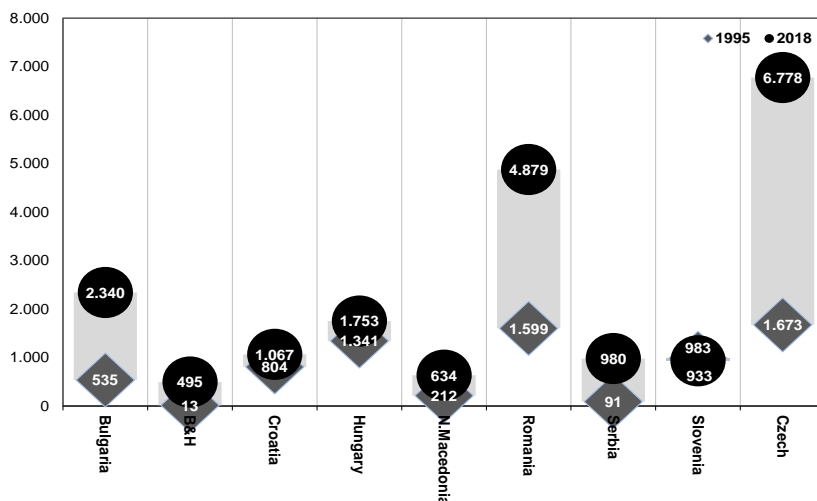
Graph 1. Export textile industry of in 1995 and 2018, in million USD
Source: Authors' calculation, based on the data taken from the World Bank database

Although the volume and growth of exports are the basic indicators of the trade competitiveness of the textile industry, this paper provides a more comprehensive and deeper comparative analysis of the export competitiveness of the textile industries of the nine selected transitional economies. Accordingly, in the continuation of the paper, various indicators of the trade competitiveness of the textile industries of the selected countries are analysed in more detail, and the validity of the set research hypotheses is tested with the help of appropriate analytical tools.

INDICATORS AND DATA SET OF TRADE AND INDUSTRY COMPETITIVENESS

Han, Wen and Kant (2009) state that, although there is no generally accepted indicator of competitiveness in various economic analyses, numerous indicators have been used to detect and measure competitiveness, the combination of which can illustrate the competitiveness of a selected branch or the economy as a whole. This point of view regarding the indicators of the competitiveness of individual sectors and the economy as a whole was previously explained in an almost identical way by Gries and Hentschel (1994), who found that it is possible to describe the competitive position of a certain sector and (or) country by combining a number of partial indicators.

The aforementioned researchers distinguished between indicators of competitiveness oriented towards results and indicators of competitiveness oriented towards the determinants of the competitive position of sectors, that is, countries. The first group of indicators includes, for example, data that speaks about the terms of trade, and comparative advantages revealed by indices, while the second group consists of indicators related to legal and institutional framework of business, and infrastructure development.

Dieter and Englert (2007) point out that, indicators oriented to results are more suitable for the analysis of sectoral competitiveness than indicators oriented to determinants, which are more applicable when researching the competitiveness of countries. According to these authors, results-oriented indicators are extremely useful in revealing the ex-post competitive position of the considered manufacturing sector in the international market. Acknowledging this, the analysis will be done with results-oriented indicators.

Many results-oriented indicators of competitiveness, including different variants of the RCA index, are based on the trade theory of classical economist David Ricard, according to which labour productivity in the observed country indicates the relative comparative advantage of the industry sector between countries.

Ricardian comparative advantage is a useful tool because it shows that a country should produce (and export) relatively more in those indus-

tries in which it is relatively more productive. The idea of Revealed comparative advantage (RCA) is to compare the performance of a country in one industry to the performance of a reference group of countries using export flows. RCA compares the country's performance in the observed branch of industry with the performance of other countries in the value of whole exports (Leromain & Orefice, 2014. p. 56).

RCA posits that patterns of trade among countries are governed by their relative differences in productivity. It shows the production specialisation level in a certain sector. In activities characterised by high productivity, there is a tendency to specialise and concentrate production (Jucevicius & Rybakovas, 2010. p. 392). Therefore, RCA measures can be most appropriately utilised to study patterns of comparative advantage within somewhat narrowly defined sectors (French, 2017. p. 4).

The RCA metric can be readily calculated using trade data to 'reveal' such differences. In particular, RCA shows that country j has revealed comparative advantage in the observed industry in a situation when its ratio of the value of exports of industry i to the value of total exports of all industrial products exceeds the same ratio considered for the whole world:

$$RCA_{ij} = (x_{ij}/X_j) \ / \ (x_{iw}/X_w) \qquad (1)$$

In equation (1), X_{ij} denotes the value of industry i in country j; X_j, denotes the value of total exports of country j; x_{iw} denotes the value of total exports of industry i from all countries; and X_w denotes the value of total industrial exports of all economies in world trade. For RCA >1, it follows that the observed industry is more significant in the country's exports compared to total international trade. According to Clark, Sawyer and Sprinkle (2005), the country has revealed comparative advantage for a given industry in relation to the global competitive environment. A country with a revealed comparative advantage in industry i is considered to have export potential in that area of production (UNCTAD, 2021). A country's higher RCA value for industry indicates its greater export strength in industry, and precisely because of this fact, RCA is a sign of the international specialisation of certain countries (Jucevicius & Ribakovas, 2010. p. 392).

RCA1 measures the competitiveness of a sector in a regional and global market. It is measured as a fraction between the relation of commodity sector/group exports (esc) and whole country exports (Ec), and the relation of world commodity sector/group exports (Es) and global exports value (E). It can be seen in equation (2):

$$RCA1 = (esc/Ec) \ / \ (Es/E) \qquad (2)$$

For RCA1>1, there is a revealed comparative advantage of a commodity group (sector) in international economy. Conversely, for RCA1<1, there is no revealed comparative advantage in the market under consideration.

The RCA2 index measures the contribution amount of a particular sector to the formation of an active trade balance i.e. the comparative advantage of the sector's exports and its competitiveness. In this regard, the volume of exports is, to some extent, a measure of a comparative advantage of one sector. The index is calculated when commodity sector imports are subtracted from exports, and that is put into relation with imports added to exports. It is shown in formula (3):

$$RCA2 = [(e_{sc} - i_{sc}) / (e_{sc} + i_{sc})] \qquad (3)$$

RCA2 ranges from -1 to 1. If RCA2 equals -1, there are no exports; consequently, $e_{sc} = 0$. When RCA2 is greater than -1, but lower than 0, it indicates comparative shortcomings; if RCA2 equals 0, the exports are equal to the imports, and $e_{sc} = i_{sc}$. If RCA2 is greater than 0, but lower than 1, it shows a detected comparative advantage; and if RCA2 equals 1, the imports do not exist, i.e. $i_{sc} = 0$.

The Michaely index (MI), named for its author, quantifies trade specialisation at the industry level (Laursen, 2015. p. 108). The form for its calculation is given in equation (4):

$$MI_{ij} = (X_{ij}/\textstyle\sum_i X_{ij} - M_{ij}/\textstyle\sum_i M_{ij}) \times 100 \qquad (4),$$

where X_{ij} denotes the value of exports of i sector of j country, and M_{ij} are imports of i sector of country j (Michaely, 1962). The part of the formula before the minus sign tells about the percentage participation of the observed industry in national exports, while the part of the formula after the minus sign indicates the percentage participation of the given industry in national imports. The measure ranges between -100 and +100. A positive order of the index points to the conclusion that the observed country is specialised in a certain area, while on the contrary, a negative value implies a lack of specialisation (Laursen, 2015. p. 108).

A COMPARATIVE ANALYSIS OF THE TEXTILE TRADE COMPETITIVENESS OF THE SELECTED COUNTRIES IN THE PERIOD BETWEEN 1995 AND 2018

In 2018, only the Bulgarian Textile industry (Textile fibres, yarn, fabrics and clothing) realised a surplus in foreign trade with other countries (+8.49%), compared to 1995 when five of the nine analysed countries had a surplus in the textile industry: Croatia (exports exceeded imports by +56.60%), North Macedonia (+50.12%), Slovenia (+48.18%), Romania (+29.97%) and Bulgaria (+9.09%).

After Bulgaria, where Textile industry exports exceeded imports by 8.49%, the highest coverage of imports by exports in 2018 was recorded in North Macedonia, where import-export coverage was 96.19%, followed by Serbia (85.29%), Romania (80.32%), Slovenia (73.64%), Bosnia and Herze-

govina (62.14%), Croatia (55.73%) and Hungary (52.90%). The Czech Republic had the lowest coverage of imports by exports – only 3.58%.

The obtained results for four indicators of foreign trade competitiveness of the textile industries (Revealed comparative advantage – RCA, Competitiveness growth index - RCA1, Index of net business performance - RCA2, and Michaely index) of the selected transition countries in the period between 1995 and 2018 are given in Table 2.

Table 2. *Trade competitiveness indexes of analysed countries in the 1995-2018 period, average values*

	RCA	RCA1	RCA2	MI
Czech Republic Textile industry	-0.3907	0.59478	-0.9233	-0.0144
Textiles fibres and their wastes	0.120761	0.109933	-0.86312	0.000581
Textile yarn and related products	-0.12851	0.402402	-0.90009	-0.00362
Articles of apparel & clothing accessories	-1.67808	0.082441	-0.97107	-0.0114
Hungarian Textile industry	-0.1938	0.64533	-0.1067	-0.0017
Textiles fibres and their wastes	-0.8977	0.015845	-0.42253	-0.0013
Textile yarn and related products	-0.69968	0.188715	-0.33645	-0.01324
Articles of apparel & clothing accessories	0.259117	0.440771	0.108828	0.012866
Slovenian Textile industry	-0.1048	0.90377	-0.0711	-0.0005
Textiles fibres and their wastes	-2.42378	0.004682	-0.83713	-0.00275
Textile yarn and related products	0.086783	0.459628	0.024144	0.001557
Articles of apparel & clothing accessories	-0.26115	0.439461	-0.14338	0.000706
Romanian Textile industry	0.35826	2.77173	0.04128	0.05417
Textiles fibres and their wastes	-1.22955	0.037618	-0.61587	-0.00444
Textile yarn and related products	-1.17241	0.409821	-0.59759	-0.05621
Articles of apparel & clothing accessories	1.76566	2.324287	0.606628	0.11482
Bulgarian Textile industry	0.38262	2.3829	0.07083	0.04333
Textiles fibres and their wastes	-0.8873	0.071012	-0.50387	-0.0053
Textile yarn and related products	-0.77396	0.447285	-0.46134	-0.02996
Articles of apparel & clothing accessories	1.445151	1.864604	0.537072	0.078582
Croatian Textile industry	0.36893	1.63524	-0.1201	0.03363
Textiles fibres and their wastes	-2.11013	0.005513	-0.85939	-0.00173
Textile yarn and related products	-0.52863	0.272311	-0.50868	-0.00966
Articles of apparel & clothing accessories	0.800162	1.357417	0.086024	0.045028
Serbian Textile industry	0.2245	1.26642	-0.1958	0.01283
Textiles fibres and their wastes	-1.57636	0.020016	-0.75605	-0.00285
Textile yarn and related products	-0.72349	0.302562	-0.58133	-0.01832
Articles of apparel & clothing accessories	1.077817	0.943838	0.2117	0.034003
B&H Textile industry	0.28227	1.52286	-0.3345	0.02493
Textiles fibres and their wastes	-1.6513	0.01004	-0.85681	-0.00174
Textile yarn and related products	-1.07982	0.264478	-0.76221	-0.02057
Articles of apparel & clothing accessories	1.105221	1.248343	0.059624	0.047239
North Macedonian Textile industry	1.15726	4.13646	0.29817	0.14937
Textiles fibres and their wastes	-1.22719	0.054748	-0.6041	-0.00071
Textile yarn and related products	-0.65323	0.462425	-0.41292	-0.02892
Articles of apparel & clothing accessories	2.634587	3.61929	0.759663	0.178994

Source: Authors' calculation based on the data taken from the UNCTAD stat database

The negative average values of RCA indexes in the most successful countries in transition (Czech R., Slovenia and Hungary) indicates that their textile industry is not relatively competitive as it does not show a comparative advantage.

In countries such as Serbia and B&H, as well as Romania, Croatia and Bulgaria, the positive values of the RCA index shows that their textile industries have comparative advantage in the national market. Only in North Macedonia is the value of the RCA index higher than one, meaning that the textile industry of this country is internationally competitive.

Within the textile industry, the competitive situation in the activities of *Textiles fibres and their wastes* and *Textile yarn and related products* is very unfavourable. The positive values of the RCA index in *Textiles fibres and their wastes* were recorded only in the Czech Republic, and only in Slovenia in *Textile yarn and related products*. This means that just some level of competitiveness from activities within their national economies has been achieved. The circumstances are considerably better in the field of production of *Articles of apparel & clothing accessories*, where entities from Serbia, Bosnia and Herzegovina, Bulgaria, Romania, and especially from North Macedonia managed to build substantial international competitiveness. *Articles of apparel & clothing accessories* in Hungary and Croatia is competitive in the national market of these countries, which is not the case with Slovenia, or the Czech Republic, where these products have no comparative advantages in either the domestic or the international markets.

Based on the average, the RCA1 index detected that comparative advantage in the global market exists in most of the observed countries, with the largest comparative advantage of the textile industry recorded in North Macedonia, followed by the Romanian, Bulgarian, Croatian, Bosnian and Serbian Textile industries. In contrast to these countries, the Czech, Hungarian and even Slovenian Textile industries do not have competitiveness in the analysed market.

A partial analysis of the textile industry shows that the activities of *Textile yarn and related products* and *Textiles fibres and their wastes* are not competitive in the relevant market. Additionally, the activities of *Articles of apparel & clothing accessories* in the Czech Republic, Hungary and Slovenia are similarly not competitive in the relevant market. The situation is completely different in the countries of North Macedonia, Romania, Bulgaria, Croatia, Bosnia and Herzegovina, and Serbia, where the activity of *Articles of apparel & clothing accessories* has a discovered comparative advantage in the global market.

The average values of the RCA2 index in the analysed countries indicate that the textile industry is adding trade surplus in North Macedonia, Bulgaria and Romania. Conversely, in Slovenia, Hungary, Croatia, Serbia, Bosnia and Herzegovina, and especially in the Czech Republic,

due to comparative shortcomings, this sector of the manufacturing industry has a deficit in foreign trade, which negatively affects the foreign trade balance of these countries. The values of the RCA2 index indicate a very unfavourable situation in terms of the contribution to the foreign trade balance, and *Textiles fibres and their wastes* and *Textile yarn and related products* in all observed countries (except for *Textile yarn and related products* in Slovenia). This situation is a consequence of the currents of globalisation, due to which less added value is produced, such as textiles fibres and their wastes and textile yarn and related products, which are used as raw materials when producing final products in the textile industry (i.e. in the production of articles of apparel and clothing accessories, products in less developed countries or in countries that have distinct comparative advantages in their production). The picture is completely different with the subsector *Articles of apparel & clothing accessories* because this activity has a deficit in foreign trade only in the Czech Republic and Slovenia, while *Articles of apparel & clothing accessories* positively affects the movement of the foreign trade balance in the rest of the analysed countries, especially in North Macedonia, Romania and Bulgaria.

The average values of MI show that North Macedonia, Romania, Bulgaria, Croatia, Bosnia and Herzegovina, and Serbia have achieved a certain specialisation level in the textile industry, in contrast to the Czech Republic, Hungary and Slovenia, which have insufficient specialisation in the textile industry. All observed countries (except the Czech Republic for *Textiles fibres and their wastes*, and Slovenia for *Textile yarn and related products*) have an insufficient level of specialisation in *Textiles fibres and their wastes* and *Textile yarn and related products*. The least specialised was *Textile yarn and related products* in Romania, Bulgaria, North Macedonia, and Bosnia and Herzegovina. The circumstances with the trade of *Articles of apparel & clothing accessories* are significantly more favourable, because all observed countries (except the Czech Republic) have achieved a certain level of specialisation, with the highest level of specialisation recorded by North Macedonia, Romania and Bulgaria, followed by Bosnia and Herzegovina, Croatia and Serbia. Hungary and Slovenia were the least specialised in the sub-sector of *Articles of apparel & clothing accessories*, while the Czech Republic has not achieved any specialisation in this sub-sector.

The validity of the H1 hypothesis was tested with the multivariate analysis of variance - MANOVA. Based on the Wilks' Lambda (WL) indicator and its values, it can be deduced that the trade competitiveness of the analysed countries' industries are statistically different. By combining all of the presented indexes (RCA, RCA1, RCA2 and MI), and by getting a WL result lower than 0.05, the H1 hypothesis, which posits that the trade competitiveness of the textile industries of the analysed countries are substantially different, is confirmed.

Table 3. Multivariate Tests

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	0.953	1024.530[b]	4.000	204.000	0.000	0.953
	Wilks' Lambda	0.047	1024.530[b]	4.000	204.000	0.000	0.953
	Hotelling's Trace	20.089	1024.530[b]	4.000	204.000	0.000	0.953
	Roy's Largest Root	20.089	1024.530[b]	4.000	204.000	0.000	0.953
Country	Pillai's Trace	2.161	30.401	32.000	828.000	0.000	0.540
	Wilks' Lambda	0.011	56.758	32.000	753.910	0.000	0.677
	Hotelling's Trace	16.653	105.383	32.000	810.000	0.000	0.806
	Roy's Largest Root	13.506	349.468[c]	8.000	207.000	0.000	0.931

Source: Authors' calculation

More detailed data about indicators of trade competitiveness concerning a statistically significant difference is given in Table 3 (column Sig.). Based on this data, it was found that all of the indexes used differ statistically in relation to the observed countries. Also, an estimate of the magnitude of the impact (Partial Eta Squared column) is given. This indicator shows to which degree the independent variable – the observed country in the case of this analysis – is responsible for the difference in the observed indexes, which represent the dependent value. By reviewing the partial eta square, the conclusions are that the observed countries have a significant influence in explaining all indicators, as well as that countries explain the highest percentage of the variance of the RCA2 indicators, and the lowest percentage of the variance of the RCA indicators.

Information about which countries differ statistically by individual indicators of trade competitiveness is given in the Bonferroni column. It shows statistically important differences between Serbia (7) and the Czech Republic (1), and Hungary (2) and North Macedonia (9) in the RCA indicator. The analysis of the RCA1 indicator value shows that Serbia is different from Croatia (6), and Bosnia and Herzegovina (8), but also from all other countries. The RCA2 index shows that the difference between Serbia and Hungary (2), Slovenia (3), as well as Romania (4) and Croatia (1-2) is not statistically important. According to the MI indicator, Serbia differs only in relation to Romania (4) and North Macedonia (9).

From Table 4, it can be concluded that North Macedonia has the highest values in all examined indicators. Also, it is possible to draw conclusions regarding other analysed countries.

Table 4. Multivariate analysis of variance

Country	RCA	RCA1	RCA2	MI
(1) Czech Republic	-0.390583	0.594875	-0.923250	-0.014500
(2) Hungary	-0.193708	0.645250	-0.106750	-0.001667
(3) Slovenia	-0.104792	0.903792	-0.071125	-0.000500
(4) Romania	0.358208	2.771750	0.041292	0.054167
(5) Bulgaria	0.382542	2.382833	0.070833	0.043250
(6) Croatia	0.368875	1.635250	-0.120042	0.033542
(7) Serbia	0.224542	1.266417	-0.195792	0.012917
(8) B&H	0.282250	1.522875	-0.334458	0.024875
(9) N. Macedonia	1.157292	4.136375	0.298167	0.149333
F	31.860	76.181	142.576	33.328
p-value	0.000	0.000	0.000	0.000
Par.Eta Squa.	0.552	0.746	0.846	0.563
Bonferroni	1-4, 1-5, 1-6, 1-7, 1-8, 1-9, 2-4, 2-5, 2-6, 2-7, 2-8, 2-9, 3-4, 3-5, 3-6, 3-8, 3-9, 4-9, 5-9, 6-9, 7-9, 8-9	1-4, 1-5, 1-6, 1-7, 1-8, 1-9, 2-4, 2-5, 2-6, 2-7, 2-8, 2-9, 3-4, 3-5, 3-6, 3-7, 3-8, 3-9, 4-6, 4-7, 4-8, 4-9, 5-6, 5-7, 5-8, 5-9, 6-9, 7-9, 8-9	1-2, 1-3, 1-4, 1-5 1-6, 1-7, 1-8, 1-9, 2-4, 2-5, 2-8, 2-9, 3-5, 3-8, 3-9, 4-6, 4-7, 4-8, 4-9, 5-6, 5-7, 5-8, 5-9, 6-8, 6-9, 7-8, 7-9, 8-9	1-4, 1-5, 1-6, 1-8, 1-9, 2-4, 2-5, 2-9, 3-4, 3-5, 3-9, 4-7, 4-9, 5-9, 6-9, 7-9, 8-9

Source: Authors' calculation

The values of the competitiveness indicators were observed by degrees of finalisation in order to test the H2 hypothesis, and all countries were analysed in aggregate, not partially. Testing was done with ANOVA – analysis of variance. Table 5 shows the descriptive indicators of the values of the competitiveness indicators according to the degrees of finalisation, when all analysed countries are observed together. The results showed that the peak level of finalisation (sub-sector *Articles of apparel & clothing accessories*) led to the highest average values of the competitiveness indicators.

From the presented data, it can be seen that the highest average values of all competitiveness indicators exist at the highest level of finalisation (*Articles of apparel & clothing accessories*).

The results of the ANOVA analysis can be seen in Table 6. The level of finalisation of production was the independent variable, while the aforementioned indexes were the dependent variables. The realised value of the F test indicates that the level of finalisation significantly affects the average value of all competitiveness indexes, as Sig. is less than 0.005. This means that the highest average values of the indicators are connected with the highest degree of production finalisation.

Table 5. *Competitiveness of selected countries, depending on the production finalisation level in the textile industry*

		Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
RCA	Textiles fibres and their wastes	-1.320	0.748	0.249	-1.895	-0.745
	Textile yarn and related products	-0.630	0.404	0.135	-0.941	-0.320
	Articles of apparel & clothing accessories	0.794	1.247	0.416	-0.164	1.753
	Total	-0.385	1.227	0.236	-0.871	0.100
RCA1	Textiles fibres and their wastes	0.037	0.036	0.012	0.009	0.064
	Textile yarn and related products	0.357	0.101	0.034	0.279	0.434
	Articles of apparel & clothing accessories	1.369	1.107	0.369	0.518	2.219
	Total	0.587	0.846	0.163	0.253	0.922
RCA2	Textiles fibres and their wastes	-0.702	0.169	0.056	-0.832	-0.572
	Textile yarn and related products	-0.504	0.263	0.088	-0.707	-0.301
	Articles of apparel & clothing accessories	0.140	0.511	0.170	-0.253	0.533
	Total	-0.355	0.495	0.095	-0.551	-0.160
MI	Textiles fibres and their wastes	-0.002	0.002	0.001	-0.004	-0.001
	Textile yarn and related products	-0.020	0.017	0.006	-0.033	-0.007
	Articles of apparel & clothing accessories	0.056	0.060	0.020	0.009	0.102
	Total	0.011	0.048	0.009	-0.008	0.030

Source: Authors' calculation

Table 6. ANOVA

		Sum of Squares	Df	Mean Square	F	Sig.
RCA	Between Groups	20.931	2	10.465	13.779	0.000
	Within Groups	18.228	24	0.760		
	Total	39.159	26			
RCA1	Between Groups	8.703	2	4.352	10.560	0.001
	Within Groups	9.890	24	0.412		
	Total	18.593	26			
RCA2	Between Groups	3.486	2	1.743	14.552	0.000
	Within Groups	2.875	24	0.120		
	Total	6.361	26			
MI	Between Groups	0.028	2	0.014	10.716	0.000
	Within Groups	0.032	24	0.001		
	Total	0.060	26			

Source: Authors' calculation

The results presented in Tables 5 and 6 prove that the level of finalisation positively affects export competitiveness, and that the effect is statistically significant. This confirms the H2 hypothesis, which posits that the manifested differences are a significant part of the result of the reached level of finalisation of production in the textile industry of these countries.

CONCLUSION

The textile fibres, yarn, fabrics and clothing sector greatly contributed to the export expansion of the observed countries in transition (except Slovenia). The largest increase in the value of textile industry exports in the period between 1995 and 2018 was recorded by the Czech Republic and Romania.

The obtained negative average values of the RCA index in the most successful countries in transition (the Czech Republic, Hungary and Slovenia) show that the textile industries in these countries have no comparative advantage, i.e., that they are not competitive compared to the textile industries of other countries. The situation is somewhat more favourable in countries such as Serbia and the B&H, as well as Romania, Croatia and Bulgaria, where the positive values of the RCA index indicate that the textile industry has a comparative advantage in the national market. The value of the RCA index is greater than 1 only in North Macedonia, which means that the textile industry of this country is internationally competitive. Within the textile industry, the competitive situation in the activities of *Textiles fibres and their wastes* and *Textile yarn and related products* is very unfavourable.

The average value of the RCA1 index shows that the detected comparative advantage of the textile industry in the global market exists in most of the observed countries, with the largest comparative advantage of the textile industry recorded in North Macedonia, then Romania and Bulgaria, followed by Croatia, Bosnia and Herzegovina and Serbia. The Textile industries of the Czech Republic, Hungary and even Slovenia are not competitive in the relevant market. The analysis of individual parts of the textile industry shows that the activities of *Textile yarn and related products* and *Textiles fibres and their wastes* do not have a competitive advantage in the relevant market, and neither do the activities of *Articles of apparel & clothing accessories* in the Czech Republic, Hungary and Slovenia. The situation is different in the countries of North Macedonia, Romania, Bulgaria, Croatia, Bosnia and Herzegovina, and even Serbia, where the activity of *Articles of apparel & clothing accessories* has a clear comparative advantage in the global market.

The average values of the RCA2 index show the existence of a positive contribution of the textile industry in the formation of the active trade balance in North Macedonia, Bulgaria and Romania. Conversely, in

Slovenia, Hungary, Croatia, Serbia, Bosnia and Herzegovina, and especially in the Czech Republic, due to comparative shortcomings, this sector of the manufacturing industry has a deficit in foreign trade, which negatively affects the foreign trade balance of these countries. The values of the RCA2 index indicate a very unfavourable situation in terms of the contribution to the foreign trade balance and *Textiles fibres and their wastes* and *Textile yarn and related products* in all observed countries (except for *Textile yarn and related products* in Slovenia).

The average values of MI show that North Macedonia, Romania, Bulgaria, Croatia, Bosnia and Herzegovina, and Serbia have achieved a certain degree of specialisation in the textile industry, in contrast to the Czech Republic, Hungary and Slovenia, which have insufficient specialisation in the textile industry. All observed countries have an insufficient level of specialisation in the activities of *Textiles fibres and their wastes* and *Textile yarn and related products*, and the lowest level of specialisation was recorded in *Textile yarn and related products* in Romania, Bulgaria, North Macedonia and Bosnia and Herzegovina.

Statistically significant differences in the achieved level of trade competitiveness among the observed countries are seen through the MANOVA analysis. This confirms hypothesis H1, which concerns the existence of a statistically significant difference in terms of the achieved level of trade competitiveness between the observed countries. The analysis showed that North Macedonia has the highest values in all examined indicators in the observed period.

The highest average values of all competitiveness indicators exist at the highest degree of finalisation (*Articles of apparel & clothing accessories*), as is shown by the ANOVA analysis. Additionally, the degree of finalisation significantly affects the average value of all competitiveness indicators. As the highest average values of indicators are related to the highest degree of finalisation, it can be concluded that the degree of finalisation has a positive impact on export competitiveness, i.e. that there is a statistically significant impact of the degree of finalisation on the average value of all competitiveness indicators.

After the analysis, especially the results indicating that the higher level of product finalisation leads to higher exports, the advice for the analysed countries is to develop more activities that lead to final production. As a result, they could bring higher added value and better exports to their countries. In this way, the development and export potential of the textile industries in the analysed countries in transition can be used to a greater extent. Further research may focus on different countries, or a different sector or industry in the same group of selected countries.

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ТРГОВИНСКА КОНКУРЕНТНОСТ ТЕКСТИЛНЕ ИНДУСТРИЈЕ ОДАБРАНИХ ЕВРОПСКИХ ЗЕМАЉА У ТРАНЗИЦИЈИ

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Резиме

Текстилна индустрија, као једна од најстаријих људских делатности, одиграла је значајну улогу у почетним фазама индустријализације у бројним европским и азијским земљама, и још увек има значајну развојну улогу како у сада индустријализованим земљама, тако и у земљама у развоју. Временом текстилна индустрија пролази кроз структурне промене услед глобализације тржишта, промена потреба потрошача, увођења иновација, премештања производње из развијених у мање развијене земље, промене образаца пословања (пословање путем подуговарања – енгл. outsourcing) и сталне појаве нових произвођача из земаља у развоју. Све ове промене утичу и одређују правац и динамику развоја, и трговинску конкурентност текстилне индустрије широм света. У складу са тим, предмет истраживања у овом раду је анализа развијености и трговинске конкурентности текстилне индустрије девет транзиционих европских земаља (Босна и Херцеговина, Бугарска, Хрватска, Чешка Република, Мађарска, Северна Македонија, Румунија, Србија и Словенија) са различитом историјом и нивоом развоја текстилне индустрије, и са различитим укупним развојним успехом током транзиционог периода. У већини посматраних земаља (Србија, Северна Македонија, Хрватска, Румунија и Словенија), остварени економски раст праћен је израженим трендом деиндустријализације, променама у спољнотрговинској активности (динамичан раст извоза), јачањем трговинске конкурентности и смањењем значаја и утицаја текстилне индустрије (осим у Северној Македонији и Србији) у привреди. И поред тога, сектор текстилне индустрије у великој мери је допринео значајној извозној експанзији посматраних земаља у посматраном периоду, иако само у Бугарској у 2018. години бележи суфицит у спољнотрговинској размени (у 1995. години текстилна индустрија је бележила суфицит у Хрватској, Северној Македонији, Словенији, Румунији и Бугарској). Добијени

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резултати показују да постоји значајна разлика у погледу достигнутог нивоа трговинске конкурентности и да је једино текстилна индустрија Северне Македоније међународно конкурентна, а да код већине осталих земаља постоји откривена компаративна предност. Такође, резултати показују и да постоје разлике у нивоу трговинске конкурентности у односу на степен финализације производа текстилне индустрије у посматраним земљама, што намеће закључак о потреби јачања трговинске конкурентности текстилне индустрије у посматраним земљама (посебно у земљама где је конкурентност текстилне индустрије најнижа и/или у земљама где је њен развојни потенцијал највећи) развојем текстилне делатности вишег степена финализације, што доноси и вишу додату вредност и већу могућност извоза. Тиме би се у већој мери искористио постојећи развојни и извозни потенцијал текстилне индустрије у посматраним земљама у транзицији.

AUDITORY REHABILIATION
DURING THE COVID-19 PANDEMIC –
THE PARENTS' PERSPECTIVE

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Abstract

The Covid-19 pandemic has affected numerous aspects of human existence, thus increasing psychological stress in the overall population worldwide. Healthcare and social support systems have suffered extreme challenges and pressures. The welfare, protection, and rights of socially vulnerable groups, such as children with loss of hearing and their families, were challenged. The system of auditory rehabilitation encountered numerous problems due to the Covid-19 pandemic, because of the compromised access to rehabilitation facilities and therapists. The objective of the study was to investigate the parents' perspective on the influence of the Covid-19 pandemic on auditory rehabilitation. A questionnaire was developed to gather the parents' answers to the research questions. The sample consisted of fifty-one parents of deaf children and children hard of hearing enrolled in the auditory rehabilitation process. The results showed a considerable impact of the pandemic on the accessibility of rehabilitation, with periods of two to three months of complete disruption for most children, due to lockdown. A vast number of parents experienced psychological stress due to those changes, accompanied by the fear of contracting Covid-19 when attending rehabilitation facilities. Most of the parents observed changes in their child's behaviour, and communication difficulties due to face masks during the pandemic. Numerous studies support these findings. The results of our research show that the improvement and an increase in the flexibility of the auditory rehabilitation system are necessary. Auditory rehabilitation should be supported by state-of-the-art technologies (e.g., telecommunication) in order to ensure the continuity of the rehabilitation process and support for hearing-impaired children and their parents, even in extreme circumstances.

Key words: deafness, hard of hearing, auditory rehabilitation, Covid-19.

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АУДИТИВНА РЕХАБИЛИТАЦИЈА ТОКОМ ПАНДЕМИЈЕ КОВИД-19 – ПЕРСПЕКТИВА РОДИТЕЉА

Апстракт

Пандемија коронавируса је у значајној мери утицала на многе аспекте живота људи и тиме довела до повећања укупног нивоа доживљеног психичког стреса. Системи здравствене и социјалне заштите широм света стављени су под огромни притисак. Посебан изазов био је сачувати права и благостање осетљивих група популације, као што су глуве и наглуве особе и њихове породице. Пандемија је утицала на промене у систему слушне рехабилитације и довела до периодично отежаног приступа рехабилитационим центрима и терапеутима. Циљ истраживања био је да испитамо ставове родитеља о утицају пандемије Ковид-19 на аудитивну рехабилитацију. Како би одговорили на постављена истраживачка питања, користили смо упитник посебно конструисан за потребе овог истраживања. Узорак истраживања чинио је 51 родитељ глуве и наглуве деце која су укључена у процес аудитивне рехабилитације. Резултати су показали да је пандемија у значајној мери утицала на могућност обављања аудитивне рехабилитације, које је била потпуно онемогућена у периоду од два до три месеца. Родитељи су у великом броју истакли да су овакве промене негативно утицале на њихово психичко стање, а значајан број родитеља осећао је страх од заразе приликом одласка на рехабилитацију. Промене у понашању своје деце током трајања ванредне ситуације, као и тешкоће у комуникацији због ношења маски, истакла је већина родитеља, а такве налазе потврђују и резултати других аутора. Разултати нашег истраживања упућују на потребу за већом флексибилношћу система аудитивне рехабилитације и укључивањем савремених технологија (нпр. телекомуникација), са циљем обезбеђивања континуитета слушне рехабилитације и подршке глувој и наглувој деци и њиховим родитељима, чак и у ванредним околностима.

Кључне речи: глувоћа, наглувост, аудитивне рехабилитација, Ковид-19.

INTRODUCTION

Hearing is one of the essential human senses, and it is extremely important for the development of an individual. Early auditory development in a child is the keystone of normal speech-language development (Van Den Abbeele et al., 2005; Author, 2015a, 2016). Severe sensorineural hearing loss (SNLH), present at birth or acquired in early childhood, presents a major burden for healthcare systems globally (Bush et al., 2017; World Health Organization, 2017). The early detection of hearing loss and early interventions implementing amplification and auditory rehabilitation are essential for the uneventful development of these children (Author, 2015b, 2016b). The parents of children with sensorineural hearing loss are confronted with numerous challenges on a daily basis (Sahoo et al., 2020). Cochlear implantation and hearing aids enable speech and language development in those children only if accompanied by continuous auditory rehabilitation (Author, 2015a, 2018a, 2018b).

The Covid-19 pandemic has caused global changes in different aspects of contemporary existence (Videnović et al., 2021), thus inducing a considerable amount of stress in the general population. The parents of deaf children and children hard of hearing were confronted with additional challenges. The Covid-19 pandemic has caused a number of changes in the system of auditory rehabilitation, both in terms of methodology and organisation, along with periodical problems in the accessibility of rehabilitation facilities and therapists (Sahoo et al., 2020). Methodology adjustments included modified rehabilitation access (Völter et al., 2021; Taddei et al., 2021), which was implemented by using online modes of communication or through the direct contact of a child and therapist with the use of protective masks or face shields. Adjustments in organisation regarding accessibility and the dynamics of rehabilitation were implemented in accordance with the epidemiological situation (Dham et al., 2020). A vast number of the publications regarding this topic in the Google Scholar database confirms the importance of the subject. With the use of keywords such as deafness, hard of hearing, auditory rehabilitation, Covid-19, we found more than eight hundred publications regarding this topic, of which six hundred and fifty refer to children. Some of those publications (317) refer to the parents' perspective, while the majority of them (519) refer to therapists' views.

A state of emergency due to the Covid-19 pandemic was declared in Republic of Serbia on the 15th of March, 2020 and lasted until the 6th of May, 2020 (Report on work of the commissioner for information of public importance and personal data protection in 2020, p.12, 2021). During that period, a complete lockdown was implemented, completely interrupting the on-site rehabilitation of hearing and speech for children with hearing loss. Even though the state of emergency was revoked in May 2020, strict epidemiological measures were implemented throughout the years 2020 and 2021. The accessibility of hearing and speech rehabilitation facilities for children with hearing loss was seriously compromised and limited by those measures. The goal of this study was to investigate the parents' perspective on the effect of the Covid-19 pandemic on the auditory rehabilitation of deaf children and children hard of hearing in rehabilitation centres and schools for children with loss of hearing.

METHODS

The study was conducted within rehabilitation centres and schools for deaf children and children hard of hearing in several cities in the Republic of Serbia (Belgrade, Novi Sad, Jagodina and Niš) in 2021. The parents' consent was obtained in advance, and the survey was completely anonymous. The permission of the Ethical committee of the Faculty of

special education and rehabilitation of the University of Belgrade (no. 295/1, 09/05/2022) was obtained as well.

Instrument

The authors designed a special questionnaire, adapted to the goals and objectives of this study. They used some hints from recent studies (Aschendorff et al, 2020; Ayas et al., 2020; Dham et al., 2020; Sahoo et al., 2020), as well as their personal long-standing experience in the field of speech and hearing rehabilitation of children with loss of hearing in Serbia. The questionnaire was designed for the parents of deaf children and children hard of hearing. The questionnaire, *Auditory rehabilitation during the Covid-19 pandemic* (Appendix), contains seventeen close-ended questions for parents, with answers given on a 3-point Likert-type scale: *agree*, *partly agree*, and *do not agree*. If parents were not sure how to answer a particular question, they were told to skip that question.

Statistical Analysis

Statistical analysis was performed using the appropriate software (Excel for Microsoft 365, version 2205; SPSS, version 28). Descriptive statistics included frequencies, percentages, contingency quotients for categories, as well as central tendency measures and dispersion measures for numeric data. Inferential statistics such as the t-test for independent samples, the bivariant chi-square test and the Fischer exact test were used as well.

The Sample and Independent Variables

The study sample consists of fifty-one parents – forty-nine mothers and two fathers of deaf children and children hard of hearing involved in auditory rehabilitation. The independent variables in this study included the characteristics of deaf children and children hard of hearing such as: gender, chronological age, age at diagnosis, age at the start of the rehabilitation process, model of amplification and rehabilitation facility. Of the total number of children, thirty-two are boys (62.7%), and nineteen are girls (37.3%).

Table 1 presents the age characteristics of deaf children and children hard of hearing involved in auditory rehabilitation: chronological age, age at diagnosis and age at the start of the rehabilitation process.

Children involved in auditory rehabilitation at rehabilitation centres were younger at diagnosis (M=17.21, SD=11.13, SE_m=2.97) compared to the children in schools for the deaf and hard of hearing (M=29.27, SD=25.22, SE_m=4.15), although the results of the t-test for independent samples did not show a statistical significance for the detected differences (t=-1.72, df=49, p=0.92). The majority of the children were diagnosed with hearing loss at the age of two (n=8, 15.7%).

Isolated hearing loss was diagnosed in most of the children in this sample (n=39, 76.5%), whereas some of the children had additional disabilities as well (language disorder, cognitive deficit, ADHD, ASD, syndromes) (n=12, 23.5%).

Table 1. Age characteristics of deaf children and children hard of hearing

Age (in months)	Rehabilitation facility					
	M	Mdn	SD	SE_m	Range	
					min.	max.
Chronological age	152.4	181.2	5.83	0.82	24	228
Age at diagnosis	25.96	24	22.79	3.19	1	120
Age at the start of rehabilitation	46.22	40	27.86	3.9	2	120

The average age at the start of rehabilitation was three years and nine months. The majority of the children in this study commenced rehabilitation at the age of six (Mod=72; 19.6%), and most of the children in this study had been enrolled in rehabilitation for more than six years at the time the survey was conducted (68.6%).

Table 2 shows the distribution of the amplification models used by children in this sample, who attend different rehabilitation facilities.

Table 2. The distribution of amplification model and rehabilitation facility in the sample of children

Amplification model	Rehabilitation facility			
	Rehabilitation centre		School for deaf children	
Cochlear implant	8	57.2%	10	27.1%
Hearing aids	1	7.1%	17	45.9%
Bimodal amplification	5	35.7%	1	2.7%
None	/	/	9	24.3%
Total	14	100.0%	37	100.0%

Regarding the type of amplification, most of the children are cochlear implant users (n=18, 35.3%) or hearing aid users (n=18, 35.3%), while only six children use bimodal amplification (11.8%). Nine children in this study do not use amplification at all (17.6%).

RESULTS

The parents' perspective on the effect of the Covid-19 pandemic on the accessibility of surdology services

The authors investigated the parents' perspective on the influence of Covid-19 on the accessibility of audiological services and the result of the survey are displayed in Figure 1.
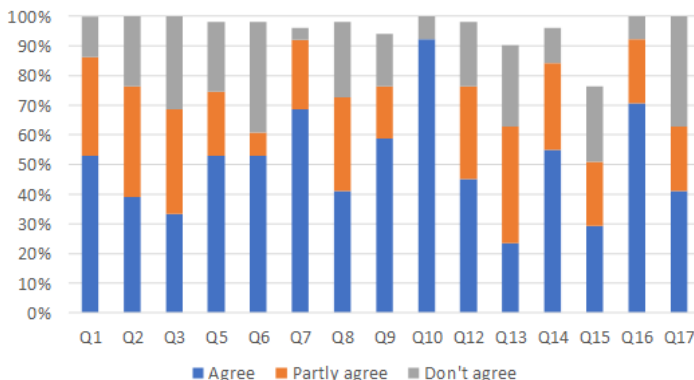
*Figure 1. The parents' perspective on the influence of the Covid-19
pandemic on the accessibility of audiological services*

The majority of the parents in this survey (53%, n=27) agreed that the Covid-19 pandemic had a significant impact on the ability to access rehabilitation centres for auditory rehabilitation (Question 1). On the other hand, 33.3% (n=17) partially agreed, while 13.7% (n=7) of the parents believed that the pandemic did not affect access to auditory rehabilitation. At the same time, most of the parents completely (n= 20, 39.2%) or partially agreed (n=19, 37.3%) that it was difficult to access rehabilitation centres for hearing check-ups or device fittings (cochlear implant or hearing aid) due to the Covid-19 pandemic (Question 2), and 23.5% (n=12) of the parents stated that they had not experienced such difficulties. The parents' perspective on the availability of auditory rehabilitation for deaf children and children hard of hearing throughout the pandemic was quite diverse in this sample (Question 3). A group of seventeen parents (33.3%) agreed that rehabilitation was accessible all the time, eighteen (35.3%) partly agreed, and sixteen (31.4%) parents noted that rehabilitation could not always be accessed. The break in the rehabilitation process due to the pandemic (Question 4) usually lasted less than two months (n=10, 62,5%), while in the cases of some children, the break lasted between two and three months (n=2, 12,5%), or longer than three months (n=2, 12,5%). Two parents did not answer this question.

Most of the parents in this study (n=27, 54%) felt insecure and scared during the pandemic, and thought that they might get infected while going to rehabilitation with their child (Question 5). Some of them felt partly insecure (n=11, 22%), while twelve of them (24%) stated that they did not feel unsafe at all. One parent did not respond to the question.

More than half of the parents reported that their child had access to some type of online rehabilitation (n=27, 54%), four of them (8%) partially agreed, and nineteen parents (38%) did not have access to online rehabilitation at all during the pandemic (Question 6). One parent did not re-

spond to this question. When parents were asked if they think that the quality of online rehabilitation is the same as face-to-face rehabilitation, the majority of the parents did not agree (n=35, 71.4%), and twelve of them (24.5%) only partially agreed. Only two parents (4,1%) agreed that there was no difference in quality between online and on-site rehabilitation (Question 7).

During the state of emergency due to Covid-19, most of the parents noticed changes in their children's behaviour (n=22, 43.1%), sixteen of the parents (31.4%) partly agree with that, while thirteen (25.5%) parents declared that they did not observe any changes in their children's behaviour (Question 8). Regarding the use of amplification, most of the parents responded that their child used a hearing aid and/or cochlear implant as usual (n=30, 63.8%) during the pandemic. Eight parents (17%) partly agreed that the child used hearing aid and/or cochlear implant as usual, while 9 (19.2%) of the parents did not agree with this statement (Question 9). The majority of cochlear implant or hearing aid users did not experience equipment malfunctions during the pandemic (n=47, 92.2%), while four of the users (7.8%) had technical problems with hearing aids, which they have solved easily. Only one of them had problems with hearing aid repair due to the lockdown for the Covid-19 pandemic (Questions 10 and 11).

Most of the parents fully (n=23, 46%) or partly (n=16, 32%) agreed that they had support from their child therapist during the pandemic, either through telephone consultations or online contact. However, eleven parents (22%) declared that they did not have such an opportunity, and one parent did not respond to this question (Question 12). Most of the parents fully (n=12, 26.1%) or partly agreed (n=20, 43.5%) that contact with a therapist was useful for them and their child, while fourteen (30.4%) did not agree with that statement. Five parents did not respond to this question (Question 13). More than half of the parents found rehabilitation at home quite challenging (agree n=28, 57.1% and partly agree n=15, 30.6%), while 6 (12.3%) of them did not consider that a problem, and three did not answer (Question 14).

The majority of the parents (n=39, 76.5%) said that their child attended online school during the Covid-19 pandemic and found that quite a challenging experience for the child (n=15, 38.5%). While eleven parents (28.2%) supported that opinion partly, another thirteen parents (33.3%) considered online school satisfactory and not much different than school under normal circumstances (Question 15). Most of the parents (n=36, 70.6%) found that the use of face masks heavily affected communication in children with hearing loss, whereas eleven (21.6%) considered it a moderate obstacle. Only four parents (7.8%) did not observe any difficulty in their children's communication (Question 16).

Some parents noted that the changes in rehabilitation practices due to the Covid-19 pandemic influenced their psychological wellbeing

(n=21, 41,2%) and 21.6% of them (n=11) partly agree with that. On the other hand, nineteen parents (37.3%) claimed that those circumstances did not affect their psychological state at all.

The Influence of the Child's Characteristics on the Parents' Perspective

The authors studied the characteristics of deaf children and children hard of hearing such as gender, chronological age, age at diagnosis, age at the start of rehabilitation, amplification model, and type of rehabilitation facility, and their impact on the parents' perspective. The investigated characteristics can have (direct or indirect) influence on the frequency and scope of the auditory rehabilitation that the child needs, so they can indirectly influence the parents' perception of the scope of the difficulties they encountered during the pandemic. Various inferential statistic methods (the t-test, the bivariant chi-square test and/or the Fischer exact test) were implemented according to the data type and sample size, in order to find a statistical significance of the difference between the groups. The gender of the child, their chronological age, their age at diagnosis and their age at the start of rehabilitation did not affect the parents' perspective on the influence of the Covid-19 pandemic on auditory rehabilitation. However, the amplification model and rehabilitation facility strongly affected the parents' perspective on this subject.

The amplification model – the parents' perspective. Fischer's exact test was used to find out how different amplification models affected the parents' perspective on auditory rehabilitation during the Covid-19 pandemic. The results showed a statistically significant difference in the attitude of the parents of cochlear implanted children, who mostly considered that the Covid-19 pandemic affected the accessibility of the rehabilitation centre (agree - 55.6%), and the parents of children with hearing aids, who only partly agreed with this statement (partly agreed - 61.1%). Half of the parents of children who use bimodal stimulation fully agreed that the pandemic affected the accessibility of rehabilitation centres/schools, while the other half of the parents partly agreed. Fischer's test revealed statistically significant differences between the attitudes of parents of children with different amplification models (p=0.002). Statistically significant difference were found in the attitude towards accessing rehabilitation centres for hearing check-ups or device fittings as well (p=0.014). The parents of children with cochlear implants children mostly declared that they did not have problems with accessing rehabilitation facilities for hearing check-ups or device fittings (do not agree - 58.8%), while the parents of children with hearing aids encountered such problems (agree - 27.7%; partly agree - 50%), as did the parents of children with bimodal fittings (agree - 16.7%; partly agree - 73.3%).

It is interesting that the parents of children fitted with hearing aids felt insecure about potential contagion when visiting rehabilitation facilities (agree - 72%; partly agree - 22.2%) much more than the parents of children with cochlear implants (agree - 33.3%; partly agree - 22.2%) and the parents of children with bimodal fittings (agree or partly agree - 50%). The Fischer's test showed a statistically significant difference (p=0.009).

The parents of children fitted with hearing aids mostly claimed that they had access to online rehabilitation (66.7%), unlike the parents of children with cochlear implants (33.3%) and parents of children with bimodal fittings (16.7%). The differences were statistically significant (p=0.022).

The previously shown results could be explained by the difference in the type of rehabilitation facility, wherein most children use the same type of amplification. In schools for deaf children and children hard of hearing, most children use hearing aids (or have no amplification), while in rehabilitation centres, most children are users of cochlear implants or bimodal amplification.

The parents of children with cochlear implants stated that their children had been using their implant the same amount of time as before the pandemic (agree - 72.2%), while the parents of children with bimodal fittings or with hearing aids supported that statement to a slightly lesser degree (agree - 66.7%). However, the difference was statistically significant (p=0.002). Most of the parents of children fitted with hearing aids considered that their child had opportunities for online support and consultations with a therapist during the pandemic (agree - 66.7%; partly agree - 27.8%), but the parents of children with cochlear implants (agree - 11.1%; partly agree - 44.4%) and the parents of children with bimodal fittings (agree - 16.7%; partly agree - 33.3%) were not that supportive of that claim. Fischer's exact test showed a statistically significant difference (p=0.002).

All of the parents of children fitted with hearing aids stated that protective masks presented a considerable obstacle for their child's communication (agree - 88.9%; partly agree - 11.1%), as did the parents of children with bimodal fittings (agree - 50%; partly agree - 50%). Some of the parents of children with cochlear implants did not find masks to be a problem during communication (don't agree - 22.2%). The difference between all groups was statistically significant (p=0.025).

The rehabilitation facility – the parents' perspective. Fischer's exact test was used to evaluate the influence of the type of rehabilitation facility for children with hearing loss on the parents' insecurity regarding the potential infection with Covid-19. The test showed that the parents of children attending schools for the deaf were more afraid of a potential infection in comparison to the parents of children in rehabilitation centres. The test showed a statistically significant difference (p<0.001). However, the parents of children enrolled in the special school for the deaf and hard

of hearing mostly (n=27, 73%) pointed out that their children had the opportunity to attend online rehabilitation and classes, while most of the children in rehabilitation centres did not have such an opportunity (n=12, 85.7%). Fisher's exact test showed a statistically highly significant difference (p<0.001).

The majority of the parents of children enrolled in rehabilitation in special schools pointed out that they had full or partial online support from therapists during the pandemic (agree or partly agree - 61.7%), while most of the parents of children from clinical rehabilitation facilities lacked such support (don't agree - 64.3%). The difference between those two groups of parents was statistically significant (p<0.001).

According to the parents' observations, there was a statistically significant difference (Fischer's test p=0.019, p<0.05) in daily hearing aid use during the Covid-19 pandemic in favour of the children from clinical rehabilitation centres, as compared to children from special schools for the deaf. The majority of the parents (92.9%) of children enrolled in rehabilitation centres pointed out that their children used their hearing aids daily, in the same manner they did before the pandemic, while only 7.1% of the parents observed that their child did not use hearing aids as much as they had before the Covid-19 outbreak. The parents of children from special schools noted that hearing aid use did not change (45.9%), 21.6% of the parents partly agreed, and 21.6% of the parents noted that their child used hearing aids less than they did before pandemic.

The majority of the parents of children from special schools found rehabilitation at home difficult and challenging (67.6%), or partly agreed with that statement (21.6%), unlike the parents of children from rehabilitation centres, who supported that opinion fully (21.4%), or partly (50%). The difference between those groups was statistically significant (Fischer's exact test p=0.026, p<0.005).

The parents of children from special schools for the deaf agreed that their children had considerable difficulties in communication due to protective masks (agree - 91.9%, partly agree - 5.4%), unlike the parents of children from audiology rehabilitation centres (agree 14.3%, partly agree 64.3%). The difference between those two groups of parents was statistically significant (p<0.001), and could be related to the percentage of children in special schools for the deaf who use hearing aids or bimodal amplification.

DISCUSSION

The Covid-19 pandemic has heavily affected auditory rehabilitation practices and reduced access to audiological services. This study represents the parents' perspective on the impact of the Covid-19 pandemic on the rehabilitation of deaf children and children hard of hearing, the

subsequent challenges the pandemic posed, and the additional psychological burden caused by the effort to provide continuous rehabilitation during the state of emergency.

Our research has shown that the process of auditory rehabilitation in rehabilitation centres and schools for the deaf and hard of hearing was completely disrupted due to the Covid-19 pandemic lockdown for at least two to three months. The parents pointed out the temporary obstruction in the access to cochlear implant and hearing aids fitting and technical support. Numerous studies have produced results congruent with our findings (Kumariet al., 2020; Taddei et al., 2021). Most of the parents of children enrolled in special schools for the deaf and hard of hearing confirmed that online rehabilitation and support from therapists was available (92.1%) but noted that the quality of online rehabilitation was inferior to the quality of on-site rehabilitation. Most of the parents find at-home rehabilitation quite challenging, which has been confirmed by other authors as well (Sahoo et al., 2020; Ayas et al., 2020). Numerous studies have shown that in countries with well-established tele-audiology and tele-therapy systems of support for children and parents, this type of rehabilitation through group video calls (therapist-child-parent) became dominant throughout the pandemic and was an important source of support for children with hearing loss, as well as their parents (Sahoo et al., 2020; Meli et al., 2021; Telmesani et al., 2022). Most of the parents in this study claim that the changes in rehabilitation practices due to the pandemic had a negative impact on their psychological status. A considerable number of parents (73.5%) pointed out the fear of being infected while going to rehabilitation facilities, especially schools for the deaf.

The changes in children's behaviour during the Covid-19 pandemic were observed by the parents in our study, as well as by numerous authors worldwide (Sahoo et al., 2020; Meli et al., 2021; Telmesani et al., 2022; Saxena et al., 2021). The time of use of the hearing aids did not change in most of the children, according to their parents. The findings of our study are incongruent with some other authors, who have claimed that the daily use of hearing aids in children worldwide decreased during the pandemic (Sahoo et al., 2020). The use of face masks caused troubles in communication for deaf children and children hard of hearing, according to their parents (92.2%). Communication was especially problematic for those fitted with hearing aids, while children with cochlear implants or bimodal fittings had less communication issues. Studies have shown that face masks function as a low-pass acoustic filter which interferes with speech, so that their impact on low frequency tones below 1000Hz is negligible, but that the decrease in intensity could be up to 12dB, depending on the type of mask, in the frequency range of 2000-7000 Hz (Saxena et al., 2021; Goldin et al., 2020; Vos et al., 2021). The better speech intelligibility in cochlear implant users in our study could be explained by the

better amplification in the high frequency range provided by cochlear implants, which helps in overcoming the mask effect. On the other hand, troubles in communication of children fitted with hearing aids are caused not only by acoustic attenuation but also by the lack of visual support, which is much more important for children with hearing aids than for those with cochlear implants. Numerous studies confirm our findings (Brown et al., 2021; Cohn et al., 2021; Corey et al., 2020; Goldin et al., 2020; Vos et al., 2021). The authors of those studies point out that face masks and shields impede communication not only in children with hearing loss but also in individuals with normal hearing (Goldin et al., 2020; Vos et al., 2021).

CONCLUSION

The Covid-19 pandemic has had a negative impact on deaf children and children hard of hearing, and their parents in many ways. It is of the utmost importance to identify the negative effects of the pandemic on this population, and to find adequate solutions for those challenges. The results of this study have revealed the need for an increase in the flexibility of the auditory rehabilitation system for deaf children and children hard of hearing, and the need to implement state of the art technologies to increase support for children with hearing loss and their parents. The main limitation of this study is the fact that we did not go into details regarding the access to and the methods used in online rehabilitation provided for deaf children and children hard of hearing from special schools. That would enable us to have better insight into the current situation and opportunities for future actions. Future research should investigate the possibilities and outcomes of various modalities of online rehabilitation for deaf children and children hard of hearing, which are already implemented in some countries. In the future, this should lead to better support for the users and their families, and make rehabilitation accessible even under exceptional circumstances.

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АУДИТИВНА РЕХАБИЛИТАЦИЈА ТОКОМ ПАНДЕМИЈЕ КОВИД-19 – ПЕРСПЕКТИВА РОДИТЕЉА

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Резиме

Пандемија коронавируса (Ковид-19) је у значајној мери утицала на многе аспекте живота људи, што је последично утицало и на повећање нивоа доживљеног психичког стреса, који је очигледан у укупној популацији. Истраживања показују да је услед промена изазваних пандемијом Ковид-19 дошло до методолошких и организационих промена у систему аудитивне рехабилитације, као и до периодично отежаног приступа рехабилитационим центрима и терапеутима. Циљ нашег истраживања био је да испитамо ставове родитеља о утицају пандемије Ковид-19 на аудитивну рехабилитацију глуве и наглуве деце у оквиру рехабилитационих центара и школа за глуву и наглуву децу у Србији. За потребе постављеног циља је конструисан посебан упитник који се састоји од 17 питања/изјава, а родитељима су понуђени одговори на тростепеној скали − „слажем се“, „донекле се слажем/не слажем“, „не слажем се“. Узорак истраживања чинио је 51 родитељ глуве и наглуве деце која су укључена у процес аудитивне рехабилитације. Истраживање је показало да је пандемија у значајној мери утицала на могућност обављања аудитивне рехабилитације у оквиру рехабилитационих центара/школа, те да је потпуни прекид у рехабилитацији код највећег броја деце трајао између два и три месеца. Приступ установама ради контроле/подешавања слушног помагала је повремено био отежан, истакли су родитељи. Постојање могућности онлајн рехабилитације/подршке од стране терапеута у већем проценту су истакли родитељи деце из специјалних школа, али су навели и да квалитет такве рехабилитације није био исти као квалитет рехабилитације уживо (92,1% родитеља). Највећи број родитеља сматр да је рехабилитација у кућним условима представљала значајан изазов. Родитељи су у великом броју истакли да су промене које су се десиле у рехабилитационој пракси негативно утицале на њихово психичко стање, а значајан број (73,5%) осећао је и страх од заразе приликом одласка на рехабилитацију, што су посебно истакли родитељи деце која похађају школе за глуву и наглуву децу. Већина родитеља приметила је промене у понашању код своје деце као последицу трајања ванредног стања. Ипак, већина родитеља истиче да су њихова деца временски једнако користила своја слушна помагала. Спроведено истраживање показало је и да су глува и наглува деца искусила тешкоће у комуникацији због ношења маски на лицу (укупно 92,2%) при чему су, према оцени родитеља, веће потешкоће искусила деца са слушним апаратима у односу на кохлеарно имплантирану и бимодално амплификовану децу. Резултати истраживања упућују на потребу за већом флексибилношћу система аудитивне рехабилитације глуве и наглуве деце и укључивањем савремених технологија у циљу пружања веће подршке и деци и њиховим родитељима. Будућа истраживања требало би усмерити ка тестирању ефеката различитих приступа у аудитивној рехабилитацији, који већ годинама уназад представљају саставни део рехабилитационе праксе неких земаља, не би ли се систем рехабилитације глуве и наглуве деце (особа) и подршка њиховим родитељима у још већој мери прилагодили потребама корисника и учинили систем доступним чак и у ванредним околностима.

SERBIAN EXPORT TO THE EU MARKET: A DYNAMIC SHIFT-SHARE ANALYSIS

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Abstract

The paper deals with the analysis of Serbian export competitiveness in regards to the EU market in the period between 2012 and 2021, using the location quotient and dynamic shift-share analysis, which breaks down changes in exports into three components: the national, the industrial, and the regional component. The results show that EU countries are suitable destinations for Serbian products. Also, products from several Serbian sectors are attractive in the European market. The location quotient shows that the most important export destinations are Bulgaria, Croatia, Romania, and Slovenia. The dynamic shift-share analysis results show that there was an increase in the competitiveness of Serbian exports to the European Union market in the observed period, mostly thanks to the national component. The regional component is expressed in some countries, such as Poland and Hungary, while the industrial component is the least represented.

Key words: export competitiveness, Republic of Serbia, EU market, location
quotient, dynamic shift-share analysis.

ИЗВОЗ РЕПУБЛИКЕ СРБИЈЕ НА ТРЖИШТЕ ЕВРОПСКЕ УНИЈЕ: ДИНАМИЧКА *SHIFT-SHARE* АНАЛИЗА

Апстракт

Рад се бави анализом конкурентности извоза Србије на тржишту ЕУ у периоду између 2012. и 2021. године применом локацијског квоцијента и динамичке *shift-share* анализе, која промене у извозу расчлањава на три компоненте: националну, индустријску и регионалну компоненту. Резултати показују да су земље ЕУ погодне дестинације за српске производе, и то за производе из више сектора. Локацијски квоцијент показује да су најзначајније дестинације Бугарска, Хрват-

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ска, Румунија и Словенија. Резултати динамичке *shift-share* анализе показују да је у посматраном периоду дошло до пораста конкурентности извоза Србије на тржиште Европске уније, и то највише захваљујући националној компоненти. Регионална компонента је изражена у појединим земљама, као што су Пољска и Мађарска, док је индустријска компонента најмање заступљена.

Кључне речи: извозна конкурентност, Република Србија, тржиште ЕУ,
                     локацијски квоцијент, динамичка *shift-share* анализа.

INTRODUCTION

International trade has become an important factor in the development of economies around the world, especially in the period of globalisation. Countries try to find products which they can specialise in exporting, but it is also important to find geographically suitable destinations for their products. It raises the question of the competitive advantages that countries achieve. It is especially important for developing countries, for which foreign trade flows are the main way of being included in the world economy. It is critical to examine the possibilities of further export orientation or geographical diversification of exports for countries facing large balance of payments deficits.

Considering the importance that Serbian exports to the EU have for Serbia's foreign trade exchange and its economic development, this study focused on the structure and regional distribution of Serbian exports. It is the reason for the application of economic base analysis. Economic base analysis is a straightforward but useful technique that may be used to comprehend the state of the economy. It is based on the calculation of the location quotient, and the application of shift-share analysis. The location quotient is a way of quantifying the export concentration to certain EU countries in relation to the entire Union. In addition to showing the concentration of exports, the location quotient was chosen because it also determines the most suitable markets for exports. The shift-share analysis is an analytically suitable tool for examining the competitiveness and degree of specialisation of Serbian exports to the EU market. Given that the EU is Serbia's most valuable foreign trade partner, it is important to observe in which export segments Serbia records the most significant results, and with which countries it achieves the highest volume of trade. This research makes it possible to identify the factors that influence the competitive position of Serbian products on the European market. At the same time, the factors that influence the results are divided into several component: the national, the industrial and the regional component. It enables us to determine what percentage of Serbian exports to the EU is due to the characteristics of the union itself, how much is due to the commodity structure of exports or the specificity of foreign demand, and how much is

due to regional specificities or the geographical characteristics of individual EU member states.

The paper aims to analyse the production and geographical structure of the exports of the Republic of Serbia to the EU countries, in order to identify the specificities of certain export commodity groups and countries in which Serbia achieves a higher export value. The subject of the research is the export of the Republic of Serbia, broken down by sections and classified by EU countries. The paper contributes to understanding the importance of improving Serbian exports to the EU market, and to identifying future export directions. The research started with the research question of identifying the competitive position of exported Serbian products on the EU market between 2012 and 2021.

LITERATURE REVIEW

The export of smaller, economically insufficiently developed countries is imperative when it comes to strengthening the factors of economic growth. For a country like Serbia, it is a driver of regional integration, as well as a great European perspective (Pervaz et al., 2018, p. 966). The country's aspiration to join the EU is, among other things, inspired by joining the EU single market, so the benefits of foreign trade in such a market can be a stable source of economic prosperity. Damijan et al. (2011) show that the increase in exports is one of the characteristics of the process of transition and European integration of developing countries. It is necessary to improve exports and stimulate those sectors that dominate the structure of exports to the EU, i.e. stimulate the export of those products in which Serbia can satisfy the demand of the EU member states (Lojanica, 2016, p. 296).

Stigliz (2006) points out that a country's ability to expand its exports is a stronger driver of economic growth than the implementation of a free trade policy. Marković and Marković (2015) argue that export is a fundamental determinant of economic growth. Increased foreign trade can significantly increase the competitiveness of developing countries with less developed institutional infrastructure, because it encourages reforms and a greater degree of specialisation (Bolaky & Freund, 2004). By entering the international market, companies are also encouraged to spend more on technological progress, which leads to an increase in innovation (Mladenović et al., 2016, p. 236).

The Republic of Serbia had a poor economic structure and underwent disorganised structural changes, which caused a poor structure of export (Marjanović & Marjanović, 2019, 507). The totality of Serbian exports, including its exports to the EU, increased significantly after the conclusion of the Stabilization and Association Agreement, which initiated the establishment of a free trade zone. Foreign trade with EU countries

accounts for more than half of Serbian exports and imports. However, the foreign trade volume is not as large as it could be, given that these countries are geographically relatively close to Serbia. One of the aspects of such tendencies in the foreign trade between Serbia and the European Union is that Serbia lags in the application of technology in production. Also, developing countries that are not yet members of the European Union are considered risky. Doing business with such countries in conditions of disruptions and crises can be unfavourable (Stanojević & Jovancai, 2015, p. 286). In addition, there are numerous technical measures that the European Union employs to protect its market. For example, there are numerous requirements for the modernisation of the production process, and harmonisation with European quality standards, among others (Rapaić & Dabić, 2013, p. 357).

The location quotient and shift-share analysis are used to assess the attractiveness of a country's products and sectors in a particular market. Theoretical and empirical studies that examined export competitiveness using these methods mainly refer to African and Asian countries. Only a small number of studies have dealt with the export of a country to the European market in this way.

Shift-share analysis was applied in examining the export market at the global level, and the prospects for the export of electrical and electronic products of Malaysia to fifteen selected countries in the periods between 2006 and 2008, and between 2009 and 2011 (Al-Mamun et al., 2015). Akkemik (2011) examined the export competitiveness of Turkish products on the European Union market using a dynamic shift-share analysis of the period between 1987 and 2006 in order to examine the effects of the establishment of the customs union. Ecel et al. (2014) analysed the possibilities of improving the export of agricultural products in Uganda by applying shift-share analysis with four components: global share, geographic share, structural share, and performance share. Shift-share analysis was a useful tool for assessing the export potential of IT services in regions of India during the periods between 2004/5 and 2008/9, and between 2009/10 and 2013/14 (Nachnani & Swaminathan, 2017). Oyewole (2021) analysed the export performance of Latin America and the Caribbean in the period between 2002 and 2017 by monitoring their market share in the global market. Using shift-share analysis, Zayani and Helali (2017) examined Tunisian export competitiveness, and identified the factors that caused the inequality of export competitiveness in relation to the main competitors – Turkey and Morocco, between 1990 and 2012. A study that dealt with the EU export competitiveness between 1995 and 2009 showed that the EU was able to resist new and strengthened competitors on the international market thanks to the stable demand for European products, which the EU countries specialised in exporting (Cheptea et al., 2012).

This research was conducted according to the model used by Mejia et al. (2018). They analysed Panama's export competitiveness on the EU market in the period between 2011 and 2016 by applying static and dynamic shift-share analysis.

METHODOLOGY

The paper deals with the analysis of the Republic of Serbia's export to the EU market using the economic base analysis, namely the location quotient and the dynamic shift-share analysis. The study covered a period of ten years – between 2012 and 2021. Data on Serbian export to the EU market, and export data by sections and trade partners were taken from the database of the Statistical Office of the Republic of Serbia. The Standard International Trade Classification (SITC, Rev. 4) accepted by the United Nations Statistical Commission in 2006 was used, according to which the following sections exist: 0 – food and live animals; 1 – beverages and tobacco; 2 – crude materials, inedible, except fuels; 3 – mineral fuels, lubricants and related materials; 4 – animal and vegetable oils, fats and waxes; 5 – chemicals and related products, not elsewhere specified; 6 – manufactured goods classified chiefly by material; 7 – machinery and transport equipment; 8 – miscellaneous manufactured articles; and 9 – commodities n.e.s. in the SITC Rev. 4.

The Location Quotient

The location quotient shows the sales markets of export products. This indicator shows product dominance in certain markets that are sensitive to economic diversity, size, and economies of scale. A location quotient is an analytical instrument mostly used with shift-share analysis as its complement. It shows the relative concentration and degree of specialisation of the selected economic activity through a comparative approach (Suarmanayasa et al., 2019, p. 71). According to Miller (1991) the location quotient is an effective instrument for determining the comparative advantage of a region in order to identify successful sectors. It is calculated according to the following equation:

$$LQ = \frac{x_i / x}{X_i / X},$$

where x stands for Serbian exports to individual EU countries, X for Serbian exports to the EU, and i for the section according to the SITC Rev. 4.

If the location quotient is equal to 1, the observed economic category is equal to both the regional level and the level of the whole. In this case, it would mean that the export share of a section is equal to the total export of Serbia to individual countries, and at the level of the EU. A lo-

cation quotient lower than 1 indicates the greater importance of exports from Serbia to the EU, while a value greater than 1 shows the importance of a specific country as an export destination.

Shift - Share Analysis

Shift-share analysis was originally introduced by Daniel Creamer in the 40s. Later, the method was improved and refined by Dunn (1960), and modified by Esteban (1972). Dinc (2002) states that shift-share analysis reveals the overall economic change that is simultaneously attributed to the growth of the national economy, the industrial structure of the region, and the competitiveness of local industries. Shift-share analysis is suitable for international trade evaluation, export market growth analysis, and export competitiveness analysis (Rahman et al., 2014, p. 3). In this paper, shift-share analysis will be applied to analyse the exports of the Republic of Serbia to the countries of the EU, where the member states will be viewed as regions, while the European Union will be viewed as a whole.

Shift-share analysis, as a descriptive statistical tool, is used for economic, regional, sectoral, and political variables that break down their growth or decline into several components (Matlaba et al., 2014). These are the national share, the industrial share and the regional share. The national share explains changes in the observed variable as a result of national trends. It presents the growth or decline of the observed regional variable if it changes at a rate equal to the rate at which the variable changes at the national level (Tervo & Okko, 1983). The industrial share explains changes in the analysed variable that can be attributed to the industrial structure, i.e. the characteristics of the selected sections. It explains the changes in the sectoral structure of the region compared to the national level (Oyewole, 2016, p. 5). This component actually explains the specialisation level when talking about exports and imports. The regional share of variable change is explained by regional specificities, i.e. regional competitiveness. The regional share will show the extent of the change in the Republic of Serbia's exports to different EU countries due to their locational advantage and national specificity. Shift-share analysis is calculated according to the following formula:

$$TS = NS + IS + RS \,,$$

where *TS* stands for total shift, *NS* for the national share, *IS* for the industrial share and *RS* for the regional share. They are calculated according to the following formulas:

$$NS = x_{i,t-1} \frac{X_t - X_{t-1}}{X_{t-1}} \,;$$

$$IS = x_{i,t-1} \left(\frac{X_{i,t} - X_{i,t-1}}{X_{i,t-1}} - \frac{X_t - X_{t-1}}{X_{t-1}} \right); \text{ and}$$

$$RS = x_{i,t-1} \left(\frac{X_{i,t} - X_{i,t-1}}{X_{i,t-1}} - \frac{X_{i,t} - X_{i,t-1}}{X_{i,t-1}} \right),$$

where x represents Serbia's exports to individual EU countries, X stands for Serbia's exports to the EU, t for the end of the period, $t-1$ for the beginning of period t, and i for the sector that is the focus of the research.

There is a difference between static and dynamic shift-share analyses. Static analysis implies the decomposition of the selected variable at the beginning and at the end of the observed period. However, it does not take into account the continuous changes that occur in the meantime. This is how a dynamic analysis is created. It actually only introduces dynamics into the static analysis by calculating the static analysis for each year in relation to the previous one, thus achieving continuity instead of focusing only on the beginning and end of the observed period. (Barff & Knight, 1988).

RESULTS AND DISCUSSION

EU countries are the most important foreign trade partners of the Republic of Serbia. Exports to the EU amount to more than 60% of the total exports of the Republic of Serbia, with a slight decline in the share noted during the last two years, mainly due to the growth of the share of China and other countries in the total exports of Serbia. The record value of Serbian exports to the EU was reached in 2021, when it amounted to around 16.5 billion US dollars. At the beginning of the observed period, the value of exports was 6.9 billion US dollars (Figure 1). The highest export growth rates were recorded in 2013 and 2021, at 33% and 30%, respectively (https://data.stat.gov.rs/?caller=SDDB).
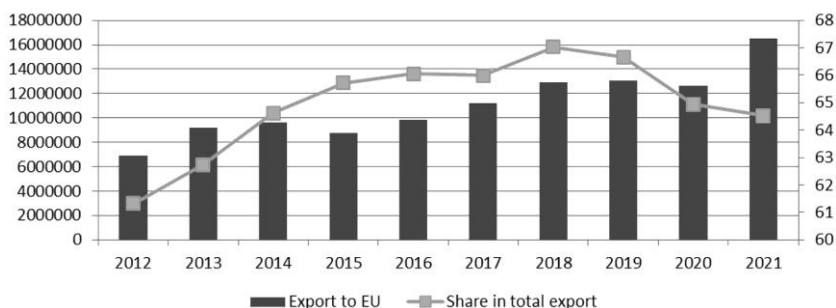
Figure 1. Exports of the Republic of Serbia to the EU and share in total export
Source: Authors, based on data of Statistical Office of the Republic of Serbia
https://data.stat.gov.rs/?caller=SDDB accessed on April 11, 2022

When talking about the structure of exports by sections, the largest share of Serbian exports to the EU is the export of machinery and transport equipment, with an average of about 34.5% during the entire observed period (between 2012 and 2021), followed by manufactured goods classified chiefly by material, with a 23% average participation in exports to the EU. The Serbian export share of food and live animals to the EU averages over 10% of Serbia's total exports to the EU. The export of other sections generally records an average participation below 10%. The highest average growth rate was recorded in the export of chemical and related products, and it amounted to 18%, while the lowest average rate was recorded in the export of animal and vegetable oils, fats and waxes. The value of the export of food and live animals increased from 1.2 billion US dollars in 2012 to around 2.1 billion US dollars in 2021. A high export value is also achieved by manufactured goods classified chiefly by material, whose value increases significantly year by year, reaching a value of 3.8 billion US dollars in 2021. It is a significant increase compared to 2012, when it was around 1.7 billion US dollars. Mineral fuels, lubricants and related materials also record high export values, while Serbia has the lowest export value for miscellaneous manufactured articles (section 8). Machinery and transport equipment has a high export value by default. There was a decline in Serbian export of machinery and transport equipment in 2020, which is a consequence of the pandemic caused by the COVID-19 virus. In addition to the service sector, the automotive industry was the most affected. However, the value of the Serbian export of machinery and transport devices to the EU reached around 5.4 billion US dollars in 2021 (Table 1).

Table 1. Exports of the Republic of Serbia to the EU by sections between 2012 and 2021

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
0	1238002.7	1152244.5	1215584.9	1080685.2	1202578.9	1109372.5	1173141.8	1408108.0	1632285.8	2100196.4
1	77799.5	67266.0	108583.4	86450.1	91701.2	107159.1	126211.3	166180.1	131234.0	165831.3
2	375261	447207.3	362046.6	304083.8	356345.6	396279.3	423524.5	377311.8	419688.2	665058.1
3	178912.4	343267.6	320669.3	213520.4	206569.6	234588.9	312854.5	222402.4	192231.1	299375.1
4	123454.3	121382.1	92045.5	93019.6	104621.4	83615.2	85092.0	127761.2	143837.1	215161.5
5	416853.5	680556.3	653357	642140.1	793934.2	976542.9	1178311.6	1122931.4	1190892.9	1701727.4
6	1660774.2	1885919	2084814.3	1997344.6	2039036.7	2769053.1	3429834.6	3246705.1	2754655.9	3802631.4
7	1848271.0	3351165.9	3501007.0	3126160.5	3626834.4	3925332.1	4402798.0	4549880.7	4407194.3	5455149.8
8	931204.0	1073108.7	1233567.7	1216465.1	1387649.5	1587500.3	1734982.8	1804226.5	1734471.5	2052733.8
9	34441.7	43234.7	22252.4	29755.3	22296.7	27793.0	29254.4	61375.5	56623.7	34983.0

*data is presented in thousands (US dollars)
Source: Statistical Office of the Republic of Serbia
https://data.stat.gov.rs/?caller=SDDB accessed on April 11, 2022

Considering that several EU partner countries dominate the exports of the Republic of Serbia, the location quotient is calculated for those whose share in Serbian exports exceeds 5%. The aim is to determine which EU countries are the most important destinations for significant export sections of the Republic of Serbia. Marked fields indicate trade partners where the location quotient of Serbian exports is greater than 1. The most important Serbian foreign trade partners are the following EU countries: Bulgaria, the Czech Republic, Germany, Croatia, Hungary, Italy, Poland, Romania, and Slovenia. When looking at the location quotient, it can be noticed that the products of each section have markets where the value of this indicator exceeds 1. In some cases, it even exceeds the value of 3. The highest location quotient for food and live animals export was recorded for Romania, with constant growth year by year. In 2021, there was also a higher share of food and live animal exports in Croatia, Hungary, and Italy than at the EU level. According to the location quotient for the Serbian export to Bulgaria, the following sections are significant: beverages and tobacco; crude materials, inedible, except fuel; mineral fuels, lubricants and related materials; animal and vegetable oils, fats and waxes; chemical and related products; manufactured goods classified chiefly by material; and commodities n.e.s in the SITC (Rev. 4). The Croatian market is attractive for food and live animals; beverages and tobacco; mineral fuels, lubricants and related materials; animal and vegetable oils, fats and waxes; chemical and related products; and miscellaneous manufactured articles. It is interesting that, although Germany is Serbia's most important export partner among all of the EU member states, there is no high degree of concentration on the German market. The location quotient for Germany was greater than 1 only for the export of machinery and transport equipment during the entire observed period (Table 2).

The following table shows the results of the dynamic shift-share analysis and its individual components for all EU countries to which Serbia exports its products. The dynamic shift-share analysis results show an increase in Serbia's exports to most EU countries, except for Cyprus and Luxembourg, in the observed period. The highest increase in Serbian exports in the total shift of the shift-share analysis was recorded in Austria, Germany, France, Hungary, Italy, Poland, and Romania (highlighted fields in Table 3). The highest increase during the observed period was in Germany, with a high negative value in the regional share. It points to the fact that no specifics of the German economy contribute to the increased import of Serbian products, but the economic characteristics of the European Union and the demand for products from specific sections dominate. In particular, German import from Serbia is growing due to the increase of the EU's import from Serbia.

Table 2. Location quotient for the most important export partners of the Republic of Serbia by sections in 2012, 2017 and 2021

Section	Bulgaria			Czech Republic			Germany		
	2012.	2017.	2021.	2012.	2017.	2021.	2012.	2017.	2021.
0	0.289	0.972	0.720	0.149	0.248	0.172	0.596	0.860	0.677
1	4.598	4.690	3.298	4.467	0.234	0.095	0.117	0.215	0.102
2	5.485	3.041	2.164	0.438	0.299	0.271	0.677	0.832	0.865
3	3.432	4.757	3.297	1.071	0.120	0.040	0.227	0.061	0.038
4	3.098	1.874	3.489	0.650	0.212	0.289	0.212	0.663	0.264
5	1.950	1.306	1.276	1.197	1.083	0.871	1.133	0.881	0.925
6	0.915	1.746	1.985	2.552	0.931	0.899	0.707	0.721	0.671
7	0.214	0.096	0.137	0.379	1.190	1.454	1.720	1.405	1.618
8	0.254	0.304	0.332	0.438	1.540	1.474	1.061	0.925	0.710
9	4.312	6.838	3.187	2.074	0.018	0.180	0.122	0.015	0.023

Section	Croatia			Hungary			Italy		
	2012.	2017.	2021.	2012.	2017.	2021.	2012.	2017.	2021.
0	1.034	1.339	1.303	1.409	1.197	0.647	0.534	0.566	1.148
1	2.020	2.613	3.261	1.718	0.829	0.841	0.028	0.134	0.591
2	0.641	1.002	0.628	0.638	1.143	0.654	0.455	0.665	0.549
3	0.769	2.930	3.148	3.373	1.089	0.869	0.157	0.005	0.035
4	3.637	2.900	4.228	0.621	0.959	0.476	0.326	0.247	0.592
5	1.953	1.225	1.480	1.757	1.710	1.438	0.549	0.516	0.725
6	1.049	1.336	0.834	1.121	1.191	0.844	1.015	0.824	1.072
7	0.490	0.334	0.365	0.654	0.871	1.440	1.090	1.276	0.741
8	1.224	1.199	1.592	0.304	0.393	0.333	2.168	1.549	1.992
9	0.544	0.544	0.035	0.008	0.006	0.002	1.070	1.392	1.138

Secton	Poland			Romania			Slovenia		
	2012.	2017.	2021.	2012.	2017.	2021.	2012.	2017.	2021.
0	0.413	0.836	0.618	3.134	2.338	2.806	0.327	0.687	0.448
1	0.120	0.350	0.214	0.215	1.059	0.778	0.271	0.225	0.619
2	1.101	1.032	0.692	1.078	1.067	0.353	1.807	1.677	1.460
3	0.125	0.198	0.085	3.619	3.020	3.389	0.286	4.189	2.461
4	0.006	0.715	1.499	0.012	0.007	0.129	2.495	2.941	2.687
5	0.969	1.224	0.946	0.833	1.381	1.302	1.228	0.970	1.081
6	2.303	1.499	1.406	0.654	0.858	0.856	1.030	0.700	0.891
7	0.568	0.767	1.102	0.105	0.680	0.421	1.135	0.963	0.830
8	0.696	0.848	0.609	0.327	0.614	0.695	1.132	1.171	1.698
9	0.012	1.274	3.894	0.121	0.366	0.038	1.345	0.330	0.874

Source: Authors' calculations

Table 3. Shift-share analysis of Serbia's exports to the EU between 2012 and 2021

	NS	SS	RS	TS
Austria	396.311,41540	16.292,52547	59.391,75914	471.995,7
Bulgaria	170.718,09550	3.693,25200	16.268,75249	190.680,1
Belgium	461.727,93260	-8.556,24764	88.358,51509	541.530,2
Republic of Cyprus	59.707,69063	19.260,42359	-156.845,81420	-77.877.7
Czech Republic	397.816,31580	-30.887,60630	352.047,29050	718.976,0
Germany	1.870.766,15800	154.615,14170	-92.432,09922	1.932.949,2
Denmark	47.841,03587	164,10280	21.597,66133	69.602,8
Spain	162.361,36940	12.597,83081	155.615,29980	330.574,5
Finland	20.335,59036	-814,90307	45.857,71271	65.378,4
France	408.655,71160	1.453,86058	24.919,22782	435.028,8
UK	244.523,39070	3.215,52971	30.646,57958	278.385,5
Greece	174.273,41710	-18.587,57173	-41.396,14534	114.289,7
Croatia	514.958,34110	-22.468,78557	-77.402,55551	415.087,0
Hungary	556.496,77160	-10.136,12743	426.996,25590	973.356,9
Ireland	9.080,65418	2.422,67136	-3.224,72554	8.278,6
Italy	1.653.147,55700	-1.451,63881	-672.969,81860	978.726,1
Lithuania	29.693,30320	6.665,00073	735,89606	37.094,2
Luxembourg	7.546,81572	2.303,62193	-14.810,83767	-4.960,4
Latvia	5.394,06797	859,50578	3.598,82623	9.852,4
Malta	3.106,83491	506,14291	678,32217	4.291,3
Netherlands	239.795,79370	9.673,0141	52.002,89214	301.471,7
Poland	369.053,75010	15.384,30285	351.259,74710	735.697,8
Portugal	18.959,37036	3.475,86096	1.754,96867	24.190,2
Romania	961.521,52250	-191.325,26420	-264.115,05830	506.081,2
Sweden	132.666,79460	-9.247,13278	168.027,4382	291.447,1
Slovenia	495.018,39330	11.626,02021	-117.650,5135	388.993,9
Slovakia	292.015,25300	35.807,59802	-58.350,35106	269.472,5
Estonia	5.220,25011	-905,09888	16.268,75249	20.583,9

Source: Authors' calculations

Negative results appear in the industrial share and the regional share, while the national share has positive values for all countries. The negative values of the industrial share were recorded for the following countries: Belgium, the Czech Republic, Finland, Greece, Croatia, Hungary, Italy, Romania, Sweden, and Estonia. An extremely high negative value of the industrial share exists in Serbian exports to Romania, which indicates that the commodity structure of Serbian exports to Romania is quite different from the commodity structure of Serbian exports to the European Union. The highest positive value of the industrial share is related to export to Germany, which shows that the export of certain Serbian sections to Germany is growing much faster than the export of the same sections to the European Union. When it comes to the regional share, negative values were observed for Cyprus, Germany, Greece, Croatia, Ireland, Italy, Luxembourg, Romania, Slo-

venia, and Slovakia. There is a high negative regional share for export to Italy, but a very high positive value in the total share. Given that Italy is an important export partner of the Republic of Serbia, it is clear that the influence of the national and industrial share dominates in the shift-share analysis, similar to the case of exports to Germany.

CONCLUSION

The location quotient and shift-share analysis results show that Serbia has developed mechanisms for exporting certain categories of products to certain EU countries. Also, the results show that certain sections have a lot of potential to become crucial export points for Serbia. The location quotient showed that Serbia has the potential to export to many EU members. The importance of the export destinations of Serbian products changed in the period between 2012 and 2021, as indicated by the location quotient change. For many countries, although it still has a value greater than 1, the location quotient shows a tendency to decrease, which may indicate a gradual re-orientation of Serbian export to some other markets. The dynamic shift-share analysis results show the strong dominance of the national share in the growth of Serbian export to all EU members. It is interesting that those EU members who are Serbia's greatest foreign trade partners record high negative values of the regional share, as is the case with Italy and Germany. This can be explained by the fact that Serbia carries out the highest foreign trade volume with them. They have a high share of total Serbian export to the EU, so exports to these countries strongly determine export to the EU. However, it can be noted that the regional share dominates in most countries (when it is positive) in relation to the industrial share. The total shift shows that there has been an increase in export competitiveness in most countries, except in the case of Cyprus and Luxembourg. Based on the presented results, it can be concluded that there was an increase in the competitiveness of Serbian exports to the EU market in the period between 2012 and 2021.

Although there are limitations to this research, reflected in the limitation of the applied methods in the form of dynamic analysis, which actually represents a cross-section of the state for each year, the results highlight the importance of the EU market structure for Serbian exports. These results point to the conclusion that Serbia exports products in high stages of processing to its most important foreign trade partners, who enjoy the largest share in the total export from Serbia. On the other hand, countries that are less developed than the most successful EU members are the destination for Serbian products in the lower stages of processing. This research can be understood as a kind of guide for economic policy-makers, which can help stimulate the export of products of higher processing stages to these countries with appropriate measures.

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ИЗВОЗ РЕПУБЛИКЕ СРБИЈЕ НА ТРЖИШТЕ ЕВРОПСКЕ УНИЈЕ: ДИНАМИЧКА *SHIFT-SHARE* АНАЛИЗА

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Резиме

Најважнији спољнотрговински партнери Србије су земље ЕУ, што је и разумљиво с обзиром на тежњу Србије да приступи ЕУ и потписивању Споразума о придруживању и стабилизацији. Из тог разлога, важно је проценити како се српски производи котирају на европском тржишту и који су потенцијали за даље унапређење извоза на тржиште ЕУ. При томе, интересантно је испитати шта утиче на тенденције извоза и да ли су то фактори који делују на нивоу ЕУ као целине, да ли су то национални фактори који су специфични за појединачне чланице Европске уније, или се пак ради о особеностима појединих привредних сектора. Циљ истраживања је испитати производну и географску структуру извоза Републике Србије са аспекта конкурентности извозних производа у периоду између 2012. и 2021. године. Наиме, испитује се конкурентност српског извоза у појединачне земље ЕУ, али се испитује и њихова конкурентност са секторског аспекта.

Локацијски квоцијент је показао да се као значајна дестинација за производе попут пића и дувана, минералних горива и мазива произведних у Србији издваја Бугарска. Хрватска је погодна дестинација за извоз животињских и биљних уља, затим масти и воскова, док се храна и живе животиње највише извозе у Румунију. Резултати локацијског квоцијента, иако за сада повољни за поједине категорије производа, подстичу забринутост због тренда опадања овог показатеља. Наиме, оваква тенденција промене локацијског квоцијента указује на промену географске структуре извоза, односно на преоријентацију ка другим тржиштима. Резултати shift-share анализе показују да на извоз Републике Србије у Европску унију највише утичу карактеристике уније као целине. Овакав резултат се може објаснити чињеницом да постоји јединствено тржиште Европске уније. У том смислу, сви споразуми који су склопљени са Унијом се односе на сарадњу са свим њеним чланицама. Када се посматра регионална компонента (специфичности појединачних земаља чланица Европске уније), негативне вредности су забележене за земље које су Србији најважнији спољнотрговински партнери – за Немачку и Италију. Извоз Републике Србије у ове земље чини највећи део извоза у Европску унију, па из тог разлога регионална компонента није изражена код ових земаља. Међутим, у оним земљама у којима регионална компонента бележи позитивне вредности, она доминира у односу на индустријску компоненту. То значи да особености појединачних земаља чланица Европске уније (као нпр. географско подручје, преференције и укуси потрошача и слично) интензивније детерминишу извоз Републике Србије у поређењу са специфичностима сектора. Када се посматра укупан ефекат добијен shift-share анализом, може се закључити да је дошло до пораста конкурентности извоза Републике Србије у већини земаља чланица Европске уније.

Резултати локацијског квоцијента и shift-share анализе указују на то да су земље чланице Европске уније погодне дестинације за српске производе. Развијене земље су погодне дестинације за производе високих фаза прераде, док се у

мање развијене земље претежно извозе производи нижих фаза прераде. Како доминантну улогу има национална компонента, било би пожељно да се унапреди структура извоза, односно да се повећа учешће извоза производа виших фаза прераде у укупном извозу.

THE DEGREE OF NEGATIVITY OF MORPHOLOGICAL, SYNTACTIC AND LEXICAL NEGATION IN ENGLISH AS SEEN BY ENGLISH LANGUAGE AND LITERATURE STUDENTS[a]

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Abstract

The phenomenon of negation is part of perception and a universal property of all human languages. The focus of this study lies on morphological, syntactic and lexical negation, with the main goal to determine how they are perceived in terms of the degree of negativity by English language and literature students (N=91). The main administered instrument was the Polarity scale, comprising utterances with the three broad types of negation. The obtained results were analysed via *IBM SPSS 21*. Overall, the sample evaluated the affixal–syntactic negation pairs fairly equally, as negative or mildly negative. On the aggregate scores, though, the affixal negation (Neg. pref. + Adj) was evaluated more negatively than the syntactic one (not + Adj). The participants evaluated the absolute negative *never* more positively than its semantics implies (as negative only), and semi-negatives, and negated frequency and quantity adverbs were rated quite evenly. In future studies, we propose the use of utterances with inanimate subjects in addition, as well as replication in different cultural settings to check whether there are culturally induced differences or else cognitive similarity.

Key words: affixal negation, EFL English language and literature students, lexical negation, negation degrees, syntactic negation.

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СТЕПЕН НЕГАТИВНОСТИ МОРФОЛОШКЕ, СИНТАКСИЧКЕ И ЛЕКСИЧКЕ НЕГАЦИЈЕ У ЕНГЛЕСКОМ КРОЗ ПРИЗМУ СТУДЕНАТА ЕНГЛЕСКОГ ЈЕЗИКА И КЊИЖЕВНОСТИ

Апстракт

Феномен негације је део перцепције и универзално својство свих људских језика. Фокус истраживања чине морфолошка (нег. преф. + прид), синтаксичка (нег. парт. + прид) и лексичка негација (речи са негативним значењем), са главним циљем да се утврди како их, у односу на степен негативности, опажају студенти студијског програма Енглески језик и књижевност (N=91). Главни истраживачки инструмент је Скала поларитета, која садржи исказе са три поменута општа типа негације. Добијени резултати су анализирани у статистичком програму *IBM SPSS 21*. Уопштено говорећи, узорак је доста уједначено оценио парове које су чиниле афиксна и синтаксичка негација, и то као негативне или умерено негативне. Међутим, када су у питању општи скорови по категоријама, афиксна негација је негативније процењивана од синтаксичке. Испитаници су оценили апсолутно негативни прилог позитивније него што његова семантика сугерише, и то само као негативан, а апроксимативе и негиране прилоге учесталости и квантификаторе су оценили врло уједначено. У будућа истраживања би било пожељно уврстити и неанимантне субјекте, те реплицирати истраживање у различитим културним срединама како би се утврдило да ли постоје културно условљене разлике или пак когнитивна сличност.

Кључне речи: афиксна негација, лексичка негација, синтаксичка негација, степени негације, студенти Енглеског језика и књижевности.

INTRODUCTION

The phenomenon of negation is a universal property of all human languages since no language can be found without it (Tian and Breheny, 2019). It represents one of the fundamental building blocks of cognition because it guarantees positive knowledge (Israel, 2011), and is part of human perception (Saury, 2009). In terms of expression, it can be realised both nonverbally and verbally. Nonverbal acts may include shaking one's head, crossing one's arms, maintaining a distance, frowning, and these acts frequently accompany a verbal act (e.g. waving a finger while saying *No*). Besides negative nonverbal acts, speakers may use negative verbal acts to reject, deny, or object to things or ideas. So what is negation then?

Logical negation implies the conversion of the truth value of a proposition *p* into its opposite, *not p*. In linguistics, this view becomes overly simplistic because not only do languages abound in resources for expressing negation (Israel, 2011) but they also subsume interrelated aspects (syntactic, prosodic, semantic, pragmatic), which make this phenomenon even more challenging to define (Aina, Bernard, & Fernández, 2019). Depending on the angle of analysis, negation may be regarded as "a logical operator, […] a type of speech act, a basic element of semantic

representations, […] a pragmatically loaded form of communicative interaction" (Israel, 2004, p. 701). Generally put, negation acts as "a truth-reversing operator" (Aina, Bernardi, & Fernández, 2019, p. 58) and it "[…] typically expresses the contradiction of some or all of a sentence's meaning" (Crystal, 2019, p. 518). This contradiction primarily assumes the binary opposition termed polarity (affirmation–negation), and its main function is "to flip the polarity of a sentence" (Bahlmann, Mueller, Makuuchi, & Friederici, 2011, p. 1). Apart from tense, aspect, evidentiality, person, reference classification, number, and case, negation is regarded as a grammatical category at the top of dependency hierarchies of grammatical systems (Lee, 2016).

Since negation may be realised on different levels of language organisation, structurally speaking, the negative polarity may be broadly reduced to morphological (negative affixal markers: *untypical*), syntactic (negative particle: *not typical*), and lexical categories (negatively keyed lexemes: *seldom*). Nevertheless, all of these are mediated by pragmatics (Prćić, 2016). Furthermore, there is a consensual view among scholars that negation is marked (de Swart, 2010; Israel, 2011; Lee, 2016) because it is viewed as logically, ontologically, epistemologically and psychologically secondary to affirmation (Horn, 2001). Being marked, a negative expression is thus more complex than the affirmative one. Thus, a negative expression seems to bear a greater potential to have different implicatures inferred than its affirmative counterpart (e.g. having a mitigating effect, acting as a hedging device). This raises many questions, such as whether negation exerts a greater semantic load than its unmarked counterpart, what the linguistic and extralinguistic implications of the act of negating are, how negation is perceived by interlocutors, what its illocutionary force and/or perlocutionary effect might be, and so on.

In this paper, we focus on the three broad types of negation (morphological, syntactic and lexical) and the way they are perceived in terms of the degree of negativity, since linguistic literature on the topic seems to be scarce. As regards the layout of the paper, firstly, we will broadly introduce the aforementioned types of negation; afterwards, we will present the methodology and the main results of the research; finally, we will point to the main conclusions, as well as further steps that might be taken in future studies.

MORPHOLOGICAL, SYNTACTIC AND LEXICAL NEGATION IN ENGLISH

At the most basic level (the level of grammar), negation may be reduced to the morphological, syntactical and lexical levels. Morphological negation is expressed via affixal negative markers (e.g. *disorganised*), syntactical typically via the negative particle *not* (e.g. *not organised*, *do*

not love), and lexical via adverbial and adjectival negative markers (e.g. *rarely*, *rare*) or independent nouns and verbs (e.g. *denial*, *to reject*). Alternatively, the expression of negation can be viewed in terms of standard and nonstandard forms. Standard negation is characterised by having scope over the whole (declarative) clause, with a verb with a negative operator as its main predicate (van der Auwera, 2010). A negative form lacking any of these properties falls into the category of nonstandard negation. Based on this simplified binary classification, syntactic negation may be considered an example of standard negative forms, and absolute and approximate negators, discussed below, may be regarded as nonstandard.

In view of English morphological (affixal) negation, linguists list a different number of negative affixes. Crystal (2019) identifies five primary negative affixes *a-*, *dis-*, *in-*, *non-*, and *un-*, while other authors also include *de-*, *dys-*, *il-*, *ir-*, *im-*, *mal-*, *mis-*, *anti-*, *counter-/contra-* (Dzuganova, 2006). Their distribution is far from equal, and some corpus studies show that *un-* is the most and *dis-* the least common negative prefix, with the former comprising almost half and the latter insignificant 6% of the corpus data of 2,156 negated adjectives (Kjellmer, 2005). What is sustainable is that affixation resulting from negative polarisation is a productive derivational process in English morphology, since English has a variety of affixes at its disposal[1].

In addition to morphological negation, syntactic negation is typically viewed as a basic means for negation formation (van der Auwera, & Du Mon, 2015)[2]. These two negation strategies behave differently not only in terms of syntax but also semantics and pragmatics. Syntactically speaking, morphological negation uses the *negative prefix + X* or *X + negative suffix* strategy (cf. morphological antonyms), whereas syntactic negation uses the strategy *not + X*, which results in certain syntactic implications that can be illustrated by the following example:

(1) *She looked unattractive.*

(2) **She looked not attractive.*

In utterance (1), negating affixally is grammatical, and in utterance (2), it is ungrammatical because attributive adjectives cannot undergo direct sentence negation (**A not attractive girl*), but can be negated affixally (*An unattractive girl*) (Huddleston, & Pullum, 2017, p. 809). Although negating affixally or syntactically does flip the polarity of a proposition, it does not necessarily convey the same meaning, as illustrated by the following examples from the same authors (p. 821).

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[1] In the current study, we included *in-*, *un-* and *dis-*, as examples of morphological negation, along with the allomorphs of *in-* (i.e. *il-*, im-, *ir-*);

[2] Note that our focus lies exclusively on negated adjectives, rather than the particle *not* used generally as a specialised negative marker;

(3) *Such mistakes are common.*
(4) *Such mistakes are not common.*
(5) *Such mistakes are uncommon.*

While negative utterance (4) is the contradictory form of (3), the affixal negation in (5) is not. Utterances (4) and (5) cannot both be true at the same time, but they can be simultaneously false, since *common* is a gradable adjective. Utterance (5) is the contrary opposition to (3), and thus it is reasonable to state that *Such mistakes are neither common nor uncommon*. Accordingly, *uncommon* implicates lesser frequency quality than its syntactic counterpart *not uncommon*, being thus stronger. By analogy, semantically and pragmatically, other utterances with a negated gradable adjective, such as *She is not attractive* and *She is unattractive*, do not seem to be functional equivalents either.

There is a whole range of negators used in the English language, the most salient being the negative operator *not*. However, there are other negative or *n*-words that can flip the polarity of a sentence, such as absolute negators (no, none, nobody, no one, nothing, nowhere, no place, neither, nor, and never) and approximate negators (few, little, rarely, seldom, barely, hardly, scarcely). These two classes may be said to belong to an in-between category (syntax-to-lexicology), while the items of the latter can be taken as examples of lexical negation in their own right (cf. examples (6) and (7) from van der Auwera, 2010, p. 89).

(6) *She never smiles.*
(7) *Stop smiling.*

In utterance (6), negation is expressed via the negative adverb *never*, and in utterance (7), indirectly or implicitly through the verb *stop*, which both carry (semi-) negative meanings. Therefore, (6) can be interpreted as +> *She doesn't smile* (*at all*), and (7) as +> *Don't smile*.

The underlying idea of the dichotomy between the absolute and approximate negator classification is that the former implies absolute zero in terms of frequency (e.g. never), whereas the latter indicates an imprecise qualification (e.g. rarely) (Huddleston, & Pullum, 2017). In a similar fashion, utterance (8), given below, implies that the rate of an individual arriving on time is comparable to absolute zero, while the subject of utterance (9) does come to a specific location, but at a (very) low rate. Due to this 'unspecificity' feature, approximate negators tend to have ambiguous meanings.

(8) *They never arrive on time.*
(9) *He rarely comes.*

Additionally, approximate negators are negative only in meaning, but not in form, as in (10) and (11) (Quirk, Greenbaum, Leech, & Svartvik, 2011, p. 780). In utterance (10), *barely* is followed by a non-assertive form (any), which is typical of negative markers, and utterance (11) requires a positive question tag, which reflects the negative nature of the adverb *hardly*.

(10) *He barely earns any money from selling shoes.*

(11) *She hardly cares about him, does she?*

On the other hand, some approximate negators sometimes do not serve their function as a negative operator in terms of syntax, as illustrated in (12) and (13) (Quirk et al., 2011, p. 781). In utterance (12), *rarely* takes the sentence-initial position, thereby functioning as a sentence modifier, no longer acting as a negative operator. Otherwise, it would have caused a subject-operator inversion and required a positive question tag, as in utterance (13).

(12) *Rarely, crime pays well, doesn't it?*

(13) *Rarely does crime pay well, does it?*

Finally, negative-implicative verbs or implicit negatives, such as *fail*, *lack*, *leave* and *refuse* may also serve the function of a negator (Miestamo, 2007), but since they require an in-depth analysis in their own right, they will be discussed elsewhere.

Apart from all the grammatical and functional characteristics of the concept of negation that we have addressed so far, there is another feature that needs further analysis – speakers' perception of negation. Psycholinguistic research suggests that negative utterances are more difficult to process, emphasising the asymmetry in processing cost between negative sentences and their positive counterparts (Tian, & Breheny, 2019). Studies show that comprehension of negation is more difficult than affirmation (Hasson, & Gluckberg, 2006), which may be closely related to learning burden in the context of L2 learning (Danilović Jeremić, 2018). However, the subject matter of our study goes well beyond language processing, which is typical of psycholinguistic research. Instead, our focus lies on the participants' judgements about the degree of negativity that they would intuitively ascribe to the given utterances. Since linguistic literature dealing with speakers' perception of negative forms is scarce, in this paper we will attempt to gain some insights into how non-native speakers perceive adverbial negators, besides affixal and syntactic negative expressions.

METHODOLOGY

The study was conducted during two exam periods in the academic year 2020/2021. with students of the English Language and Literature (ELL) Study Programme at the State University of Novi Pazar, and the Faculty of Philology and Arts, University of Kragujevac. The main aim was to determine how non-native ELL students perceive different negative forms in English, which represent different levels of negativity (negative, semi-negative, and negated frequency and quantity adverbs), so as obtain some preliminary insights into the line of research holding that negation is the matter of cognition.

Sample

The final sample included N=91 ELL students, aged from 18 to 28 (M=22.07, StD=2.17), unevenly distributed according to geographical distribution (Novi Pazar, N=70, and Kragujevac, N=21) due to the voluntary nature of the research, and the sex criterion (m=22; f=69), which is commonplace in language acquisition studies. The participants were enrolled in different years of study: Year 1 (N=14), Year 2 (N=31), Year 3 (N=12), Year 4 (N=20), and Year 5 (N=14). As regards the initial age, they started learning English formally approximately at the age of 9 (M=9.25, StD=4.31).

The reason behind choosing ELL students was the assumption that they have better knowledge of the linguistic phenomenon of negation, either theoretically or intuitively, and, above all, they are expected to have better overall mastery of English.

Instruments and Procedures

To collect data, we devised a sociodemographic questionnaire to determine the background data on the participants (age, sex, year of study, year of enrolment, initial age of learning English formally), as well as the Polarity Scale to determine the participants' perception of negativity degrees. The employed seven-point Likert-type scale has values ranging from 1 – *absolutely negative* to 7 – *absolutely positive*, and it includes affixal negation (e.g. *Her attendance was irregular*), its syntactic counterpart with the particle *not* (e.g. *Her visits were not regular*), and lexical negation with negatively keyed words (e.g. *They seldom meet up with their cousins*). Regarding the last category, we assumed a certain scalarity (i.e. different degrees of negativity), similar to scalar implicature interpretation, by including the absolutely negative adverb (e.g. *She never smiles*), semi-negatives (e.g. *I hardly know you*), and negated frequency and quantity adverbs (e.g. *He doesn't come often*, *I didn't sleep much*)[3]. Finally, we included corresponding pairs (e.g. *not considerate* vs. *inconsiderate*) to check whether there is a difference between affixal and syntactic negation. The scale made use of ten pairs of affixal vs. syntactic negation of adjectives (Neg. prefix + Adj, not + Adj.), and twelve items with adverbs, with four items distributed to each of the following categories: the absolutely negative adverb, semi-negatives, and negated adverbs of frequency and quantity. The scale reliability test has shown good internal consistency (Cronbach's α=.878).

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[3] In formal semantics, the assumption that *often* and *many* are corresponding pairs is taken *a priori*, without subjecting it to empirical testing. However, recent research provides evidence that patterns of quantificational force lexicalisation may indeed be similar for the two English adverbs (Alstott, & Jasbi, 2020);

The data being quantitative, we employed the statistical program *IBM SPSS 21*, namely: descriptive statistics tests (frequency, mean, standard deviation) to determine the degree of negativity ascribed to certain items in utterances; difference tests to determine differences between sexes (independent-samples T test), affixal-syntactic pairs (paired-samples T test), and years of study (one-way ANOVA); and scale reliability test to check its internal consistency.

RESULTS AND DISCUSSION

Since our aim was to test how the participants perceive different negative categories and what values they typically assign to specific negative forms, we will present the mean values of the three broad categories of English negation, and compare the tested pairs values, where appropriate.

Table 1 shows the mean values of contrasted morphological and syntactic pairs, as well as *t* values. As illustrated, the corresponding affixal vs. negative particle pairs were generally evaluated as negative to mildly negative[4]. Very interestingly, out of ten corresponding pairs, only two were differently evaluated (not active vs. inactive, not mature vs. immature), in favour of the particle. In other words, the participants evaluated the affixal items more negatively. This finding is in line with previous research showing that although negated adjectives tend to be conceived as expressing an intermediate meaning between an adjective and its antonym, thus being more similar to the adjective without the negative particle than to its antonym, such an effect was less strong for affixal antonyms (Aina, Bernardi, & Fernández, 2019).

When these two broad types of negation were compared in terms of their aggregate scores (cf. Table 2), paired-samples T test indicated a statistically significant difference in favour of the syntactic negation ($t(83)=1.995$, p=.049). Namely, overall, the participants evaluated affixal negation much more negatively than the syntactic one. This finding, however, is not in line with the conclusions of the abovementioned study, which states that these two types of negation are similar, since the affixal negation has a morphological structure resembling the negated adjectives (Aina, Bernardi, & Fernández, 2019).

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[4] Drawing on Grubor (2021), the seven points of the scale can be taken as a frame of reference: *1* very negative, *2* negative, *3* mildly negative, *4* neutral, *5* mildly positive, *6* positive, *7* very positive estimates. In this study, the value equalling exactly 1 would be absolutely negative, and 7 would be absolutely positive;

Table 1. Pairs of affixal (Neg. pref. + Adj.) and syntactic negation (not + Adj.)

Item	N	M	StD	Min	Max	T
He is not considerate.	91	2.75	1.47	1	7	-.293
He is inconsiderate.	91	2.81	1.75	1	7	
They are not active.	91	2.95	1.46	1	7	**2.040***
They are inactive.	90	2.56	1.43	1	7	
I am not interested in eating healthy.	91	2.80	1.72	1	7	-.301
You are disinterested in healthy food.	89	2.90	1.64	1	7	
Doing that is not mature.	91	3.32	1.73	1	7	**2.224***
Saying that is immature.	91	2.82	1.47	1	7	
His actions are not logical.	90	2.73	1.49	1	7	-1.643
The answer is illogical.	91	3.03	1.54	1	7	
She is not attractive.	90	2.28	1.59	1	7	1.148
She is unattractive.	91	2.05	1.37	1	6	
We are not organised when we plan things.	90	2.98	1.59	1	7	.391
They are disorganised when it comes to planning.	90	2.90	1.50	1	7	
She is not responsible.	90	2.73	1.87	1	7	1.773
He is irresponsible.	91	2.33	1.89	1	7	
Her visits were not regular.	91	3.11	1.36	1	7	.922
Her attendance was irregular.	91	2.96	1.58	1	7	
He was not happy about the way I did it.	91	2.70	1.35	1	7	-1.425
He was unhappy about the outcome.	90	3.02	1.68	1	7	

$p<.001^{***}$; $p<.01^{**}$; $p<.05^{*}$

Table 2. Morphological and syntactic negation (overall scores)

Type	N	M	StD	Min	Max	T
not + Adj.	88	2.83	.72	1.00	4.80	1.995*
Neg. pref. + Adj.	86	2.69	.90	1.30	5.30	

$p<.001^{***}$; $p<.01^{**}$; $p<.05^{*}$

We also set out to test whether there are variable negativity degrees between the three tested subtypes of adverbs: the absolute negative *never*, which should assume the lowest level of negative polarity (i.e. absolutely negative); over semi-negatives, such as *hardly* and *rarely*, which are expected to take on the 'almost-never' value; to negated frequency and quantity adverbs, such as *not often* and *not much*, which are assumed to take the 'occasionally' value, which is line with quantification force research that focuses on how speakers judge quantity[5].

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[5] According to this research, the adverbials from our study fall under different quantificational forces categories: *often* under the positive proportional force, *seldom* and *rarely* under the negative proportional force, *never* under the negative existential force (Alstott, & Jasbi, 2020, p. 2002), which corresponds with the previously mentioned content values of the adverbs employed herein.

If we apply the same frame of reference (Grubor, 2021), the results fall outside the set semantic values of the adverbs. The absolute negative did not take the lowest value, but took the negative value only (around 2), although other studies reported much lower mean values of 1.28 (Parreira, & Lorga da Silva, 2016). However, the scores on the positively keyed utterances were neutral, not positive (around 4). The first one, *He never beats around the bush*, may be said to be representative of directness, which is typically appraised as positive in the Serbian mindset and interpreted as honesty, and similarly, the second one, *We never stalled the process*, has the implicitly negative verb *stall* negated in addition, thereby potentially indicating responsibility. With this in mind, we may assume that the negative adverb *never* played its role in colouring the utterance as 'not so positive' as semantics may imply.

The semi-negatives were assigned different values, except for *rarely* and *barely*, and *hardly* and *seldom*, which were assigned similar values. The former pair is typically treated as synonymous, but the latter is not, since *hardly* would rather go along with *rarely* and *barely*, while *seldom* would take on a higher value. If we consider some learner corpus studies, in which *seldom* was found to be infrequently (Rabadán, & Izquierdo, 2013) or never used (Bobkina, & Stefanova Radoulska, 2018) by L2 English learners, we may assume that this slight discrepancy in the participants' judgements (perceiving *hardly* and *seldo*m as synonymous) may be the cause of assigning lower values to the latter adverb. In a similar vein, hierarchical cluster analysis performed in quantification force research revealed that there is one tier containing, among others, *never*, *rarely* and *seldom*, termed minority quantificational force, and another tier including, among others, *many* and *often*, termed majority quantificational force (Alstott, & Jasbi, 2020).

The descriptive statistics were supported by the paired-samples T test, which detected statistically significant differences between all the semi-negatives but *rarely* and *barely*, on the one hand, and *hardly* and *seldom*, on the other (*hardly* vs. *rarely*: $t(86)=2.505$; $p=.014$; *hardly* vs. *barely*: $t(89)=2.331$; $p=.022$; *rarely* vs. *seldom*: $t(86)=-2.329$; $p=.010$; *barely* vs. *seldom*: $t(88)=-2.477$; $p=.014$). As can be noted from the *t* values, the sample perceived *hardly* and *seldom* as more positive than *barely* and *rarely*. Finally, in terms of the negated frequency adverb *not often* and quantity adverb *not much*, no differences were found between the frequency and quantity adverbs, and any of the semi-negatives, which implies that these categories were not seen as distinctively different. Thus, it is possible that, overall, the participants regarded semi-negatives as negative, without paying special attention to specific levels of negativity degree. However, the question that some future studies may address is whether the negated frequency and quantity adverbs are closer to the mi-

nority or majority quantificational force category since, in their case, the majority quantificational force is reversed.

Table 3. Adverbial negation: absolutely negative adverb, semi-negatives, and negated frequency and quantity adverbs

Item	N	M	StD	Min	Max
She never smiles.	91	2.36	1.56	1	7
They never arrive on time.	90	2.33	1.65	1	7
He never beats around the bush.[+]	91	4.64	1.87	1	7
We never stalled the process.[+]	91	4.21	1.80	1	7
I hardly know you.	90	3.47	1.51	1	7
He rarely comes.	88	2.99	1.58	1	7
I barely slept.	91	2.97	1.80	1	7
They seldom meet up with their cousins.	89	3.55	1.59	1	7
They don't meet up with their cousins often.	91	3.26	1.58	1	7
He doesn't come often.	90	3.30	1.47	1	7
I didn't sleep much.	91	3.05	1.89	1	7
She doesn't smile much.	91	2.84	1.51	1	7

[+]positively keyed utterances

When the aggregate values were compared (cf. Table 4), the order was as set by the grammatical rules and semantics: the absolute negative took the lowest value (although being only negative), then semi-negatives, and negated frequency and quantity adverbs (*not often*, *not much*) reported a mildly negative score.

Table 4. Degrees of (adverbial) negation (overall scores)

Negation degrees	N	M	StD	Min	Max
never: negative	90	2.36	1.21	1	5.50
never: positive	90	4.43	1.44	1	7
never: average	89	3.38	.92	1	6.25
semi-negatives	86	3.22	1.14	1.25	7
negated frequency & quantity adverbs	90	3.28	.83	1.63	5.63

To test whether our participants made a significant difference between semi-negatives, and negated frequency and quantity adverbs, which are expected to take on higher values than semi-negatives (*X rarely smiles* expresses a lower level of frequency than *X does not smile often*), we employed paired-samples T test. Statistically significant differences were reported between the absolutely negative adverb and all other tested categories, including the positively keyed utterances, as illustrated in Table 5. On the other hand, no difference was found between the semi-negatives, and negated adverbs of frequency and quantity. Besides not being differently evaluated by the participants, these two categories were significantly correlated in addition (*r*=.606, *p*=.000).

Table 5. Differences in negation degrees

Negator type	Negator type	T	p
never: negative	semi-negatives	-6.743	.000
never: negative	negated frequency & quantity adverbs	-7.129	.000
never: positive	semi-negatives	6.019	.000
never: positive	negated frequency & quantity adverbs	7.654	.000
semi-negatives	negated frequency & quantity adverbs	1.022	.310

Regarding the sex criterion, independent-samples T test detected no difference on any item or aggregate score. As for the year of study criterion, ANOVA reported statistically significant differences on two items only, namely, *not considerate* ($F(86) = 1.875$; $p = .002$) and *not happy* ($F(86) = 1.659$; $p = .021$). A post-hoc Tukey test showed a difference between Year 1 and Year 4 ($M(I–J) = 1.600$; $p = .010$), and Year 3 and Year 4 ($M(I–J) = 1.683$; $p = .010$) on the former item, and Year 2 and Year 3 ($M(I–J) = -1.285$; $p = .034$), and Year 3 and Year 4 ($M(I–J) = 1.583$; $p = .010$) on the latter item. To summarise, the male and female participants did not evaluate the items differently, which was also the case with students enrolled in different years of study, excluding the said two items.

Finally, we need to point to the *limitations* of the study. The sample is not representative because it involved two out of the six state universities in Serbia. Furthermore, the distribution by the sex and year-of-study criteria was uneven. Concerning the instrument, all the items referred to animate entities, thus potentially exerting emotional perlocutionary effects. Moreover, all the items were given on the sentential, rather than the suprasentential plane.

CONCLUSION

In order to propose some possible directions of future research, we will address the aims of our study and its main results, and then provide some suggestions relative to the sample and the instrument.

The main aim was to determine how non-native ELL students perceive different negative forms in English. Overall, the sample evaluated the affixal–syntactic negation pairs fairly equally (only two out of ten pairs displayed a statistically significant difference in favour of syntactic negation), on a continuum ranging from negative to mildly negative. The aggregate scores, though, indicated different results – the affixal negation was evaluated more negatively than the syntactic one. This finding is worth pursuing in further research since there is a discrepancy in the results. The results pertaining to the separate items on the affixal–syntactic plane, except for the items *inactive* and *immature*, are in line with the available literature, which reports that these two categories are similarly perceived (Aina, Bernardi, & Fernández, 2019). On the other hand, the

results relating to the overall categories suggest that affixal negation is more negatively evaluated by our participants. This might raise the question of whether there are tiers, as quantification-force research shows, with negative prefixes overall imparting a higher level of negativity than *not + Adj*, as in our study, whereas the individual utterances are evaluated against the semantic value *per se*.

We also set out to test the extent to which the participants distinguished between different levels of lexical negatives. The participants evaluated the absolute negative more positively than its semantics implies (as negative only). However, the positively keyed utterances with *never* were evaluated as neutral rather than with some level of positivity, which may imply the cognitive force of negation. Regarding semi-negatives, and negated frequency and quantity adverbs, the participants evaluated them fairly equally, contrary to the theoretical and intuitive understanding. Therefore, it might be reasonable to include the affirmative form of these adverbs and compare the results in some prospective studies.

Concerning the sample and employed instrument, future research may include a representative sample of ELL students in Serbia by including random participants from all the universities in the country, in line with the strict statistical procedures. Although valuable insights may be gained by including the general population and not a target sample, as was the case in our study, the problem would lie in the variable concerning the proficiency levels of the participants, which would be too complex to determine. However, what would be insightful is to include a control group of native speakers as a frame of reference against which the results may be compared. As for the instrument, we mainly used negated adjectives referring to animate entities (e.g. *She is not attractive*), which may be emotionally coloured, thus potentially exerting certain perlocutionary effects on the participants, such as taking pity on the subject. Against this backdrop, it may be wise to include inanimate entities in future research as well (e.g. *The offer is not attractive*), since they lack emotional connotations and may thus exclude potential interference of pragmatic effects. What is more, the inclusion of discourse would be more relevant from the standpoint of contemporary linguistic enquiry if researchers could find valid procedures for measuring the reliability of the employed texts.[6]

On a more general note, it would be useful to replicate this study with samples from different countries, in order to check whether there are culturally induced differences in different EFL contexts or in comparison to native speakers' reports. Should no differences be found, it may be reasonable to assume that negation is a matter of cognition rather than a purely linguistic phenomenon.

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[6] Longer samples of texts would not easily allow the extraction of negative forms in terms of their negativity degree without making sure that they have not been influenced by the context.

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СТЕПЕН НЕГАТИВНОСТИ МОРФОЛОШКЕ, СИНТАКСИЧКЕ И ЛЕКСИЧКЕ НЕГАЦИЈЕ У ЕНГЛЕСКОМ КРОЗ ПРИЗМУ СТУДЕНАТА ЕНГЛЕСКОГ ЈЕЗИКА И КЊИЖЕВНОСТИ

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Резиме

Феномен негације је део перцепције и универзално својство свих људских језика. Фокус истраживања чине морфолошка негација (нег. преф. + прид), синтаксичка негација (нег. парт. + прид) и лексичка негација (речи са негативним значењем). Главни циљ је утврдити како их опажају студенти студијског програма Енглески језик и књижевност у односу на степен негативности. Коначан узорак N=91, узраста од 18 до 28 година (M=22,07, StD=2,17), чинили су студенти Државног универзитета у Новом Пазару и Универзитета у Крагујевцу. У сврху прикупљања података, осмислили смо социодемографски упитник (за утврђивање пола, узраста, године студија), као и седмостепену Скалу поларитета за утврђивање степена негативности. Скала садржи исказе са три поменута општа типа негације, и то двадесет исказа са по десет парова афиксне и ситаксичке негације (нпр. непривлачан/-на – није привлачан/-на), четири исказа са апсолутно негативним прилогом никада (два са негативним, два са позитивним значењем), четири исказа са апроксимативима (нпр. готово никада), и четири исказа са негираним квантификатором (нпр. Не спавам много) или прилогом учесталости (нпр. Не долази често). Добијени подаци су анализирани у статистичком програму IBM SPSS 21, применом дескриптивне статистике (израчунаване су фреквенције, средње вредности, стандардна девијација) и тестова разлика (т-тест за независне и упарене узорке, једнофакторка анализа варијансе). Тест за утврђивање поузданости скале показао је добру интерну конзистентност (α=0,878). Уопштено говорећи, узорак је доста уједначено оценио парове које су чиниле афиксна и синтаксичка негација, што је у складу са резултатима других истраживања, и то као негативне или умерено негативне. Међутим, у погледу општих скорова, афиксна негација је процењивана негативније од синтаксичке. Испитаници су оценили апсолутно негативни прилог позитивније него што ње-

гова семантика сугерише, и то само као негативан (2,35 у просеку), а исказе са позитивним значењем као неутралне (4,42 у просеку), док су доста уједначено оценили апроксимативе, и негиране прилоге учесталости и квантификаторе. За будућа истраживања је пожељно укључити студенте са осталих универзитета у Србији, поред аниматних уврстити и неаниматне субјекте у исказе због потенцијалног утицаја прагматичких ефеката, и реплицирати истраживање у различитим културним срединама не би ли се проверило да ли постоје културно условљене разлике или пак когнитивна сличност.

THE MADNESS OF TWO HEROES: HERACLES AND MARKO KRALJEVIĆ

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Abstract

The motif of insanity was quite frequent in Ancient Greek Literature. In turns, it was viewed as obsession, illness, or just and justified punishment. Insanity always brought some kind of self-inspection and self-cognition. Heracles is an ancient hero who committed a crime against his closest relatives in a state of severe madness. The Serbian epic hero Marko Kraljević shared a similar fate. The authors of the paper will investigate the motives of insanity of both heroes in two different, but traditionally close cultures: Greek and South Slavic. The motif of *heroic madness* is explored in tragedies related to Heracles, and in Serbian epic poetry known as the epic cycle of Marko Kraljević.

Key words: madness/insanity, Heracles, Marko Kraljević, isolation, punishment, conflict, crime, murder.

ЛУДИЛО ДВА ХЕРОЈА: ХЕРАКЛЕ И МАРКО КРАЉЕВИЋ

Апстракт

Мотив лудила био је веома чест у античкој грчкој књижевности. Некада је лудило третирано као опседнутост, болест или праведна казна. Лудило је увек доносило неки увид и спознају. Херакле, античи јунак, због злочина према ближњима пада у тешко стање лудила. Сличну судбину доживљава и српски епски јунак Марко Краљевић. Аутори рада истражиће мотиве лудила код два јунака две традиционално блиске културе: грчке и јужнословенске. Мотив лудила хероја истражује се у грчким трагедијама везаним за Херакла и у циклусу српских епских песама о Марку Краљевићу.

Кључне речи: лудило/махнитост, Херакле, Марко Краљевић, изолација, казна, сукоб, злочин, убиство.

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INTRODUCTION

Throughout human history, individuals who behaved differently from the majority and opposite to the moral values of the community were isolated, expelled, or punished by the environment itself. Such unusual behaviour intrigued other people, who tried to comprehend and explain the causes and consequences of such acts. In every epoch, thus, we find literary records as attempts to answer the questions of what madness, or insanity, is, what causes it, and how a mad person looks and behaves.

The essence of *losing the mind* is a feeling almost akin to the loss of one's life and, even more often, it is a fate worse than death itself. People who succeed in defeating this condition of clouded consciousness become empowered by this metaphysical experience as a person who returned from the world of the dead (Radulović, 2019). Crime towards both others and oneself is often associated with madness, either as the cause or as the consequence of it. The conflict between the person's needs, hopes and beliefs, and their unfulfillment are the crucial points in straying from the path of sanity. The only salvation those who fail to stay on that path seek is death, mostly their own or the death of those around them (Šofranac, 2013, p. 14). That is why madness is so intriguing, and why it became a common motif in the tragic stories of many cultures. Today the word 'madness' is used within a spectrum of bountiful meanings, starting from mental disorders and moving onto milder meanings such as ecstasy, foolish behaviour, anger or even excessive joy.

SOURCES OF MADNESS

Judging by the frequency of madness as a subject in Ancient Greek literature, Thomée, one of the pioneers in the historical research of insanity, concludes in his study of insanity (Thomée, 1830) that the behaviour characterised as madness occurs more frequently in unstable social, economic and political conditions, in circumstances of constant warfare and destruction, and even in the unfavourable, humid climate. One can trace this kind of behaviour in Heracles and Marko Kraljević, both of whom are victims of tremendously difficult life conditions, horrific bloody conflicts and cruel geographical environments. Thomée also lists a number of mythical stories with deities and heroes who became victims of madness (Vaughan, 1919, p. 12, pp. 21-24).

The widespread and common belief among the Ancient Greeks was that the gods provoked and caused madness in humans. People would get swept up in divine anger due to some omission, impious or inappropriate act, and even due to 'immense happiness', for which they would consequently be punished, as attested in Herodotus (Hdt. 3.21) and Sophocles' play *Oedipus Rex*. It seems that the gods' 'favourite' type of punishment was insanity.

In the Middle Ages, however, insanity was understood as God's punishment, or as a consequence of possession by divine or demonic forces, as is the case of nymphs in the South-Slavic mythology (*Serb.* vila). The etymology of the noun *vila* and the verb *viliti*, *vileniti* is possibly connected to the loss of clarity of mind and fury, as corroborated in other similar Balto-Slavic words (Loma, 2015, pp. 247-250 et passim; Skok, 1988 s.v. *vila*). In Serbian mythology, the *vilas* are supernatural beings who lived near water and appeared after midnight, like nymphs and Rusalki. These female demonic creatures sometimes possessed people, similarly to Hellenic goddesses Selene, Artemis and Hecate, associated with the moon, or night time, as well as Nereids, deities of water (Vaughan, 1919, p. 16, p. 26). Those who, instead of sleeping, lived their lives at night would typically be the ones who got possessed. In common speech, the Serbian verb *vileniti* is used to describe those who perform their daily activities during the night, or those who cannot sleep, usually hunted by some manic thoughts (Tolstoj, Radenković, 2001, pp. 80-82; Skok, 1988, p.593). In the case of Marko Kraljević, the *vilas* are strongly connected with the hero's birth, life, and his heroic and mystical death.

THE MOTIF OF THE MADNESS OF THE TWO HEROES

A comparative study of the fates of the Hellenic hero Heracles and the South Slavic hero Marko Kraljević points to certain similarities between the two of them (Vukadinović, 2006). Our focus is directed at the motif of madness/frenzy that occurs in ancient plays and Serbian epic sources.

Madness was especially addressed by Greek tragic poets (e.g. madness of Ajax, Kassandra, Philoctetes, Phaedra, Medea, Orestes, etc.). Each of these cases of madness have their own causality and consequence. The loss of mind is evident in the heroes' behaviour, depicted on and behind the stage, or in the comments given by others in the play, who act as eye-witnesses. What is indicative in these texts is that, from the psycho-dynamic point of view, the Greek poets portrayed insanity with incredible precision, focusing on how it begins, how a person succumbs to it, and how the illness culminates. The madness that derives from conflicts in most ancient texts is accompanied by ambiguity, which also plays an important role in understanding the process of succumbing to the state of a lost mind (Šofranac, 2013, p. 37). According to Šofranac, "This ambiguity is not necessarily in the very hero, but in the structure of the drama itself" (Šofranac, 2013, p. 37). A conflict of love and hatred, i.e. mixed feelings, can be noticed towards the victim (Maričić, Radulović, Todorović, 2018). As Šofranac notes, "Murders are, most often, part of the sacrificial rituals and an integral part of these rituals is ambiguity" (Šofranac, 2013, p. 37). In tragedies in which madness is a motif, the images of rites and ritual sacrifice are dominant. The sacrifice of Iphigenia, the beloved

daughter of Agamemnon, by her own father in Aulis, provoked by the collective madness of soldiers, is eventually substituted by the sacrifice of an animal (usually the hero's horse or a dog) instead of a human, in this case a deer. Similarly, such is the case of the furious Ajax, who killed animals thinking that he was killing his enemies. The madness of Heracles is directly connected to sacrificial rites, and it occurred just before he wanted to offer sacrifices of purification to Zeus. It was at that moment that he was possessed by Lyssa (Madness), and began to slaughter his family.

If we follow the classification of heroes, characterised in the history of European literature by five basic developmental tendencies, according to Northrop Frye (Frye, 1957, pp. 23-28), Heracles belongs to the first type of hero, because he is above other people and their natural surroundings. He became a demigod, and every story about him became a myth. If Frye's classification is applied to the South Slavic hero, one could notice that he sublimates the elements of the historical and mythical Marko Kraljević, a typical medieval hero of folk tales and legends. Since his qualities are above other people (but not above their natural surroundings) then, according to Frye, Marko Kraljević is a stratified literary-historical-epic figure. According to the circumstances of his birth, his acquisition of supernatural power and divine attributes, his very name, his hard nature and, finally, all the heroic accomplishments with various heroes of supernatural powers, he is actually a Slavic demigod. In a thousand years, the shadow of the historical Marko Kraljević would be shattered, and every legend and song about the hero would become a myth, as was the case with Heracles, whose poetic significance was first noted by Homer (Hom. Il. 19.95-105). Heracles and Marko Kraljević will be remembered as 'fierce guys' in the history of literature. What they did, and what was said, paraphrased, recorded, sang and dramatized, surpasses the biography of a common mortal.

Heracles' madness, however, differs in many ways from the aforementioned mythical figures, because he is, above all, a cultural hero, with kingship over many cities. He is also the father of many sons of the pre-Homeric age. In the Serbian epic, Marko Kraljević's frenzy, anger and grudge were mentioned by the *singer of tales* – a term coined by Milman Parry and Albert B. Lord (Lord, 1960), meaning minstrels (*Serb.* guslari) – the interpreters of heroes' actions. Heracles' madness was exceptionally described by Euripides in his tragedy *Heracles Furens* (Ἡρακλῆς μαινόμενος), which is considered to be his most daring play (Maričić, 1988).

There are certain elements that led us to believe that this play has a historical background. It was written and performed during the whirlwind of the madness of the Peloponnesian war in 424 BC, or some years earlier, in 428 BC, when the war was raging alongside the consequences of a plague epidemic, which the tragic poet Sophocles had portrayed in his play *Oedipus Rex* as a punishment from the gods. The case of Heracles'

madness is mentioned by earlier and posterior ancient Greek authors, such as Pindar (520 - 445 BC) and Apollodorus (2nd century BC), but their poetic and prose narratives did not have the intention to describe the psychological state which Hercules suffered as the perpetrator of bloodshed and, ultimately, someone who was mad enough to kill his own wife and children. The dive into Heracles' mind and soul was the task of Euripides, the first psychologist of the ancient world.

The opening scene of Euripides' play is set right after Heracles made his twelfth labour – a descent to Hades. In his absence, the tyrant Lycus intended to kill his family. At the last moment, Heracles returns from Hades and kills Lycus. This is the point at which the second part of the tragedy begins. As the choir sings a hymn in Heracles' honour, Lyssa (Λύσσα), the goddess of madness (anger, frenzy) enters the scene. It is noticeable that *lyssa* is literally 'wolfish rage', a derivative of the word *lykos*, meaning 'wolf', which was the name of the usurper Lycus, previously killed by Heracles. Lyssa is invoked by Iris (Ἶρις), the messenger goddess of the Olympians, acting in accordance with the command of Hera, Zeus's wife:

Iris
Courage, old men! She, whom you see, is <u>Madness,</u> <u>the daughter</u> of <u>Night</u>, and I am Iris, the handmaid of the Gods. We have not come to do your city any harm, but our warfare is against the house of one man only, against the one who is called the son of Zeus and Alcmena. For until he had finished all his grievous labors<u>, Destiny was preserving him</u>, nor would father Zeus ever stand for me or Hera <u>to harm him</u>. But now that he has accomplished the labours of Eurystheus, <u>Hera wishes to brand him with the guilt of shedding kindred blood by slaying his own children, and I wish it also</u>. Come then, unwed maid, child of black Night, harden your heart relentlessly, <u>send forth the frenzy upon this man, confind his mind</u> even to the <u>slaying of his children</u>, drive him, <u>goad him wildly on his mad path</u>, shake out the sails of death, that when he has conveyed over Acheron's ferry <u>that fair group of children by his own murderous hand</u>, he may learn to know how fiercely burns <u>the wrath of Hera </u>against him burns and may also experience mine; otherwise, <u>if he should escape punishment,</u> the gods will become as nothing, while man's power will grow.

Madness:
I call the Sun-god to witness that here I am acting against my will; but if indeed I must at once serve you and Hera and follow you in full cry as hounds follow the huntsman, then I will go; neither ocean with its fiercely groaning waves, nor the earthquake, nor the thunderbolt with blast of agony shall be like the headlong rush I will make into the breast of Heracles; through his roof will I burst my way and swoop upon his house, after first slaying his children; <u>nor shall their murderer know that he is killing the children he begot, till he is released from my madness.</u> Behold him! **<u>see how</u>**

even now he is wildly tossing his head at the outset, and rolling his eyes fiercely from side to side without a word; nor can he control his panting breath, like a fearful bull in act to charge; he bellows, calling on the goddesses of nether hell. Soon will I rouse you to yet wilder dancing and pipe a note of terror in your ear. Soar away, O Iris, to Olympus on your honored course; while I unseen will steal into the halls of Heracles.

Chorus:
Alas alas! lament; the son of Zeus, flower of your city, is being cut down. Woe to you, Hellas! that will cast you away from your **benefactor**, and destroy him as he dances in the shrill frenzy of Madness. She is mounted on her chariot, the queen of sorrow and sighing, and is goading on her steeds, as if for outrage, the Gorgon child of Night, with a hundred hissing serpent-heads, Madness with the eyes flashing. Soon has the god changed his good fortune; soon will his children draw their last breath, slain by the father's hand**.**[1]

(Eur. *Her*. 822-841; emphasis added)

The attack of Heracles' madness, as well as the crime itself, was described by Euripides with incredible precision in the words of the messenger:

Messenger
Victims which came to purify the house were stationed before the altar of Zeus, for Heracles had slain and cast from his halls the king of the land. There stood the group of his lovely children, with his father and Megara; and already the basket was being passed round the altar, and we were keeping holy silence. But just as Alcmena's son was bringing the torch in his right hand to dip it in the holy water, he stopped without a word. And as their father lingered, his children looked at him; **he was no longer himself**; **his eyes were rolling; he was distraught; his eyeballs were bloodshot, and foam was oozing down his bearded cheek. He spoke with a madman's laugh**: "Father, why should I offer the purifying flame before I have slain Eurystheus, and have the toil twice over? It is the work of my unaided arm to settle these things well; as soon as I have brought the head of Eurystheus here, I will cleanse my hands for those already slain. Spill the water, cast away the baskets from your hands. Ho! give me now my bow and club! To Mycenae I will go; I must take crow-bars and picked axes, for again I will shatter with iron levers those city-walls which the Cyclops squared with red plumb-line and mason's tools." Then he set out, and though he had no chariot there, he thought he

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[1] For the original Greek version (Murray, 1913). Translated by Edward P. Coleridge, vide: http://www.perseus.tufts.edu/hopper/text?doc=Perseus%3atext%3a1999.01.0102 downloaded 5/10/2022;

had, and was acting like he was mounting to its seat, and using a
goad as though his fingers really held one.

(Eur. *Her*. 921-949; emphasis added)

After all has transpired, Heracles regains his consciousness. Then
he falls into a state of despair and regret. He was overwhelmed by prepos-
terousness and the desire to commit suicide. Theseus dissuades him from
his dark intentions, and advises and consoles him:

Heracles
Hear me if just for a moment…I will unfold to you why the **life
now is unbearable to me** as well as it was formerly. First, I am
the son of a man who incurred the guilt of blood, before he mar-
ried my mother Alcmena, by slaying her aged father. Now when
the foundation is badly laid at birth, it is necessary for the race to
be cursed with woe; and Zeus, whoever this Zeus may be, begot
me as an enemy to Hera; yet do not be vexed, old man; for I regard
you as my father rather than I do Zeus. Then, while I was being
breatfead and nursed, that bedfellow of Zeus foisted fearsome
snakes into my cradle to cause my death. Afterwards I took on a
cloak of youthful flesh, what else do I need to tell **after all of the
toils I endured? what have I not destroyd**, whether it were lions,
or triple-bodied Typhons, or giants or the battle against the hosts
of four-legged Centaurs? or what about when I had killed the hy-
dra, that monster with a ring of heads with power to grow again, I
passed through a herd of countless other toils besides those and
came to the dead to grab to the light the three – haded hound, hell'
gate keeper at the bidding of Eurystheus. And last, ah, woe at me!
**I have dared this labour, to crown the sorrows of my house
with my children's murder**. I have come to this point of necessi-
ty; no longer may I dwell in Thebes, the city that I love; for sup-
pose I stay, to what temple or gathering of friends shall I go? For
mine is no curse that invites greetings. Shall I go to Argos? how
can I, when **I am an exile from my country? Well, is there a
single other city I can rush off to?** Am I then to be looked at
askance as **a marked man**, held by cruel stabbing tongues: "Is not
this the son of Zeus that once murdered his children and his wife?
Plague on him[2], take him out from the land!" **Now to one who
was once called happy, such changes** are a grievous thing;
though he who is always unfortunate feels no such pain, for **sor-
row is his birthright**. This, I think, is the pityous pass I shall one
day come to;**for earth will cry out forbidding me to touch her,
the sea and the river-springs will refuse me a crossing,** and I
shall become like Ixion who revolves in chains upon that wheel.

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[2] One of the oldest curses in Serbian is *Kuga ti na kuću*! („Plague on your house")
reflecting the worst punishment, meant not for an individual, but for the whole family
or tribe (i.e. society);

And so this is best, that I should be seen by no one of the Hellenes, among whom in happier days I lived in bliss. **What right have I to live?** what profit can I have in the possession of a useless, impious life? **So let that noble wife of Zeus dance**, beating her foot in her shoe; for now has she gained her heart's desire in utterly confounding the first of Hellas' sons. Who would pray to such a goddess? Her jealousy of Zeus for his love of a woman has destroyed the benefactors of Hellas, guiltless though they were.

Theseus:
I cannot counsel you... There is not a man alive that has wholly escaped misfortune's taint, nor any god either, if what poets sing is the truth. Have they not intermarried in ways that law forbids? Have they not thrown fathers into ignominious chains to gain the sovereign power? Still they inhabit Olympus and brave the issue of their crimes. And yet what shall you say in your defence, if you, a child of a man, takes your fate excessively hard, while they, as gods, do not? No, then, leave Thebes in compliance with the law, and come with me to the city of Pallas. There, when I have purified you of your pollution, I will give you home and the half of all I own… these shall henceforth be called yours by men, while you live; and at your death, when you have gone to Hades' halls, the whole city of Athens shall exalt your honor with sacrifices and a monument of stone. For it is a noble crown of a good reputation for citizens to win from Hellas, by helping a man of worth.

<div align="center">(Eur. Her. 1255-1339; emphasis added)</div>

In the mythical biography of Heracles, the extensive slayings and bloodshed singled him out from other Greek heroes. Each murder had something to do with divine punishment. Heracles was often in a state of No-sense (Foucault, 2013). His heroic labours excommunicated him from life in a peaceful community. He is a hero who has to wander alone with his own tragedy. Euripides is the poet of anthropodicy. It is no coincidence that Heracles' infamy is characterised as the culmination of bloodshed which results in the loss of reason, but only in the form of a psychotic episode (Milivojević, 2007). Euripides is the first author who showed that the greatest battles happen in the human mind, and that the greatest battle is the battle with ourselves. The irrational force of passion captured Heracles' mind. The perception of reality gets a new dimension and meaning. The scope and precision of medical and psychological knowledge expressed in the tragedy *The Frenzy Heracles* causes astonishment and admiration. Euripides is the first European writer who articulated madness. His knowledge of this disease of the spirit and mind is far beyond mere observation, a topic that today seems to be strictly professional and meant for the medical specialists to dwell on. To the audience and the readers of Euripides' play, the poet clearly presents the phenomenon of Heracles' pathogenesis, or what happens when a person experiences an emotional and

moral breakdown. Understanding this interaction between the hero and the situation in which he finds himself makes Euripides a psychologist at a time before psychology was established as a scientific discipline.

In Heracles' case, madness did not occur by chance. Even he himself says that this is the consequence of the "ancestral sin" (ver. 1255). Heracles is suffering from a turnover of destiny, from a game of chance, from an external force. His insanity was also preceded by a series of 'dirty' labours which he, as a hero, had to fulfil. And he served a man 'worse than himself'. After one of these labours, in return, he received his wife Megara, the daughter of the king of Thebes. However, Destiny did not intend for him to live a calm life beside his wife and children. Hera had other plans, causing him to undergo new sufferings. Theseus, whom Heracles had taken out of Hades, consults a friend and assures him that suicide would be a cowardly act (Maričić, Šijan, 2020, p. 71, p. 73; also see Garrison 1991; Dover, 1974, pp. 168−169; Van Hooff 1990). Heracles accepts this kind of self-cognition with difficulty. Heracles' madness is an initiation into his awareness that man must endure regardless of the difficulties of life, proving that the blows of destiny constantly play with human lives. Euripides carried out a vivisection of Heracles' emotions and mind, putting that complex mosaic in front of us all to 'see' from our own viewpoint and 'read' in our own manner.

Unlike with Heracles, in the Serbian epic ballads about Marko Kraljević, a folk singer does not explicitly say anything about Marko's insanity. There is an obscure madness at hand here. The singer of tales expresses only the manifestations of madness in the forms of Marko's frenzy, pride, rage, unreasonable behaviour, grudges, insensible laughter, and the like. The singer primarily depicts the medieval Serbian knight as the protector of the weak and dis-empowered people: he frees the captives, opposes the Ottoman scoundrels, and speaks with and treats wounded animals. But there is also a dark side to his nature. Like most epic heroes, he is also a hector, a grouch, a drunkard, vain in his own heroism, drunk on his own masculinity, easily offended, haughty and wild. His cruelty is part of his infantile perception of the world, which is actually the perception of the epic singer. In each ballad, there are always just *black and white* spheres in which Marko, led by some personal instinct, solves certain labours. He is a hero of epic times and 'communication by the sword'. He has an epic biography of murders and conflicts on the battlefield, a biography full of bloodbath that enthrals him, and through all that time he had to serve people 'worse' than himself. In all these, one can recognise a personal and a national frustration. In order to satisfy the higher principles of justice and to establish the world's balance, Marko was given the role of the avenger by the singer of tales that inspired Margaret Yourcenar to write the "Smile of Marko" and "The End of Marko" in her *Oriental Tales*. Due to his role of avenger of the poor, weak and oppressed, Marko

trusts no one except himself. He holds a grudge against everyone, because he sees potential enemies in everyone.

In some areas of the Balkan region, Marko was purposely portrayed as an anti-hero. In these ballads, he is characterised as a bloodthirsty man – he kills his brother, his mother, his wife and girlfriend and, in some cases, morbid, even cannibalistic motifs are related to his character. Accoriding to Ljubinković (1995), these ballads were created in the so-called 'limitrophe' areas, in which different ethnic and religious interests are confronted and opposed, creating different and completely opposite views on the character and role of Marko Kraljević (Ljubinković, 1995, pp. 184-187).

It is said above that bloodshed and murder are often associated with madness, either as a cause or as a consequence. Nevertheless, the intention of an epic singer was not to show us the psychological state of Marko's madness, but rather to describe Marko's violence as a result of deep frustration and inhibition. On the other hand, Marko's every misdeed is justified by the folk singer. We will indicate here only one aspect of Marko's frenzy – violence, expressed towards women. Why towards women? In the singer's subconscious, women have an unpredictable, 'demonic' nature, similar to the *vilas* which are, as Euripides' Madness, the daughters of Night. A woman is inclined to communicate with the invisible and intangible world, known as intuition. The language of a woman is not a sword; on the other hand, she is willing to shed blood due to internal urges. Women are the ones who know how to provoke anger and rage in Marko. The hero is not immune to their evil language and the truth that comes out of their mouths.

In the poem *Marko Kraljević and the Daughter of the Moorish King*, Marko tells his mother about the Arab princess who helped him escape from captivity. In doing so, she stole many ducats and ran away with him, as Ariadne and Medea did in the Greek tradition. But there is no gratitude in this hero, since Marko put "his 'kalpak' (headgear for medieval Serbian knights) on his knee" (*Marko Kraljević and the Daughter of the Moorish King,* 52-53), an action usually preformed when he negotiated with the enemy, and a clear sign that he does not keep his word (Čajkanović, 1994, pp. 366-367). In his male pride, he finds in the act of the girl a betrayal towards her own kind, and if she was able to betray her own religion and homeland, she would do the same to him. He displayed the same pattern in his own house, when Vidosava, the wife of his uncle Momčilo, betrayed him for Vukašin. However his subconscious gives him no peace, and he builds endowments in order to gain redemption:

> On a morning, as day dawned,
> I sate me down to rest.
> And the Moorish maiden took me,
> Encirch'ng me with her black arms.
> And when I looked on her, mother.

On her black face and white teeth,
A loathing gat hold on me;
I drew the rich-wrought sabre.
And smote her on the silken girdle.
That the sabre cut clean through her.
I mounted my Sharatz,
And the head of the Moorish girl spake and said:
'Brother-in-God, Kraljević Marko!
Leave me not! Leave me not!'
Therein, mother, I sinned against God,
Gaining much gold thereby.
And for this cause I let build many pious buildings.

(*Marko Kraljević and the Daughter of the Moorish King*, 77-85)[3]

In the Moorish girl, however, Marko saw the embodiment of the enemy, who differs in looks/skin and religion. But in the human dimension, he feels something terribly wrong in this act of his, a great sin, for which he is remorseful. The other sin, greater yet than murder, is stealing. That's why his mother calls every spoil that Marko brings home *ludo blago* (*Engl.* fool's treasure) i.e. 'gold without labour'. For Marko, stealing is probably the greatest sin of all, which is why he always distributes it to others.

Marko's mother asked a question:
"Ah, my son, Kraljević Marko,
Wherefore dost thou build so many pious buildings?
Hast thou sinned greatly against God?
Or doth gold come to thee without labour?"

(*Marko Kraljević and the Daughter of the Moorish King*, 1-5)

In the ballad from Dalmatia, *Marko Kraljević kills his sweetheart*, his wife secretly curses him before a mirror. Marko's mother hears the curse, which she afterwards recounts to her son. His crime equals Heracles', but what differs is the cause of the crime and his bonds with the female figures. There is a clear patriarchal relationship with his wife, and a pathological relationship with his mother. There is no communication with the child-bearing woman, while the mother is seen as a pillar of the house. The hero leaves his household and even his mother after the committed crime, and thereafter begins a new story of the tragic knight:

And that fell hard on Marko's soul,
so he took his forged knives,
and he went to his sweetheart's dwellings,
he struck her into the heart,

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[3] All translations of the ballads were done by D.H. Low, unless it is differently noted. For the original version see: Lukić, Zlatković, 1996;

cut out her unborn child
and gave it to his mother
impaled on that very knife:
"Here is, mother, the apple that isn't ripe,
which you haven't let to mature"
And to his court he spoke out loud
"Farewell, my court!
When I hear the cuckoo bird sing inside you,
then my mother will see her Marko".
And he spoke to his ash tree
"Farewell, green ash tree!
When an apple grows on you,
then my mother will stop waiting for Marko."

(*Marko Kraljević kills his sweetheart*, 23-39) [4]

In the epic ballad from the region of Split, *Marko and Philip the Hungarian* (Stojković, 1922) the Hungarian hero (Vukadinović, 2007) has a strong desire to defeat Marko. Prior to his clash with Philip the Hungarian, Marko had asked Philip's wife Anđelija for Philip's whereabouts while at their doorsteps, but she addressed the hero with disparaging words, for which he punished her by beating her beautiful face and stealing ducats in order to 'pay the drink' to her husband. Here are the words that offended Marko: "Get thee hence, starveling dervish,/Philip is no brother to such as thee!" (*Marko Kraljević and Philip the Hungarian*, 74-75).

In another, less known version, Marko's cruelty grows completely mad:

Then he grabbed Philip's sweetheart,
he cut through her white breasts
and pulled her arms through that holes…
He carved out her black eyes
and gave them to her like apples
to hold in her hands,
and he bound her to Šarac's tail
dragged her across the green mountain,
while her body was hitting trees and stones;
He took her to the crossroads
and cut her in four and tied her limbs
to four branches for eagles and ravens to eat their fill.

(*Marko Kraljević and Philip the Hungarian,* 2nd version)

He commits no lesser a crime against the beautiful Rosanda in *The Sister of the Captain Leka*. The girl rejects Marko's marriage proposal, because she desires another groom. She makes a mistake and characterises Marko as the servant of the Sultan, who would have no grave, and no

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[4] Translation by the authors;

proper burial. Furious due to her refusal and offense, Marko tricks her in-
to approaching him. The girl has a tragic end:

> …by the hand he seized the damsel.
> He drew the sharp dagger from his girdle,
> And cut off her right arm;
> He cut off her arm at the shoulder.
> And gave the right arm into her left hand.
> And with the dagger he put out her eyes,
> …
> And wrapped them in a silken kerchief,
> And thrust them into her bosom.

<div align="right">(The Sister of the Captain Leka, 534-543)</div>

In the ballad *A Damsel Outwits Marko*, a young woman saves her-
self from the violent hero's nature using her own wits. In order to inflict
psychological turmoil, Marko uses verbal violence:

> "Bitch that thou art!
> ...
> Well for thee, fair damsel.
> That thou tookest no apple.
> Nor apple nor golden ring!
> By the faith of my body,
> I should have cut off thy two hands,
> Nor wouldst thou have saved thy head.
> Nor ever on thy head have worn the green garland!"

<div align="right">(A Damsel Outwits Marko, 87-93)</div>

Similarly, Marko has no mercy when he cuts off the right hand of the
blacksmith Novak, who had forged him a sabre. The hero has an obsessive
vision of himself as the best and undisputed knight. Any opposition to that
image causes furious anger and vengefulness. In his arrogance, the hero
becomes so conspicuous that he loses awareness of reality. He cannot stand
the reality. After he calms and comes to his senses, he is regretful. He feels
guilty after the crimes, since he has transgressed the values of his social and
cultural environment. That is why he tries to make up for his crimes with
building churches, and in the case of Novak, with ducats:

> In good sooth, Kraljević Marko,
> I have forged one better,
> A better sabre — for a better knight.
>   …
> "Stretch forth thy hand, Novak!
> Stretch forth thy hand that I pay thee for the sabre."
>   …
> Kraljević Marko swung the sabre
> And hewed off his arm at the shoulder:

"Lo, here thy recompense, smith Novak!
Nevermore shalt thou make blades or better or worse.
And here for thee are an hundred ducats.
For to nourish thee the days of thy life."

(*Marko Kraljević and Musa Kesedzija*, 144-162)

There is no ballad that explicitly states that Marko has fallen into a state of madness. Bloodshed is permitted to heroes. Killing is justified. In order to survive, one has to be severe, because the world is similarly severe. Cruelty is his means of survival. That is why Marko trusts no one. The only female figures to whom he pays due respect and shows fear are the *vilas*. His final destination would be related to a *vila*. It is indicative that Marko is said to have been buried by the monk Vaso somewhere in, or near the monastery Hilandar on the Mount Athos, which is called Vilindar in the ballad (*Engl.* 'the gift of a *vila*', a popular-folk etymology). A *vila* announces Marko's death. But the *vila* is a supernatural creature. She can harm him, and that is why he is afraid of the *vila*. On the other hand, the only female person whom he trusts is his mother. She is his conscience, his moral and knightly code, the essence and the basis, or the motivation behind many of his actions. Marko becomes the personification of her principles. She is the only one to whom the hero confesses his madness and his misdeeds:

Marko eats a poor dinner,
dry bread and some onion.
Still, loud laughs out Marko.
His old mother asked him:
"Why are you laughing, Marko my child?
Are you laughing to a poor dinner of yours
or to the old ages of your mother?"…
"I am laughing neither to my poor dinner
nor to your old age,
but I am laughing, my dearest mother,
to my youthful foolishness"

(*Marko and the Poturica*, 1-12) [5]

This self-ridicule (Čajkanović, 1994, pp. 366-367) is an epic manifestation of madness. It is not a laughter of fear and repentance, but an unusual association that does not jeopardise the hero's values. In another ballad, the mother advises her son not to take part in any other bloodshed:

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[5] Translation by the authors.

> O my son, Kraljević Marko,
> Cease, my son, from thy adventures.
> For evil may bring no good thing with it,
> And it wearies thine aged mother.
> That she must ever be washing bloody garments.

<div align="center">(The Ploughing of Marko Kraljević, 6-9)</div>

These verses announce that the mother has grown old and nothing has changed. She still washes Marko's bloody clothes and sees no end of bloodshed.

Marko's life is constantly agonistic. Bearing the awareness of the historical reality, Marko Kraljević as the epic hero also moves through the space of various historical facts and periods. He lived for more than 300 years in the ballads, and 400 in the minds and beliefs of the people – as long as the Turkish oppression prevailed. This is approximately the period spanning between the battle of Kosovo in 1389 and the Serbian Uprising in 1804. The singers of tales throughout that time gave to Marko, a real medieval knight, the attributes of an epic hero whom they remembered as the protector of the oppressed. Folk ballads recall and reflect everything that was tragically characterised in history: the collapse of the Serbian Empire, the discord of the Serbian noble houses, the fatal battles, vassalage and waging war on the side of the invaders, the Turkish oppression of the people, rapes and terror, migrations, the loss of lands, family, offspring and, finally, identity. In the ballad *The Death of Marko Kraljević*, and its several versions (Lukić, Zlatković: 1996, pp. 489-490), the hero feels desperate when he realizes that he no longer has hope to satisfy his essential desires or to preserve some of his values. The hero falls into a pathological despair, where he sees his existential breakdown. This is a sign of the cancellation of the basic ontological and axiological assumptions on which he was created as a being. Marko's despair represents an epic suicide and the real slavery of the conquered people. He does not leave his weapon to any other hero. The hero has no successor, no progeny. Unlike Heracles, Marko Kraljević kills his horse, throws his mace into the sea, and breaks his sabre. Marko's death is a metaphor for the collapse of the state and its people under the mighty and cruel enemy. In order not to be rejected and forgotten in the years to come, Marko acts mercifully. In his last will and testament, as it is described in the ballad, the hero takes care of his own burial, the churches and the poor:

> "One purse (sc. of gold) I give to him that findeth me,
> That he may bury my body;
> Another purse I give for to adorn the churches.
> The third I give to the maimed and the blind.
> That the blind may go into all the world.
> To sing and to celebrate Marko."

<div align="center">(The Death of Marko Kraljević, 107-112)</div>

The trinity in these final verses came from the people's Christian spirit that celebrates Prince Marko as a hero, a saviour and a saint. The same is the case with Heracles, who was a ἥρως (*Engl.* hero), σωτήρ (*Engl.* saviour) and ἅγιος πατρών (*Engl.* saint). The Serbian people forgave, forgot, praised Marko's deeds, and justified his misdeeds of madness and his immense pride. His madness reflects his incapability to stay calm and spiritually untouched while living in a crazy and turbulent Balkan world of pain, injustice and horrors. Conversely, his Hellenic counterpart has to endure all of life's sufferings, among which the worst one is the slaughter of his own family by his own hand, as his most difficult labour and ultimate fate.

CONCLUSION

The diachronic analysis of madness in the poetic sources of two close and similar traditions stemming from different ethnic groups led us to the conclusion that madness originates from things and events that are difficult to bear, sad to know and hard to accept. The motif of madness was quite common in ancient Greek literature. In turns, madness was treated as an obsession, sickness or righteous punishment. Madness always brought some insight and cognition. If we look at the motif of madness in Euripides' Hercules and the one in the epic Marko Kraljević, we may notice that Hercules suffered a fate imposed by the gods in a culture that was at the beginning of its rich history. The result of his madness is the wrath of the gods. In the end, he accepts his unjust life and difficult tasks as a result of inevitable fate, without negotiation. Marko's madness is a consequence of the loss of individual and national freedom imposed not by *force majeure*, but by humans. His 'individual madness' manifests tremendous anger and frustration due to the collective loss of the state, freedom and people. Marko Kraljević cannot and does not know how to suffer. He is a hero of survival. He does not accept suffering and sacrifice as the mystery of life, unlike other Serbian heroes such as Miloš Obilić and Prince Lazar, and therefore he fights reality. While doing so, he faces cruelty and sometimes loses his temper and his mind, and he commits cruel crimes too. That is why the folk singer of epic songs tries to justify the crimes of the hero, and to transform his misdeeds into heroic deeds.

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ЛУДИЛО ДВА ХЕРОЈА:
ХЕРАКЛЕ И МАРКО КРАЉЕВИЋ

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Резиме

Античка Грчка, уз древни Рим, најзначајнији је извор уметничких узора, мотива и традиција уопште. Из неког разлога, мотив лудила много је присутнији у уметности једне у односу на другу колевку цивилизације чији смо баштиници. Хераклово лудило се, ипак, по много чему разликује од многих митских личности, јер је он пре свега културни јунак, родоначелник многих градова и синова претхомерског доба. У српској епици, о махнитости, бесу, гордости и инату Марка Краљевића говорили су народни певачи - гуслари, као тумачи јунакових

поступака. Епски певачи се нису бавили унутрашњом манифестацијом Марковог лудила, што им и није био циљ, већ описом његових екстатичних злочина. Постоји, условно речено, три вида у којима се оно може приказати: лудило јунака који претрпи тешке ударце, губитке и разочарења; симулирано лудило које има сврху мимикрије и привлачења пажње, управо да би се она одвратила од суштине; и, на крају, оно што посматрачи виде или доживе као лудило, а што можда и не заслужује такву одредницу.

Дијахронијска анализа лудила у поетским изворима две блиске традиције, али различитих етничких група, довела нас је до закључка да лудило потиче од ствари и догађаја које је тешко поднети, тешко прихватити и тужно познавати. Мотив лудила био је прилично чест у старој грчкој књижевности. Понекад је лудило третирано као опсесија, болест или праведна казна. Стање лудила је увек доносило неки увид и спознају.

Ако погледамо мотив лудила у Еурипидовом Хераклу и исти мотив у епским песмама о Маркз Краљевићу, приметићемо да је Херкле доживео судбину коју су му богови наметнули у култури која је била на почетку њене богате историје. Резултат његовог лудила је гнев богова. Они су ти који су поставили границе хероју, тј. смртнику. Херакле на крају, без преговора, прихвата неправедан живот и тешке задатке као резултат неизбежне судбине. Марково лудило је последица губитка индивидуалне и националне слободе наметнуте не вишом силом, већ поступцима људи и друштвеним околностима. Његово „индивидуално и егзистенционално лудило" испољава огроман бес и фрустрацију због колективног губитка државе, слободе и народа. Марко Краљевић не може и не зна да трпи. Он је херој опстанка. Марко Краљевић не прихвата страдање и жртву као мистерију живота, за разлику од других српских јунака Милоша Обилића и кнеза Лазара, и зато се бори са стварношћу. При томе се суочава са окрутном реалношћу у којој јунак повремено губи разум и чини грозне злочине. Епски певач не анализира психолошке окидаче јунакове природе. Он све време покушава оправдати злочине митског хероја Марка Краљевића и та злодела претворити у јуначка дела трагичног средњовековног јунака.

THE INFLUENCE OF THE STANDARD OF LIVING ON BREAST CANCER MORBIDITY AND MORTALITY IN EUROPE IN THE PERIOD BETWEEN 2017 AND 2019

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Abstract

This paper explores the hypothesis that there is a connection between the standard of living (expressed by the Human Development Index) and the standardised rates of breast cancer incidence and mortality in the female population of Europe. The examination whether the standard of living has an impact on breast cancer incidence and mortality is based on the use of bivariate correlation, as the simplest form of quantitative analysis of two variables which seeks to determine the empirical relationship between them. The second part of the analysis involves the determination of linear relationships using simple linear regression analysis models testing the average impact of the Human Development Index on the standardised breast cancer incidence and mortality rates. The analysis takes into account the importance of yet another socioeconomic factor – response to screening, which can have a major impact on breast cancer mortality..

Key words: breast cancer, index of social development, factors, incidence, mortality.

УТИЦАЈ ЖИВОТНОГ СТАНДАРДА НА МОРБИДИТЕТ И МОРТАЛИТЕТ ОД КАРЦИНОМА ДОЈКЕ У ЕВРОПИ У ПЕРИОДУ ИЗМЕЂУ 2017. И 2019. ГОДИНЕ

Апстракт

Овај рад анализира хипотезу о повезаности животног стандарда (преко ин-декса HDI) и стандардизованих стопа инциденције и морталитета од карцинома дојке у женској популацији Европе. Испитивање постојања утицаја животног

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стандарда на појаву морталитета и инциденције услед карцинома дојке заснива се на употреби биваријантних корелација, као најједноставнијих облика квантитативне анализе две варијабле у сврху одређивања емпиријског односа међу њима. Други део анализе односи се на утврђивање линеарних веза моделима просте линеарне регресионе анализе, који тестирају просечни утицај индекса друштвеног развоја на стандардизовану стопу морталитета и инциденције. Анализа разматра значај одазива на скрининг као додатни фактор, који може имати велики утицај на смртност од карцинома дојке, а који такође припада групи социоекономских фактора.

Кључне речи: карцином дојке, индекс друштвеног развоја, фактори,
                            инциденција, морталитет.

INTRODUCTION

The rapid increase in chronic degenerative diseases is one of the major health challenges of global development in this century. Cancer is the leading cause of death worldwide, responsible for nearly 10 million deaths in 2020, or nearly one in six deaths globally (WHO, 2022). The most common types of cancer are breast cancer, lung cancer, colon cancer, rectal cancer, and prostate cancer. Breast cancer is listed as a cause of death that could be avoided if timely diagnosis and adequate treatment are provided (OECD & European Commission, 2022). The most common risk factors that have been the subject of scholarly research over a considerable period of time include the quality of healthcare and lifestyle (smoking, insufficient physical activity, poor diet, stress, alcoholism), as well as poor prevention (no access to screening, not responding to screening, insufficient information about health and specifically about diseases). Furthermore, public health and the global economy are inextricably linked. Due to this, different levels of investment in health care, approaches to optimal treatment, stages of the disease at the moment of diagnosis, and levels of healthcare organisation on the national level are reflected in the different mortality and morbidity rates across countries. According to the data provided by the American Cancer Society (ACS) and the International Agency for Research on Cancer (IARC) in 2020, breast cancer is the leading cause of neoplasms in the female population in almost all parts of the world (IARC, 2022). As far as the overall new cancer burden among women is concerned, the standardised incidence rates show that the countries of the world can be roughly divided into economically developed ones, with high incidence rates, and other countries, with significantly lower values. The trend of high incidence rates is explained by a better organisation of preventive examinations, and a better quality of diagnostics, but also by the effects of demographic aging, which leads to an increased number of women at risk of this disease (IARC, 2022)

It has been estimated that there were 684,996 deaths worldwide among women diagnosed with breast cancer in 2020. The clustering of the

countries of the world according to the number of prevalence cases and breast cancer mortality shows some regularity related to the level of economic development (IARC, 2022). The Cancer Atlas (Jemal et al., 2019) confirms the connection between the degree of socioeconomic inequality (shown through the HDI[1]) and different types of cancer (although a more detailed analysis at country level has not been done). The study indicates that increased HDI values are accompanied with a transformation of healthcare and clinical services, which leads to an increased prevalence. In countries marked by a high socioeconomic development, cancer is the leading cause of premature death, after cardiovascular diseases, because it is a disease "linked to socioeconomic transitions" (Jemal, et al., 2019, pp. 44). Breast, lung, colorectal, prostate and stomach cancer are predominant diseases in these countries. On the other hand, countries with low HDI values are going through social and economic changes, and it can be expected, according to the forecasts of the international organisations ACS and IARC, that cancer death rates in these countries will double by 2040 (ACS, 2019).

The main goal of the paper is to test the hypothesis on the connection between the standard of living (shown by the HDI) and breast cancer incidence and mortality rates in the female population of Europe. Focusing on European countries, which are demographically, socially, culturally, historically and ethnically much closer to each other, with a prevailingly high level of social development (measured by the HDI), could yield more precise information about the degree to which breast cancer incidence and mortality trends are linked with the level of the standard of living. The purpose of the analysis is to test whether the level of social development can still be considered (and to what extent) a determinant in breast cancer incidence and mortality in Europe. Can we say that there is a certain level of social development above which the standard of living becomes irrelevant? The importance of responsiveness to screening, which also belongs to the group of socioeconomic factors, will be taken into consideration as an additional factor that can have a major impact on breast cancer mortality. One of the reasons for focusing this research on European countries is the greater reliability and availability of data, as well as a greater degree of equality between women and men, especially in terms of access to healthcare and prevention.

METHODOLOGY

This research involves an analysis of the data on the standardised breast cancer incidence and mortality rates, based on the database maintained by the Statistical Office of the European Union (EUROSTAT), and the Human Development Index (HDI), calculated by the Office of the

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[1] HDI stands for the Human Development Index.

Human Development Report, of the United Nations Development Program (UNDP). The analysis presented in this paper addresses the average values of the indicators for the 2017–2019 period. Out of fifty-one European countries, thirty-two, for which all the necessary data was available, are included in the analysis. The countries that have been left out are mostly those of Central and Eastern Europe.

The Human Development Index (HDI) is used as an indicator of the level of the standard of living, as an assessment of the country's progress through three main dimensions of social development: healthcare, education, and the economic state of the nation. The summary health indicator is the value of life expectancy at birth. Education is measured by the (average and total) years of schooling for those aged 25 and older, whereas economic power is calculated based on the gross national income per capita (adjusted to the purchasing power parity). According to the HDI values, countries are classified into three categories as highly developed (very high index =>0.800, high 0.700–0.799), developing (medium 0.550–0.699), and underdeveloped (low <= 0.549). According to the HDI, which is either very high or high in Europe, all European countries belong to the category of developed countries of the world.

The examination of whether breast cancer incidence and mortality are related to the standard of living is based on the use of bivariate correlation, as the simplest form of the quantitative analysis of two variables for the purposes of determining the empirical relationship between them, and testing simple hypotheses about the relationship. This type of analysis was used to test the hypothesis that breast cancer incidence and mortality rates depended on the population's standard of living. The Pearson correlation coefficient was used in the analysis, assuming the normality of distribution.

The second step in establishing linear relationships was the application of simple linear regression analysis models, which test the average impact of the Human Development Index on the standardised mortality rate and the standardised incidence rate. The analysis was performed using the least squares deviation method (LSD) on logarithmic data with a significance level (α) of 5%. Data analysis and visualisation were done in the RStudio programme, in the R programming language.

RESULTS

The scatter diagram shows that there is no statistically significant relationship between the variations in the incidence rate and the standard of living index (Diagram 1.a). The Pearson correlation coefficient did not confirmed the hypothesis that the Human Development Index is associated with the standardised incidence rate. The values indicate a very weak positive monotonic relationship between these variables (R=0.31, p>0.05). The scatter diagram between the Human Development Index and the standardised mortality rate (Diagram 1.b) also indicates a weak, but

negative correlation (R=-0.26, p>0.10). The inverse nature of the correlation means that the decreasing mortality rate corresponds to an increased standard of living in this trend. The scatter diagrams show a large dispersion of data around a straight line, which means that their interdependence is weak and virtually non-existent. In either case, the Pearson coefficients showed there is no statistically significant monotonic relationship between the variables at the 5% significance level.
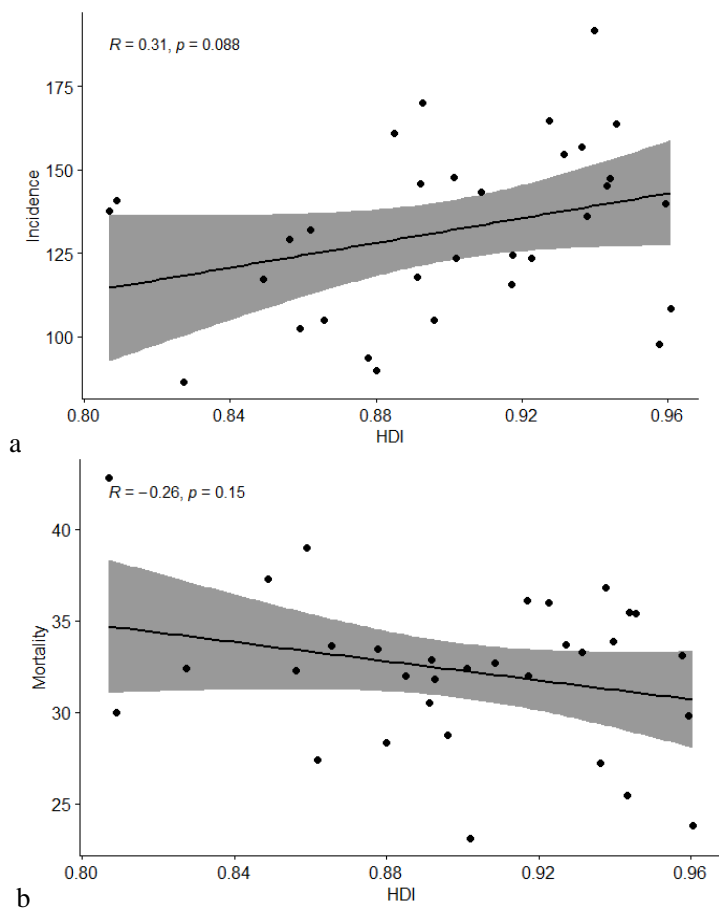
Figure 1. *Correlation diagrams, Human Development Index and standardised breast cancer incidence rates (a) and Human Development Index and standardised breast cancer mortality rates (b) among women, European countries, 2017–2019*

Note. The value of the Pearson correlation (R) ranges from -1 to +1. The value of the coefficient determines the strength of the correlation and the sign determines the direction of the correlation.

Source: Prepared by the author.

It was of particular importance for the analysis to determine the degree of impact of the standard of living, as a predictor variable, on the level of variation in the breast cancer incidence and mortality rates, i.e. to analyse the degree to which the standard of living explained variation in the incidence and mortality variables. Answers were provided by examining the presence and significance of linear correlation using simple linear regression analysis models. The simple linear regression models were derived from logarithmic data for all three variables. From the first linear regression model (Diagram 2.a), wherein the dependent variable is breast cancer incidence and the independent variable is the HDI, we learn through the least squares method that only 6%[2] of the variation in incidence can be predicted and explained by the standard of living. The standard of living does not have a statistically significant positive impact on incidence, as demonstrated by determining the statistical significance of the standardised beta coefficient (β=0.301, p>0.1). In the second model (Diagram 2.b), wherein the dependent variable is breast cancer mortality and the independent variable is the HDI, it can be observed that only 3% of the variation in mortality is explained by the standard of living, while the rest is explained by the influence of other factors. This means that there are other more important variables, apart from the standard of living, that influence the trend of breast cancer incidence and mortality. Although the value of the standardised beta coefficient is negative (β=-0.252, p>0.1), indicating a negative impact of the standard of living on breast cancer mortality, the p-value of the test is greater than 0.1, which indicates the absence of statistical significance between the variables.

The results of the correlation and linear regression analyses do not allow for the conclusion that there is a correlation without statistical significance between the standard of living and the number of new cases and deaths from breast cancer. It can be concluded that there is a very weak correlation between the standard of living and breast cancer incidence, which move in the same direction, and the variation in different directions of the standard of living and breast cancer mortality. Finally, the regression analysis suggests that the number of new cases and deaths cannot be explained by the level of the standard of living in a particular country. The comparative data for European countries (Table 1) used in the analysis suggests significant deviations that clarify the results of the statistical method indicating the correlation between these variables. For example, in the countries of Central and Eastern Europe, most of which have the lowest living standards in Europe, there are countries that are not marked by low incidence rates and high mortality rates. For example, the Republic of Serbia has the lowest values of the standard of living among the se-
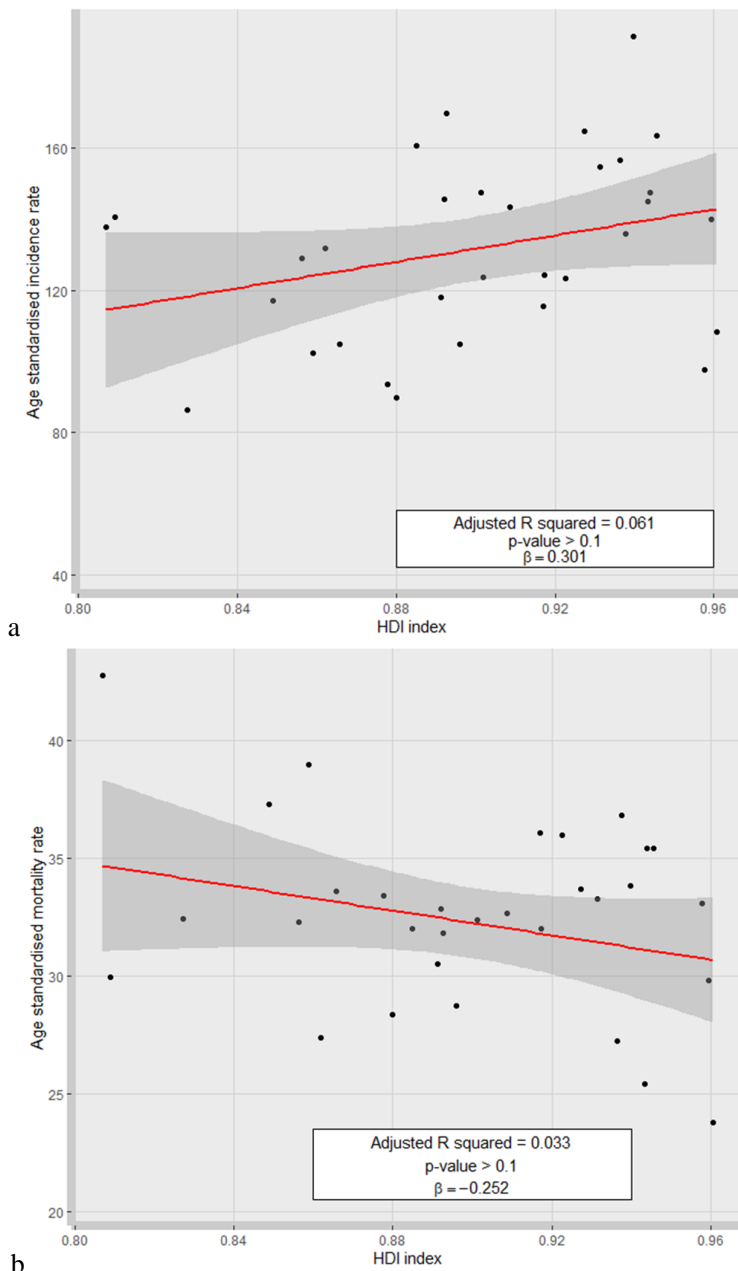
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[2]Through adjusted R-squared

a

b

Figure 2. Simple linear regression models of the Human Development Index and standardised breast cancer incidence rates (a), standardised breast cancer mortality rates (b) among women in selected European countries, 2019–2020
Source: Prepared by the authors

lected countries, while it average incidence rates are in the same range as in Western European countries for the given time period. On the other hand, unlike the Republic of Serbia, Slovenia has a high standardised mortality rate, while it is among the top 15 European countries in terms of the standard of living. The example of Lithuania shows that both the values of the standard of living and the standardised mortality rates can be low – in this particular case, even below those of Switzerland, which is second in Europe in terms of the standard of living.

Table 1. *A comparative overview of the average HDI values, standardised incidence and mortality rates for selected European countries, 2017–2019*

| | Country | HDI Index | | | | Standardised rate | | | | | | | | Region |
| | | | | | | Incidence | | | | Mortality | | | | |
		2017	2018	2019	Average	2017	2018	2019	Average	2017	2018	2019	Average	
1	Norway	0,959	0,962	0,961	0,961	108,1	108,8	107,9	108,3	22,9	25,4	23,1	23,8	Northern Europe
2	Switzerland	0,957	0,959	0,962	0,959	140,7	139,8	139,3	139,9	29,7	30,2	29,5	29,8	Western Europe
3	Iceland	0,954	0,959	0,96	0,958	96,8	97,9	98,2	97,7	38,1	31,4	29,7	33,1	Western Europe
4	Germany	0,944	0,945	0,948	0,946	164,4	163,7	163,1	163,7	35,0	35,6	35,7	35,4	Western Europe
5	Denmark	0,944	0,942	0,946	0,944	148,4	147,6	146,4	147,5	34,4	35,0	36,9	35,4	Northern Europe
6	Sweden	0,941	0,942	0,947	0,943	146,1	146,1	143,1	145,1	24,6	25,5	26,2	25,4	Northern Europe
7	Netherlands	0,937	0,939	0,943	0,940	190,6	192,4	192,1	191,7	33,2	33,7	34,7	33,8	Western Europe
8	Ireland	0,934	0,937	0,942	0,938	135,1	136,3	136,5	135,9	33,9	39,2	37,3	36,8	Northern Europe
9	Finland	0,934	0,936	0,939	0,936	157,7	156,5	155,9	156,7	26,7	26,5	28,5	27,2	Northern Europe
10	United Kingdom	0,93	0,929	0,935	0,931	153,5	155,3	155,3	154,7	/	33,2	33,4	33,3	Western Europe
11	Belgium	0,913	0,933	0,936	0,927	163,5	164,7	165,9	164,7	31,7	34,7	34,7	33,7	Western Europe
12	Luxembourg	0,919	0,922	0,927	0,923	124,1	123,3	123,0	123,5	34,2	33,9	39,8	36,0	Western Europe
13	Slovenia	0,913	0,917	0,921	0,917	115,0	115,7	116,4	115,7	33,9	38,4	35,9	36,1	Central and Eastern Europe
14	Austria	0,916	0,917	0,919	0,917	124,3	124,4	124,6	124,4	32,1	32,3	31,6	32,0	Western Europe
15	Malta	0,901	0,91	0,915	0,909	143,2	143,4	143,6	143,4	31,5	38,6	27,8	32,7	Southern Europe
16	Spain	0,897	0,901	0,908	0,902	121,7	124,0	125,2	123,6	22,4	23,4	23,5	23,1	Southern Europe
17	France	0,898	0,901	0,905	0,901	146,7	147,7	148,7	147,7	31,6	32,6	33,0	32,4	Western Europe
18	Czechia	0,897	0,894	0,897	0,896	103,9	105,3	105,5	104,9	29,7	28,1	28,5	28,8	Central and Eastern Europe
19	Cyprus	0,887	0,892	0,897	0,892	144,8	145,6	146,8	145,7	32,7	32,5	33,4	32,9	Southern Europe
20	Italy	0,888	0,893	0,897	0,893	168,1	170,6	171,4	170,0	31,3	32,2	32,0	31,8	Southern Europe
21	Estonia	0,887	0,891	0,896	0,891	118,0	118,0	117,7	117,9	28,7	31,2	31,6	30,5	Central and Eastern Europe
22	Greece	0,88	0,886	0,889	0,885	157,0	161,6	164,2	160,9	32,2	31,8	32,0	32,0	Southern Europe
23	Lithuania	0,876	0,88	0,884	0,880	89,6	89,5	90,2	89,8	30,0	28,3	26,8	28,4	Central and Eastern Europe
24	Poland	0,875	0,877	0,881	0,878	93,3	93,4	93,5	93,4	33,7	33,6	33,1	33,4	Central and Eastern Europe
25	Latvia	0,86	0,866	0,871	0,866	104,4	104,9	105,6	105,0	33,7	33,2	33,9	33,6	Central and Eastern Europe
26	Portugal	0,859	0,86	0,867	0,862	130,8	132,0	133,1	132,0	28,0	26,8	27,3	27,4	Southern Europe
27	Slovakia	0,856	0,859	0,862	0,859	101,2	102,3	103,2	102,3	37,2	39,4	40,3	39,0	Central and Eastern Europe
28	Croatia	0,852	0,856	0,861	0,856	129,5	128,9	129,0	129,1	30,2	31,9	34,9	32,3	Central and Eastern Europe
29	Hungary	0,845	0,849	0,853	0,849	116,6	117,9	116,8	117,1	37,7	36,9	37,3	37,3	Central and Eastern Europe
30	Romania	0,823	0,827	0,832	0,827	86,1	86,3	87,0	86,4	31,5	32,7	33,1	32,4	Central and Eastern Europe
31	Bulgaria	0,808	0,809	0,81	0,809	139,7	141,2	141,4	140,8	31,3	29,2	29,3	30,0	Central and Eastern Europe
32	Serbia	0,802	0,808	0,811	0,807	135,9	137,8	139,5	137,7	41,7	42,3	44,4	42,8	Central and Eastern Europe

Source: UNDP Human Development Index,
standardised incidence and mortality rates EUROSTAT

Prevention Examinations

The available literature often highlights the importance of preventive examinations and the mortality rates from various forms of cancer. Research has shown that women of a lower socioeconomic status attend

screening programmes less frequently, and that they often ignore symptoms, and are therefore more likely to be diagnosed with the disease at an advanced stage (Ceronja, 2010). Education, as one of the direct determinants of socioeconomic status, is as an important factor behind differences in medical examination attendance. Among the countries of the European Union, in Bulgaria, Cyprus, Greece, Poland and Lithuania, there is a pronounced difference between women with a higher level of education, who undergo X-ray examinations of the breasts more frequently, and those with a lower level of education (Eurostat, 2022b). The fact that the population is insufficiently informed is the result of the poor functioning of the national screening programme and the healthcare system in general, which should be an important source of information. The geographical distance from health services is a type of economic inequality, which also affects screening attendance. In Romania and Bulgaria, there is a significant difference between women who live in cities and those who live in rural areas, and the number of the former who attend preventive examinations is 15% higher than the number of their counterparts from the latter group (Eurostat, 2022b).

The percentage of the population covered by national screening programmes is the greatest in Northern European countries, which means that its effect on breast cancer incidence and mortality rates is also greater. Covering of 75% or more of the target population of women is an indicator of the successful implementation of the screening programme. According to the latest available data for the 2017–2020 period (Eurostat, 2022a), the Netherlands, Denmark, Ireland, Finland, Norway, Slovenia, Malta and Great Britain reported a coverage of more than 70%. Less than half of the target population was covered by screening programmes in countries that had joined the European Union last, and generally in those countries of Europe that had lower values of the HDI (Serbia, Bulgaria, Latvia, Hungary, Slovakia). Unresponsiveness to screening programmes is usually interpreted as the effect of an insufficient involvement of local communities, and of low investment in prevention, namely in the activities aimed at improving women's health. Usually, unresponsiveness is seen as a consequence of the poor functioning of the healthcare system. One of the conclusions of the World Health Organisation (WHO) is that national mammographic breast screening programmes are not an optimal solution for countries with limited economic resources, because the healthcare systems of many European countries cannot ensure the testing of a large number of healthy women, and cannot establish quick and accurate diagnosis, and provide therapy quickly enough for positive cases of breast cancer. For these countries, the WHO recommends the so-called early diagnosis programme, which is based on the rapid identification of cancer in patients who already have the symptoms of the disease. This idea arose after a study conducted in Ukraine, which demonstrated that

the disease was diagnosed at an advanced stage in one out of four breast cancer cases in this country (WHO, 2021).

Preventive measures include keeping statistics, i.e. keeping registries of cancer patients. This analysis includes countries with a very high and high standard of living, and it is surprising that some of them do not have a cancer registry with national coverage. It is assumed that a small part of the breast cancer incidence and mortality that was below the expected level in our analysis could be explained by partial registration.

In this analysis, the Republic of Serbia stands out for the unusually high standardised mortality rates. Although there is a registry at the national level, it is right to say that the high rates have to do with relatively poor cancer surveillance and insufficiently effective programmes for the early detection of breast cancer. Between 2017 and 2021, only 8.4% of the women in Serbia responded to the national annual breast cancer screening (Eurostat 2022a).

The study titled *Global Availability of Cancer Registry Data* investigates whether there is a correlation between the gross national income and the existence of a population-based cancer registry (Siddiqui & Zafar, 2018). The analysis found that the gross national income is directly related to the existence of a registry, through the values of the average health expenditure per capita. Countries with different standards of living spend a similar percentage of their gross domestic product on healthcare, but have a different average rate of healthcare spending per capita. High-income countries spend about 3,224 US dollars per capita on healthcare, while spending on healthcare in low-income countries amounts to only 39 US dollars per capita. The research shows that the countries with the lowest income do not have nationwide registries, which is the reason it is impossible to assess the cancer-related situation, and which makes it difficult for the governments of those countries to direct resources to fight cancer (Siddiqui & Zafar, 2018).

DISCUSSION AND CONCLUSION

Access to education and employment, which influence health insurance and income levels, are identified as positive consequences, while the modern lifestyle (stress, smoking, physical inactivity, alcoholism) is highlighted as the negative consequence of the modernisation of society. Significant differences in breast cancer mortality rates among European countries are a consequence of improved patient survival rates thanks to an early diagnosis and better organisation of health services in the western parts of the continent. It is also possible to observe differences in survival rates among countries with similar medical standards, and these may be associated with the structure and funding of the healthcare system. Differences in treatment may also have an impact, as some countries

favour chemotherapy over surgery or *vice versa*. In some countries, access to specialist medical care is complicated, which may be a reason for establishing the diagnosis at an advanced stage.

The hypothesis that an increased HDI leads to increased breast cancer incidence and decreased mortality is well-aligned with the data at the global level. European countries have high values of HDI, regardless of the differences in the population's standard of living, and the aforementioned hypothesis is not plausible in this case. It seems that, upon reaching a certain level of social development, the importance of socioeconomic determinants in cancer mortality changes. According to the data, the variations in the relationship between breast cancer incidence and mortality are the smallest in the countries of Northern and Western Europe. On the other hand, the greatest variations are observed in the regions of Central and Eastern Europe. In countries that were under socialist rule for a great part of the 20th century, the values are the highest – especially the mortality rates, and the reasons for this are late diagnosis and the treatment of diseases in the terminal stage. The organisation of preventive examinations and the response to these are the major challenges for that group of countries, because it seems that a small share of women either respond to national screening programmes aimed at an early detection of breast cancer or they decide to initiate examinations independently, due to insufficient trust in the health system and poor awareness of the need to takes care of their own health. Research has shown that the attendance of screening programmes is lower among women of a lower socioeconomic status, and that national policy-makers should focus on special actions targeting those vulnerable categories in order to reduce socioeconomic inequalities in health outcomes.

The main limitations of this research that could challenge the reliability of our conclusions are related to the quality of the available data, especially in some countries, and the potential shortcomings of HDI as an indicator of the standard of living. According to critics, the HDI measures the average achievements of countries in some aspects, and can only provide a broad framework for some of the key issues of social development. Social development is assessed using indicators that are more common in developed economies, whereas the factors of poverty, and gender or ethnic inequality are not taken into account (Jahan, 2002). Just like no single indicator can cover all of the diverse aspects of countries' development, the HDI cannot fully capture the complexity of the indicators of progress and the quality of life. Therefore, its significance in relation to breast cancer mortality is not easy to explain.

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УТИЦАЈ ЖИВОТНОГ СТАНДАРДА НА МОРБИДИТЕТ И МОРТАЛИТЕТ ОД КАРЦИНОМА ДОЈКЕ У ЕВРОПИ У ПЕРИОДУ ИЗМЕЂУ 2017. И 2019. ГОДИНЕ

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Резиме

Карцином дојке је 2020. године забележен као најчешћи карцином код женске популације у готово свим деловима света. Када је реч о оптерећењу женске популације новооболелима од карцинома дојке, стандардизоване стопе инциденције показују да се земље света грубо могу поделити на економски развијене са високим стопама инциденције и земље са знатно нижим вредностима. Тренд високих стопа инциденције преписује се бољој организацији превентивних прегледа, квалитетнијој дијагностици и ефектима демографског старења који доводе до повећања броја жена у ризику од ове болести. Груписање земаља света према степену морталитета и случајевима преваленције показује одређене законитости које зависе од економског развоја. Најразвијеније земље имају опадајуће вредности стопа морталитета, док остале земље стагнирају или чак бележе раст ових вредности.

Према претходној анализи, закључили смо да између животног стандарда и стандардизоване стопе инциденције постоји слаба позитивна монотона корелација без статистичке значајности. Компаративна анализа земаља Европе потврђује да земље са највишим животним стандардом не морају по правилу имати највише вредности стандардизованих стопа инциденције од карцинома дојке. Анализа животног стандарда и стандардизованих стопа морталитета у земљама Европе потврђује негативну монотону корелацију, такође без статистичке значајности. У овим земљама, високог и веома високог нивоа животног стандарда, не постоји међусобна линеарна узрочност са стопама смртности. Утврђено је да индекс друштвеног развоја као социоекономска детерминанта здравља не представља нужан, већ доприносећи услов за стабилизацију и смањивање стопе морталитета и високих стопа инциденције.

THE CONCEPT OF HABITUS IN THE RESEARCH OF DIGITAL DIVIDES AND INEQUALITIES

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Abstract

In the paper, we discuss the relevance of the concept of habitus, developed by the French sociologist Pierre Bourdieu, in the research of social inequalities and divides in digital practices. We approach digitalisation as a field of practice and social inequality, in which social processes are deeply imbued with the mediation of technologies. We particularly emphasise dimensions and levels of digital inequalities and divides, including the first-level digital divide that points to Internet access, the second-level digital divide that aims to differentiate the binary inequalities of Internet access from inequalities in skills and uses, and the third-level digital divide that poses the question of inequalities in the outcomes of Internet use. We present relevant empirical studies, with the aim of testing our main hypothesis regarding the relevance of the concept of habitus as an adequate research tool in the field. We confirm the hypothesis, demonstrating that this concept has both theoretical and methodological significance in the research of digital divides and inequalities.

Key words: digitalisation, digital divide, social inequalities, habitus, Pierre Bourdieu.

КОНЦЕПТ ХАБИТУСА У ИСТРАЖИВАЊУ ДИГИТАЛНИХ ПОДЕЛА И НЕЈЕДНАКОСТИ

Апстракт

У овом чланку се бавимо питањем релевантности концепта хабитуса, који је развио француски социолог Пјер Бурдије, у истраживањима друштвених неједнакости и подела у дигиталним праксама. Дигитализацију одређујемо као поље пракси и друштвених неједнакости, те као поље у којем су друштвени процеси прожети медијацијом технологије. Посебан акценат стављамо на представљање различитих нивоа дигиталних неједнакости и подела, укључујући први ниво дигиталне поделе који се односи на приступ Интернету, други ниво дигиталне поделе који има за циљ да диференцира бинарне неједнакости приступа Интернету од неједнакости у домену вештина и начина употребе, као и трећи ниво који

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отвара питање неједнакости које се јављају као последица употребе Интернета. У раду представљамо релевантна емпиријска истраживања из области са циљем да тестирамо нашу главну хипотезу, а то је претпоставка о релевантности хабитуса као адекватног концепта за ову врсту истраживања. Главна претпоставка рада је потврђена, тако да закључујемо да концепт хабитуса има и теоријски и методолошки значај у истраживању дигиталних подела и неједнакости.

Кључне речи: дигитализација, дигитална подела, друштвене неједнакости, хабитус, Пјер Бурдије.

INTRODUCTION

Today, digital technologies have relevance in almost every aspect of our daily lives. These technologies can indeed "be constitutive of new social dynamics, but they can also be derivative or merely reproduce older conditions" (Sassen, 2002, p. 365). Generally speaking, the latter seems to be the case when we consider the social inequalities in the development and use of new information and communication technologies (ICTs). Digital media generates new and contradictory discourses about their cultural and social consequences. Questions about access to ICTs, but also the ways of their use, and the outcomes and inequalities implicated in their use are among the most important questions for sociologists in this field of research (Robinson et al, 2015).

The term *digitalisation* refers to technology and the transformation of data. But, it should also denote the whole network of communication and media technologies, practices and actions relating to these technologies and media, as well as the processes that shape these practices and actions. Like any other social field of practices, digitalisation is about social differentiation, divides and inequalities. Of particular importance, as the most ubiquitous media in this context, is the Internet, which is a *paradigm*, and the main lever of digitalisation and social transformation.

This is the case because, today, the key economic, social, political or cultural activities are enabled and structured by the Internet and its online networks. Furthermore, exclusion from these networks is one of the most harmful forms of exclusion and marginalisation in contemporary societies (Brydolf-Horwitz, 2018; Liu, Baumeister, Yang, & Hu, 2019), since it represents a crucial aspect of exclusion from one's social networks in general (see Allan & Phillipson, 2003).

In this respect, digital exclusion is prevalent in low-income communities (Powell, Bryne & Dailey 2010), among relatively deprived individuals (Helsper, 2017), in rural areas (Warren, 2007; Park, 2017), among women (Mariscal et al., 2019), the disabled (Macdonald & Clayton, 2011), users of mental health services (Greer et al., 2019), older adults (Gallisti et al., 2020), and especially in regards to adult learning (Gorard, Selwyn & Williams, 2000; Eynon & Helsper, 2011). Digital exclusion

was particularly notable during the COVID-19 pandemic (see Seifert, 2020), and it was also a critical issue in education (Madigan & Goodfellow, 2005; Rye, 2008; Sims, Vidgen, & Powell, 2008; Khalid & Pedersen, 2016).

The *digital* and the *social* exclusion variables directly influence each other, relating mostly to similar (economic, cultural, social, personal) fields of resources (Helsper, 2012). The digital divide still persists when it comes to gender, age, ethnicity or disability, depriving significant proportions of the population from the opportunity to use ICTs, and to participate in their digital and/or social communities. This is exactly why the whole field of research considering the use and the effects of ICTs is focused on the question of social inequalities (Chambers, 2006, p. 126).

In general, inequality is about the unequal possibilities of *access*, in terms of social class, gender, language, age, and cultural or geographical belonging (Goode, 2007). Social hierarchies are a cultural universal, regardless of their gross variation in type and degree (Brown, 1991). Social inequality usually implies a hierarchy in which some individuals have greater social power, status or influence than others, while inequality transforms into social stratification when differences in power or privilege become significant enough to form visible social strata or classes (Sanderson, 2001). Thus, it is possible to describe the changing patterns of social divides and inequalities in the process of sociocultural evolution (Lenski, 1966).

This is the reason why digital divides are visibly present across the stratified domains within one society, and from a comparative perspective. The Internet as a digital space is not just a medium of communication, but a medium for the accumulation of capital and the operation of global capital (Sassen, 1998). As we will put forth in this paper, Internet as a global social and spatial structure seems to be deeply dependent on territoriality and space, which is shaped by national, legal, administrative and cultural frameworks (Sassen, 2007). This speaks in favour of the need for the comparative research of a wide range of levels of social inequalities, from global to local (and macro and micro) perspectives.

The sociological and anthropological study of social structures implies two types of basic units – the relational characteristics which arise from the location and interaction between individuals (which translate into institutions or macro patterns), and the relational characteristics among groups and social associations which have a common interaction and affiliation, distinguishing them from out-group entities (Smelser, 1988). These two relationships can be represented as both micro and macro aspects of social structure. In addition, the basic elements of interaction must also be *repetitive* in space and time (see also Giddens, 1984; Collins, 2004), which applies to the social practice of digitalisation as well.

When we consider inequalities, we first think of economic inequalities, as an unequal distribution of wealth. However, this type of social inequality represents only one aspect of the spectrum. The links between social inequality and human emotions are also interesting, since there exists a predictive correspondence between how the actor feels and the social conditions under which the actor's feelings unfold (Thamm, 1992), especially in the digital sphere.

In different sociological research, there seems to be a consensus that inequality is always a multidimensional phenomenon (Collins, 1975). From a theoretical perspective, all hierarchical systems (including class, status, notions of prestige, or any ranking system) represent the implications of social variation concerning the processes of conflict and consensus. The social logic of inequalities remains the same, no matter the field of practice, including the social practices of digitalisation, and the creation and use of technology.

The general research question in this paper is the question of what kind of social inequalities exist in the field of the use of ICTs, particularly the Internet. Our specific research question is whether, and to what extent, the concept of habitus, developed by the French sociologist Pierre Bourdieu (2013), is an adequate research tool in the field. To answer these questions, we will look for examples in the empirical research studies regarding social divides and digital inequalities. Our assumption is that the concept of habitus is particularly significant in the research of (digital) social inequalities, since it points to the social background, and to the cultural and social capital of individuals, as well as their capacities for social action. Thus, our research task is to perform a critical review of relevant studies in this research field, and to demonstrate why we find this concept relevant through concrete examples.

DIMENSIONS AND LEVELS OF DIGITAL INEQUALITIES AND DIGITAL DIVIDES

Digital inequalities are a common subject of sociological research because they point to "the disparities in the structure of access to and use of ICTs" and "the ways in which longstanding social inequalities shape beliefs and expectations regarding ICTs and its impact on life chances" (Kvasny, 2006, p. 160). According to Christoph Lutz, it is recommended to speak about inequalities in plural rather than the singular form, in order to stress the fact of "the plurality, multi-dimensionality and complexity of social stratification in the context of digital technology" (Lutz, 2019, p. 145). Research and literature on digital inequalities have found that they tend to mirror existing social inequalities (Robinson et al., 2015; see also Helsper, 2012), since the online and the offline social worlds closely resemble each other (Wellman & Hampton, 1999). This also implies that

'traditionally disadvantaged citizens' become disadvantaged in a similar way when it comes to the access to and use of the Internet, or the possibilities to develop digital skills (Hargittai, 2002; Zillien & Hargittai, 2009).

Scholars have widened the understanding of digital inequalities by suggesting that there are different *levels* of social inequality and exclusion. For example, differences are identified at the level of technical access (physical availability) and social access (including knowledge and skills). Thus, it is possible to identify the overlapping factors of social exclusion (low income, physical or mental disability etc.), digital exclusion (lack of hardware devices and Internet service), and the issues of accessibility (rural-urban divide, ICT illiteracy, etc.) (Khalid & Pedersen, 2016). According to Norris (2001, p. 4), divides exist at three levels:

> The global divide, refers to the divergence of Internet access between industrialized and developing societies. The *social divide* concerns the gap between information rich and poor in each nation. An finally within the online community, the *democratic divide* signifies the difference between those who do, and do not, use the panoply of digital resources to engage, mobilize, and participate in public life.

DiMaggio and Hargittai (2001) differentiate five dimensions along which these divides exist:

> technical means (software, hardware, connectivity quality), autonomy of use (location of access, freedom to use the medium for one's preferred activities), use patterns (types of uses of the Internet), social support networks (availability of others one can turn to for assistance with use, size of networks to encourage use), and skill (one's ability to use the medium effectively).

> (also in: Hargittai, 2002)

The digital divide is also a concept that has been measured and researched on 'internal' and 'external' country levels, either focusing on one country or approaching the matter from a comparative perspective. In both cases, this concept highlights the "gaps between groups of people, whether these people are grouped by socio-economic status, geographic location or other characteristics" (Petrović et al., 2012, p. 598). That is why researchers like Norris (2001) conclude that the Internet and the digital environment did not create or enable social mobility, nor did they lead to less stratified societies.

In this regard, Christoph Lutz (2019) offered a comprehensive and inclusive typology, by distinguishing first-, second-, and third-level digital divides. This distinction "has emerged organically" and is based on over more than two decades of research in the field.

The first-level digital divide refers to "the gap between those who do and those who do not have access to new forms of information tech-

nology" (Van Dijk, 2006, p. 221-222; Lutz, 2019, p. 142). Research on this level often relied on large scale surveys, and confirmed inequalities in Internet access, either between different population segments or groups (race or gender gaps, for instance) or differences between states, mirroring global economic and social inequalities. For example, "while Internet access might be mostly saturated in rich countries, the same cannot be said about social media access", "the mobile Internet", or "the AI-powered technologies such as smart speakers, smart homes, social robots, and Internet-of-things (IoT) applications" (Lutz, 2019, p. 142). A good example for "a theory-based first-level digital divide approach" is Napoli and Obar's (2014) study and the notion of the "mobile internet underclass", developed in order to discuss mobile Internet access.

The term second-level digital divide was coined by Hargittai (2002), and it aims to "differentiate binary inequalities in Internet access (first-level) from inequalities in skills and uses (second-level)" (Lutz, 2019, p. 143). Studies concerning this level have shown differentiated inequalities along the socio-economic lines. For example, Blank and Groselj (2014), in a study conducted on a sample of British Internet users, showed how age, gender and education have a substantial effect on how often individuals use the Internet, and identified ten types of Internet use. The point is that each type of use reveals a different social structuration. There are numerous research studies in the field that point to the differences in online participation (social media particularly). According to the Pew Research Center (Pew, 2018), "age has proven to be a strong predictor of online participation and social media use, and some platforms are clearly gendered" (see also: Lutz, 2019, p. 143).

Finally, the third-level digital divide refers to the outcomes of Internet use (DiMaggio, Hargittai, Celeste & Shafer, 2004), implying gaps in individuals' "capacity to translate their internet access and use into favorable offline outcomes" (Van Deursen & Helsper, 2015, p. 30; see also: Lutz, 2019, p. 144). The outcomes of Internet use encompass both its benefits and its harmful effects. Researchers in the field thus investigate "tangible offline outcomes from Internet use in economic, social, political, and cultural terms" (Van Deursen & Helsper, 2015; Lutz, 2019, p. 144). Results indicate that uses and skills, as well as the attitudes of Internet users, are more predictive as outcomes than demographic or socioeconomic characteristics (Lutz, 2019, p. 144).

In this manner, the disadvantaged position of different social groups usually influences the outcomes of Internet use. For example, Madden et al. (2017, p. 68) show that "marginal Internet users" are more likely to "engage in online behaviors that make them susceptible to potential privacy problems, such as being tracked with third-party cookies or unwittingly disclosing their information to fraudulent or predatory websites". The research of this dimension demonstrates how digital environ-

ment reinforces or reproduces already established social/structural inequalities, rather than changing them. Besides, there are many other topics and research problems, such as the question of the so-called 'digital traces', algorithmic surveillance or dataveillance, and algorithmic bias and data-based discrimination (Lutz, 2019). In the following section, we shall turn our attention to the concept of (digital) habitus, and its possibilities and constraints in the context of the research of digital inequalities.

(DIGITAL) HABITUS AS A RESEARCH CONCEPT

Research on digital inequalities points to the ways in which social factors influence activities related to the access to and the use of information and communication technologies, particularly the Internet. There are different approaches developed in the field. The so-called interpretative approaches aim to understand people's 'interaction with algorithms'. They could be "complemented by surveys and experiments to quantify and generalize individual's understanding" (Lutz, 2019, p. 144). Actor-network theories, and feminist theories and approaches also have significance as "promising ways forward in understanding digital social inequality" (Halford & Savage, 2010, p. 947).

Bourdieu's theory of practice (2013) is our focus, and particularly his concept of *habitus*. Some researchers have already demonstrated that it is a useful conceptual tool in the studies of digital inequalities (Ignatow & Robinson, 2017). The key concepts of Bourdieu's theory of practice seem to have significance in this field of research, since they are 'calibrated' to explain social (class, cultural) differences and inequalities (Štrangarić, 2017; Marković Krstić and Milošević Radulović, 2020). For example, this is the case with the concept of the *field* (Hilgers and Mangez, 2015), which is significant in the research of Internet use as well (Ignatow & Robinson, 2017, p. 952). There are many other examples of digital divide research studies that rely on Bourdieu's concept of the field (Zillien and Marr, 2013; Hargittai and Hinnant, 2008; Levina and Arriaga, 2014).

Bourdieu's concept of *capital* is also used in this research area, when (re)conceptualised as the information capital or *digital* capital. Although the early conceptualisation of information capital derives from other researchers, Van Dijk's (2005) notion remains the most influential. It deals with the type of capital that is achieved through financial resources and the possibilities of access to digital networks, technical skills, attitudes, valuing, as well as the ability to find the "right information" or relevant sources online (Van Dijk, 2005, pp. 72-73). It is, like the symbolic and cultural, a 'secondary form' of capital.

Habitus is one of the best known and most influential theoretical concepts developed by Bourdieu. He conceptualised it in the 1960s, and he

surely did not have the 'digital environment' in mind. Some critics argued about the complexity and constraints of the concept, such as its imprecision or implausibility, and problems with its operationalisation (DiMaggio, 1979; Goldthorpe, 2007; Ambrasat et al., 2016). Nevertheless, it proved to be relevant in the context of digital research, as we shall demonstrate.

In short, habitus is a system of *dispositions,* understood as manners of being, seeing, acting or thinking. It is a system of 'long-lasting' (rather than permanent) structures of perception, conception and action (Bourdieu, 2013). It refers to people's thoughts and practices in everyday life, which are *socially learned* and usually taken for granted. Habitus is a scheme or a disposition that is not just limiting, but also enabling. It has a 'generative capacity' and both the subjective and objective dimensions. They stand in dialectic relation, and this concept attempts to overcome the dualism of subject and object (Bourdieu, 1988, p. 782).

One of the most important functions of habitus, especially in empirical social research, is its capacity to explain *distinctions* (Bourdieu, 1984). Habitus points to cultural differences and inequalities, but also implies political and class dimensions (Birešev, 2014). It is a dynamic concept 'inscribed' in social actors as a 'sense for practice' (*Fr. sens pratique;* Bourdieu, 1980). In other words, it enables individuals to economise with their practices and actions. Bourdieu conducted research among the Kabyle community in Algeria to investigate how habitus 'functions' in practice (Bourdieu, 2013), with social actors being left with the possibility to carry out strategies that are prescribed and 'already there'. This is not to say that the behaviour of individuals is absolutely determined, since the concept of habitus leaves the possibility for 'creativity' to exist in social actors. This is something we should recognise in different aspect of everyday life, and in the use of ICTs as well.

Considering the use of this concept in research of the Internet and the digital environment in general, it can be said that habitus becomes an important notion for the depiction of social inequalities. For example, such is the case in research regarding the differences in attitudes towards the ICTs (Kvasny, 2005). The question is how individuals with different 'social biographies' and social status form their attitudes or 'use' the discourses about these technologies. The concept of habitus in this kind of research is crucial, since it helps to focus on the question how social actors with different social backgrounds (class, status) use technology *as a resource* for different purposes.

A remarkably interesting and important study was conducted by Laura Robinson (2009), who used the term 'information habitus'. Her research was about access to, and the use of information and communication technologies (ICTs) among families with low or middle-range incomes in rural areas in California. Robinson spoke of *playful habitus*, a characteristic of families with higher incomes, since it was something like

a 'serious game' when it came to the use of ICTs. This type of habitus promotes technological engagement and the learning of skills (Robinson, 2009; Ignatow &. Robinson, 2017, p. 954). On the other hand, among families with lower incomes, she identified the *task-oriented habitus*, and something she characterised as a 'taste for the necessary'.

This is a concept already developed by Bourdieu. He attributed it to the lower social strata ('popular classes') and to their conditions of scarcity and desire. Bourdieu's original claims were about working-class families' "choice of the necessary" and "taste for necessity", made out of social need (Bourdieu, 1984; Deeming, 2014). In Robinson's research, it was about the attempt to situate new media use within respondents' larger lifeworlds, and to examine the effects of digital inequality on the economically disadvantaged American youth (Robinson, 2009, p. 488).

Robinson thus analyses the dramatic divergence in informational habitus internalised by the respondents with varied access to primary resources. In order to grasp "how individuals relate to IT resources" (Robinson, 2009, p. 491), she claims that it is first necessary to understand "how their informational habitus emerges from their experiences of scarcity and abundance with respect to other primary goods" *(ibid.)*. What was evident is that "the enactment of these dispositions creates distinctive patterns of usage that are best understood as outcomes of the different forms of habitus that correspond to Bourdieu's opposed categories of 'playing seriously' and 'the taste for the necessary'" (Robinson, 2009, pp. 492-493). As a result, Robinson identifies different kinds of information habitus: the *playful* information habitus that "allows individuals to derive the benefits that accompany open-ended roaming and browsing" (Robinson, 2009, p. 493); and the *task-oriented* information habitus, recorded with respondents "without plentiful resources" (*ibid.*) that are "constrained in terms of both access and autonomy" (*ibid.*), enacting "a 'taste for the necessary' in their rationing of internet use" (*ibid.*).

We can recognise two important aspects of using the concept of habitus in this case. It is a concept that can be *multiplied,* or adapted to the complexities and particularities of the social situation in focus. There is no prescribed 'number' or quantity of habitus(es), nor is it just a firm and unchangeable quality of a particular social class. In other words, this is a concept that allows for flexibility and adaptation. Still, habitus remains relatively stable, despite the development of new technologies and new disciplinary frameworks in social sciences, allowing for additional explanations and development, which is also important for this paper.

For instance, habitus is crucial in the research of "the ways in which longstanding social inequalities shape beliefs and expectations regarding ICT and its impact on life chances" (Kvasny, 2006, p. 160), or in the research of the 'digital disconnect' and social exclusion (McChesney, 2013). Studies already show the existence of structural social differences

and inequalities which impact the development of digital literacy (Lareau, 2011). One study from Italy clearly demonstrated that young people from different social classes spend their time online in different ways (Micheli, 2015), either in search of information important for their education and to acquire some form of capital (in higher classes) or to merely play or amuse themselves (in lower classes).

There is no possibility to make conclusions about the far-reaching implications of the use of habitus in this kind of research. What we wanted to show, however, is the importance of this concept in both theoretical and methodological terms. It seems that the concept of habitus, applied to digital practices, has enough 'methodological flexibility'. This is the case because it opens up a whole field of numerous operationalisations through the development of its subtypes. This was clearly demonstrated by Robinson's research and the case with different information habitus(es). At the same time, it seems that this concept opens up many other theoretical possibilities. It is not just a concept that we can use to explain social practices, but a concept that can be used to explain social practices and social differentiations (or inequalities) that are changing and provoking the need for a further theoretical 'calibration' of the concept. The general conclusion is as follows: habitus is still relevant, and it is a pivotal concept related to the identification and explanation of social inequalities, both in the physical reality and in the online sphere.

Furthermore, it seems that the concept of information habitus is also plausible in the context of the wide understanding of the different levels of digital inequalities. This is the case because researchers in the field identified differences at the level of both technical access (physical availability) and social access (knowledge and skills). Information habitus seems to bridge these differences, since it is able to identify the importance of both aspects of social inequality.

When it comes to the typology of digital divides offered by Christoph Lutz (2019), information habitus also seems as a flexible concept able to grasp different levels, including the access to information technology (first-level digital divide), and the second-level that differentiates between the users' skills and different uses among users. Consequentially, the third-level digital divide emerges, as do the gaps in individuals' "capacity to translate their internet access and use into favorable offline outcomes" (Van Deursen & Helsper, 2015, p. 30; see also: Lutz, 2019, p. 144).

It is also important to mention the criticism of the concept of habitus – for instance, the approach of Anthony King (2000). He argues that Bourdieu was right for insisting on the flexibility of habitus and the possibility of it encompassing and recognising both the *opus operatum* of structure, and the *modus operandi* of practice (King, 2000, p. 426). Robinson's study in particular seems to confirm this, as it concerns the theoretical and methodological flexibility of the concept, as well as its 'expli-

cative power'. However, we should not forget that this concept is a part of the following 'theoretical formula': [(habitus)(capital)] + field = practice (Bourdieu, 1984). In case we recognise and accept the critique of habitus as an 'objectivist' theoretical concept which is hard to operationalise, and which struggles to explain social change, we could possibly find 'a way out' of circularity or objectivistic implications only by taking into account the entirety of Bourdieu's theory of practice. Empirical research requires the application of the entirety of Bourdieu's 'theoretical formula' if we want to raise the possibilities for its explicative potential (Spasić, 2013; Costa and Murphy, 2015).

CONCLUSION

In this paper, we attempted to demonstrate the potential of Bourdieu's concept of habitus in the research of social inequalities in the field of digital practices. We deliberately did not pay particular attention to theoretical discussions, or the advances and detailed critiques of this concept. Despite the theoretical issues, the empirical research we refer to undoubtedly shows the flexibility of the concept and the possibilities for its advancement. Furthermore, the presented research indicates the creation of socially stratified patterns of perception, classification, meaning creation, and social action.

Communities on the Internet are real communities, implying that the Internet is not just a medium which exists 'out there', but a social fact which must be understood in relation to local culture (Wellman & Hampton, 1999). According to Barry Wellman, while humans used to live in 'little boxes', today they live in 'networked societies'. Although networked communities can be divided into 'online' and 'offline'communities, there is *no* sharp distinction between online and offline social connections and relationships. They overlap and reinforce each other, which also includes the prevalent social divides and inequalities (see also Wellman, Boase, & Chen, 2002).

In today's world, with its ubiquitous digital practices, the importance of the research on digital inequalities is reflected in the fact that there is no equal access to and use of the Internet and digital technologies. This research field could help us recognise the constraints of the technologies themselves, their potentials for social change, and the changes in people's chances in life. However, it is hard to foresee the changes in this dynamic field of development. If we bear in mind the past and current experiences in our sociocultural evolution (Lenski, 1966; Sanderson, 2001), we could ultimately conclude that the levels of inequalities will possibly become more and more differentiated and stratified in accordance with the development of more differentiated and sophisticated digital technologies or ICTs.

Finally, we can conclude that Bourdieu's concept of habitus could be *revitalised* in the field of digital research, since it provides many conceptual resources. On the one hand, the rise and the importance of digital media technologies create new domains and practices, but on the other hand, they seem to replicate existing social patterns, divides and inequalities.

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КОНЦЕПТ ХАБИТУСА У ИСТРАЖИВАЊУ ДИГИТАЛНИХ ПОДЕЛА И НЕЈЕДНАКОСТИ

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Резиме

Тема којом се бавимо у овом истраживању је питање релевантности концепта хабитуса, који је развио француски социолог Пјер Бурдије, у истраживањима друштвених неједнакости и подела у дигиталним праксама. Истраживачко питање се односи на то које врсте друштвених неједнакости постоје у домену информационих и комуникационих технологија (ИКТ), а посебно Интернета, и на то да ли је Бурдијеов концепт хабитуса адекватно теоријско-методолошко оруђе за емпиријска истраживања у наведеном подручју. У раду представљамо типологије дигиталних неједнакости и подела, укључујући први ниво дигиталне поделе који се односи на приступ Интернету, други ниво дигиталне поделе који има за циљ да диференцира бинарне неједнакости приступа Интернету од неједнакости у домену вештина и начина употребе, као и трећи ниво који отвара питање неједнакости које се јављају као последица употребе Интернета. Како бисмо одговорили на истраживачко питање и потврдили или одбацили хипотезу о адекватности концепта хабитуса у истраживањима дигиталних подела и неједнакости, у раду смо направили преглед релевантних емпиријских истраживања. Један од најважнијих примера који издвајамо је употреба и разрада концепта хабитуса као „информационог хабитуса", где се концепт диференцира у складу са различитим начинима коришћења ИКТ и употребом Интернета. Такође указујемо на значај употребе концепта хабитуса у истраживањима која се баве неједнакостима као дугорочно успостављеним друштвеним трендовима који имају везе са употребом ИКТ, али и животним шансама. Студије такође указују и на постојање структуралних друштвених неједнакости које утичу на развој дигиталне писмености. Иако не постоји могућност да се донесе закључак о коначним импликацијама употребе хабитуса у овој области, на основу типологије подела, неједнакости и емпиријских истраживања која приказујемо закључујемо да хабитус има и теоријски и методолошки значај у наведеној области. Другим речима, закључујемо да је у питању концепт који не само да има потенцијал за објашњење, већ представља истраживачку алатку коју је, управо кроз поменута и слична истраживања, могуће даље развијати.

THE NEXUS BETWEEN TRADE INFRASTRUCTURE DEVELOPMENT AND EXPORT: THE CASE OF CENTRAL AND EASTERN EUROPEAN COUNTRIES

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Abstract

The focus of economic policymakers in Central and Eastern European countries (CEEC) is on developing and improving national infrastructure, including roads, railways and other forms of physical infrastructure needed for the realisation of economic activities, with the primary goal being to create a favourable business environment for foreign investments and export intensification. The article aims to examine whether the development of infrastructure in these countries has contributed to the increase in exports and to what extent, which would likewise examine the justification of infrastructure investments as a part of the economic strategy and foreign trade policy. The method of panel regression analysis with fixed effects was applied, which confirms the positive and statistically significant impact of infrastructure on export, justifying the initiative for the development of national infrastructure in the observed countries. Based on the obtained results, valid conclusions have been drawn regarding the theoretical and practical implications of the research, which point to the importance of physical infrastructure development as one of the leading determinants for export incentives.

Key words: infrastructure, export, Central and Eastern European countries (CEEC), economic development.

ВЕЗА ИЗМЕЂУ РАЗВОЈА ТРГОВИНСКЕ ИНФРАСТРУКТУРЕ И ИЗВОЗА: ПРИМЕР ЗЕМАЉА ЦЕНТРАЛНЕ И ИСТОЧНЕ ЕВРОПЕ

Апстракт

Фокус креатора економске политике у земљама Централне и Источне Европе је на развоју и унапређењу националне инфраструктуре, укључујући путеве,

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железницу и друге облике физичке инфраструктуре потребне за реализацију привредних активности, са примарним циљем стварања повољног пословног окружења за стране инвестиције и повећање обима и интензитета извоза. Рад има за циљ да испита да ли је развој инфраструктуре у овим земљама допринео повећању извоза и у којој мери, чиме би се утврдила оправданост инфраструктурних улагања као дела економске стратегије и спољнотрговинске политике. Примењена је метода панел регресионе анализе са фиксним ефектима, која потврђује позитиван и статистички значајан утицај инфраструктуре на извоз, што оправдава иницијативу за њеним развојем у посматраним земљама. На основу добијених резултата изведени су релевантни закључци о теоријским и практичним импликацијама истраживања, који указују на значај развоја физичке инфраструктуре као једне од водећих детерминанти за подстицај извоза.

Кључне речи: инфраструктура, извоз, земље Централне и Источне Европе,
                           економски развој.

INTRODUCTION

One of the key roles of infrastructure is to enable, facilitate and accelerate the movement of goods, people, and information. Since the availability of resources shapes the efficiency of economic activities, the construction and continuous improvement of infrastructure is a prerequisite for the development of a certain industrial area, country, or region. The role of physical, and information and communication (ICT) infrastructure shapes the systems of the global economy, while the spatio-temporal convergence of international trade is based on constant demands to reduce transport costs and time between certain points. The importance of investment in infrastructure is also confirmed by the high amounts of financial resources and support from international financial institutions directed toward these projects, especially in developing countries (World Bank, 2015). The contribution of good infrastructure is found in direct benefits for the population, and it is a basis for performing business activities that contribute to the achievement of the economic growth and development of national economies.

Economic and industrial development requires an adequate level of infrastructure in order to effectively implement internal and international trade. Infrastructure includes institutional, personal, and material components (Buhr, 2003), whereby the key element of the material component is transport infrastructure and related service activities, as well as facilities such as transport terminals, distribution, and logistics centres. This concept can be treated as a trade or logistics infrastructure that, in addition to the physical 'hard' dimension, also includes a 'soft' component (Arvis, Ojala, Wiederer, Shepherd, Raj, Dairabayeva & Kiiski, 2018). Special attention when considering different dimensions of infrastructure in the context of the international position of countries is focused on

physical infrastructure assuming that its improvement can contribute to better economic conditions and the intensification of international trade.

Infrastructure development is one of the prerequisites for achieving growth, reducing poverty, and achieving broader development goals, such as more intensive participation in global supply chains (GSC). Achieving comparative advantages, especially in developing countries, depends significantly on the adequacy of infrastructure and its continuous improvement (Luo & Xu, 2018). The concrete contribution of infrastructure development is reflected in the reduction of production and transaction costs (Lakshmanan, 2011; Hallaert, Cavazos-Cepeda & Kang, 2011), and the increase in the total productivity of production factors (Wan & Zhang, 2017). In addition, investment in infrastructure has a multiplier effect, where every dollar invested in infrastructure projects leads to an increase in private investment of approximately 2 US dollars, and an output of 1.5 US dollars. Thus, stimulating infrastructure development has a strong multiplier effects on the initial development of low-income countries (Eden & Kraay, 2014). The development of infrastructure is closely related to the level of participation in GSC and greater success in attracting investments, as infrastructure provides access to international markets, which is especially important for open economies and developing countries (Luo & Xu, 2018).

The improvement of the entire infrastructure directly contributes to the growth of total productivity and efficiency in the economy, while the development potential in the modern conditions of the global market, due to the aspirations of countries for more active participation in international economic flows, primarily refers to the physical component, trade, and transport infrastructure, as part of the overall logistics infrastructure. What has been noticeable in recent years is the high level of investment by countries in infrastructure projects, with a tendency to continue this trend. This is especially present in the CEEC, where capital investments in infrastructure have a dominant share in the structure of total investment projects, even reaching 18% of the GDP in certain economies within this group of countries (European Commission, 2019; CEECAS, 2021). These countries are open economies that heavily rely on import and export flows which have in previous years, as will be the case in future development strategies, imposed intensive development, especially of road and railway infrastructure. In this sense, it is necessary to examine whether these initiatives and the high relative levels of investments aimed at these projects contribute to the goals within the economic strategy on the specific example of CEEC. The main motive and goal of these strategies are, above all, to attract investments and encourage exports.

As there is some evidence in the existing literature about the positive impact of physical infrastructure improvement on various dimensions of economic development, it can serve as a starting point for the initial

assumption about its positive impact on international trade. The identified gap in the previous literature refers to the absence of research that examines the impact of physical infrastructure on the volume of international trade in CEEC, which may be particularly important considering the levels of capital investment on that basis in these countries.

In order to realise the research goal, a panel regression analysis with fixed effects was applied. A total of 16 individual countries within the CEE region were observed, which have in recent years achieved a high level of investment in the development and improvement of physical infrastructure. The period of analysis coincides with this trend, and includes the period between 2007 and 2018, within which the infrastructure component of the Logistics Performance Index (LPI) (World Bank, 2022) was used as a key independent variable, and the most relevant existing indicator in the assessment of exclusively the trade infrastructure of these countries. Empirical research is supported by the use of control variables closely related to the volume of international trade as a dependent variable, namely, the inflow of FDI and the Global competitiveness index (GCI). The theoretical basis for those control variables relies on studies which proved their connection with export (Mukhtarov, Alalawneh, Ibadov & Huseynli, 2019; Ruzekova, Kittova & Steinhauser, 2020; Sabra, 2021).

In addition to the introduction, the rest of the article consists of a literature review in this area, followed by the presentation of data and research methodology. After that, the research results are presented and discussed, followed by a conclusion and recommendations for future research.

LITERATURE REVIEW

Recent research has shown the different impacts of improving physical infrastructure on the dimensions of economic development. Yeo, Deng and Nadiedjoa (2020) found that infrastructure development leads to the sustainable growth and development of middle-income countries in the long run, with its indirect role in stimulating international trade. On the other hand, some earlier studies (Kuştepeli, Gülcan & Akgüngör, 2012; Crescenzi & Rodrıguez-Pose, 2012) examining the importance of infrastructure and the relationship between highway investment, the volume of international trade, and the pace of economic growth, failed to prove the interdependence of these variables. This can be attributed to the complexity of the macroeconomic environment of certain countries, where the efficient functioning of a large number of market mechanisms is necessary to achieve positive effects based on investment in infrastructure. It is important to determine which infrastructure within a certain economy requires special attention, whose improvement gives the best results, as well as in which stage of development the specific economy is. Erkan (2014) presented conclusions on the special importance of railway

and port infrastructure on the example of 113 countries. The improvement of these dimensions, which by the nature of transport imply the lowest unit costs in international trade, would enable the realisation of positive effects, primarily through the growth of the volume of international trade.

Shepherd (2016) points out that when it comes to facilitating trade, improving infrastructure, and initiating the participation of countries in global value chains (GVC), it is not only the development of one country that is important, because the effects of its efforts also depend on neighbouring countries. This is particularly important for developing, as well as for landlocked countries, which are cut off from direct access to the most massive form of international transport and are highly dependent on the development of the land infrastructure in the surrounding countries. Vlahinić Lenz, Pavlić Skender and Mirković (2018), examining the effects of land infrastructure on economic growth in CEEC that are members of the EU, established the existence of a positive relationship between the development of road infrastructure and economic growth. Despite this, the results of the contribution of railway infrastructure show a negative impact, and indicate a long-standing problem of inefficient and outdated railways. The improvement of this type of infrastructure would enable the substitution of road transport by rail, which is more environmentally friendly, and would additionally increase the efficiency of international transport and improve competitiveness in the long term. Ismail and Mahyideen (2015) also proved that the development of transport infrastructure is of crucial importance for the intensification of international trade in goods and the achievement of economic growth. Investing in infrastructure contributes to increasing competitiveness and brings multiple economic benefits (Purwanto, Heyndrickx, Kiel, Betancor, Socorro, Hernandez & Fiedler, 2017).

In addition to maritime, road and railway infrastructure, airports and air traffic form one of the basic elements in the transport network. Air traffic contributes to increased business connectivity and cooperation, especially between distant areas (D'Aleo, 2016). Airports are an important factor in the process of globalisation, whereby the size of the airport, the presence of low-cost companies and the volume of cargo transport have a significant impact on the quality of service and the efficiency of the airport (Carlucci, Cirà & Coccorese, 2018), as well as on the development of tourism in a certain region or country (Bugarčić & Bugarčić, 2021). For this reason, it is necessary to continuously improve the efficiency of airports, and to increase public and private investments in this infrastructure (Sergi, D'Aleo, Arbolino, Carlucci, Barilla & Ioppolo, 2020), whose progress contributes to the development of air traffic and leads to the diversification of international transport. In addition, another possibility of direct use of the geographical position of countries is the improvement of inland navigation and river ports, which can be an additional way of achieving

internal and international trade through international shipping routes (Nikoličić, Maslarić, Strohmandl & Mirčetić, 2017). The development of river infrastructure through the construction of navigable canals can enable better connectivity, equivalent to the contribution of sea navigable canals, which have significantly facilitated international trade by sea, and led to a reduction in the time and cost of international transport.

It can be stated that infrastructure investments are in most cases the key driver of strengthening the national economy and increasing productivity, while respecting the specificities of a certain region. The level of economic development also depends on the quality of infrastructure for specific products, such as oil and gas, which represent an important geostrategic resource for the domestic industry. This requires large investments by different countries, and the key question in such decisions is whether the economic impact caused by the new project could fundamentally boost the economy by creating new jobs and new incomes, and which sectors are expected to benefit from such projects (Dimitriou, Mourmouris & Sartzetaki, 2015). Infrastructural pipelines enable the availability of natural resources and energy for transit countries, while the country of origin of a particular resource thus enables its continuous and more efficient export through a specific infrastructure. A similar effect, achieved by different technology and method of transmission, can be expected based on the development and modernisation of ICT infrastructure, which primarily refers to the Internet, whose availability, speed, and active use in the digital world is an imperative, especially in the context of the development of Industry 4.0.

Achieving the goals of economic and trade growth through the improvement of infrastructure requires respect for the principle of sustainability. Bhattacharya, Oppenheim, and Stern (2015) emphasise that infrastructure development requires clear strategies of national authorities and international organisations, an appropriate level of investment in those projects, and respect for the economic, social, and environmental principles of sustainable development. Infrastructure development trends, as the backbone of every society and economy, need special attention. Investments aimed at improving infrastructure are motivated by a desire to increase economic productivity and employment, whereby Thacker, Adshead, Fay, Hallegatte, Harvey, Meller and Hall (2019) confirmed the importance of infrastructure that directly or indirectly affects the achievement of 72% of sustainable development goals (SDG). To ensure the construction of adequate infrastructure, policymakers must establish long-term visions of sustainable national infrastructure systems in line with the SDG, and develop flexible plans for further development. The concrete contribution of infrastructure, in the form of sustainable economic and trade growth, is realised through the process of international transport. Different types of transport require appropriate infrastructure,

based on location and time, which requires the analysis of individual forms of transport, and the formulation of development policies based on the needs and position of a specific country or region.

Based on existing confirmations that the development of infrastructure is positively correlated with economic growth, proven on the example of the EU-28 countries (Maciulyte-Sniukiene & Butkus, 2022), the question of how this mechanism works, assuming the key role of export activities in this process, arises. Some authors emphasise that the influence of physical infrastructure and ICT on exports is more important as the country becomes richer (Portugal-Perez & Wilson, 2012), while on the other hand, there is evidence that the positive effects and impact of infrastructure development diminish over time, and are primarily significant for large exporters within the economy (Kadochnikov & Fedyunina, 2018). From the aspect of time, Rehman, Ding, Noman and Khan (2020) indicate the existence of short-term and long-term two-way causality between infrastructure and exports in Pakistan, while one of the significant effects of this relationship, in the long run, is the positive impact of infrastructure on the reduction of the foreign trade deficit, proved in selected South Asian economies (Rehman, Noman & Ding, 2020). Regarding the impact on export competitiveness, trade infrastructure does not have positive effects on countries with a lower level of income (Olyanga, Shinyekwa, Ngoma, Nkote, Esemu & Kamya, 2022), but its importance can be distinguished through a direct channel of influence with the improvement of information efficiency and, indirectly, through the structure of the industry itself (Zhou, Wen & Lee, 2022). The lack of evidence on the impact of physical trade infrastructure on export in CEEC, and the economic evaluation and justification of investments in this area compared to the countries' size, provides the basis for the empirical analysis and assessment of this relationship.

The particular importance of trade infrastructure for international trade was identified during the recent pandemic crisis. The growing importance of the entire logistics system for the business environment at the international level, evident due to the challenges caused by the pandemic (Sudan & Taggar, 2021; Bugarčić & Stanišić, 2022), is especially significant when it comes to the efficiency of physical infrastructure, especially international ports and the functioning of intermodal transport (Guerrero, Letrouit & Pais-Montes, 2022). In this regard, infrastructure quality could be an important trade flow driver for different forms of transport (Wessel, 2019) in various economic circumstances, and one of the main contributions of infrastructure development could be found in stimulating international trade (Coşar & Demir, 2016; Karymshakov & Sulaimanova, 2021; Rahman, Shafi, Junrong, Fetuu, Fahad & Sharma, 2021).

According to our research goal, the article aims to examine the degree of influence of physical trade infrastructure on export in CEEC. Al-

so, assumptions regarding the influence of the control variables (GCI and FDI) on export are tested. Therefore, the following hypotheses were formulated: (H1) *infrastructure development has a positive statistically significant impact on the volume of exports in CEEC;* (H2) *the level of countries' global competitiveness affects exports;* and (H3) *FDI inflow is important for export promotion.*

DATA AND METHODS

Secondary data from relevant international institutions was used for empirical analysis and testing the stated assumptions. The indicator of the infrastructure quality level, as a key independent variable, is a sub-component of LPI. This indicator measures the quality of infrastructure in the observed countries, including roads, railways, and other forms of physical infrastructure needed for the realisation of trade activities. The overall rating is formed based on the quality of transport and storage infrastructure, which is adequately separated and presents the overall assessment of trade infrastructure in the observed years according to the selected countries (World Bank, 2022). Given that the effects of changes in this area require a certain time interval, the infrastructure indicator is measured every two years, with the latest data for 2018, which conditions the analysis period that spans the period between 2007 and 2018. Data for the total export, as a dependent variable, was taken from the UN database (UN COMTRADE, 2022). To increase the accuracy of the obtained results, control variables that are closely related to the export activities of the countries were used, namely, the net inflow of FDI (UNCTAD, 2022) and the level of national competitiveness, expressed through the GCI within the *Global Competitiveness Report* (WEF, 2018). The main goal of the research is to examine the contribution of infrastructure improvement to export growth in CEEC-16, based on which the following econometric model was constructed:

$$EXPORT = \beta_0 + \beta_1 Infrastructure_{it} + \beta_2 GCI_{it} + \beta_3 FDI_{it} + a_i + u_{it}.$$

The procedure of panel regression analysis of the given model was performed using fixed effects, selected in accordance with the Hausman test results (Dritsakis & Stamatiou, 2018). The balanced panel model contains 96 observations (16 countries x 6 years). Before conducting the analysis procedure, an insight into the descriptive statistics and indicators of the correlation analysis was given, which, in addition to the theoretical basis of the given relationship, indicated the adequacy of the regression analysis, where logarithmic data was used for the values of exports and net inflows of FDI due to the high absolute values.

EMPRICAL RESULTS AND DISCUSSION

The results of descriptive statistics indicate the average, minimum and maximum values of the variables in the observed set, as well as the existence of a certain difference between the variables, which is primarily a consequence of the different sizes of the observed economies. Also, there is a significant difference in the level of infrastructure development among the observed countries in the analysed period (Table 1). Such results resulted, among other reasons, from differences in the countries' sizes, where Poland has the maximum value in terms of FDI net inflow as well as export. On the other hand, Montenegro has the minimum value in terms of total export, and Hungary has a negative FDI net inflow.

Table 1. Descriptive statistics

Variables	Mean	Std. deviation	Min	Max
Export (US $ at current prices in millions)	46,200	58,300	355	262,000
Infrastructure	2.79	0.38	1.98	3.57
GCI	4.23	0.29	3.48	4.80
FDI net inflow (US $ at current prices in millions)	3,800	4,300	-5,440	19,800

Source: Own calculations

The existence of a positive correlation between the dependent and independent variables, presented in Table 2, provides the basis for the further econometric analysis of the observed impact.

Table 2. Correlation matrix

Variables	Export	Infrastructure	GCI	FDI net inflow
Export	1.0000			
Infrastructure	0.5376	1.0000		
GCI	0.4481	0.6135	1.0000	
FDI net inflow	0.6483	0.0827	0.1647	1.0000

Source: Own calculations

The visual relationship between the level of development of trade infrastructure and the volume of exports is represented by a scatter diagram (Figure 1). Data for exports is in logarithmic form, given the large absolute differences, which achieved an adequate insight into the relationship between the observed variables.
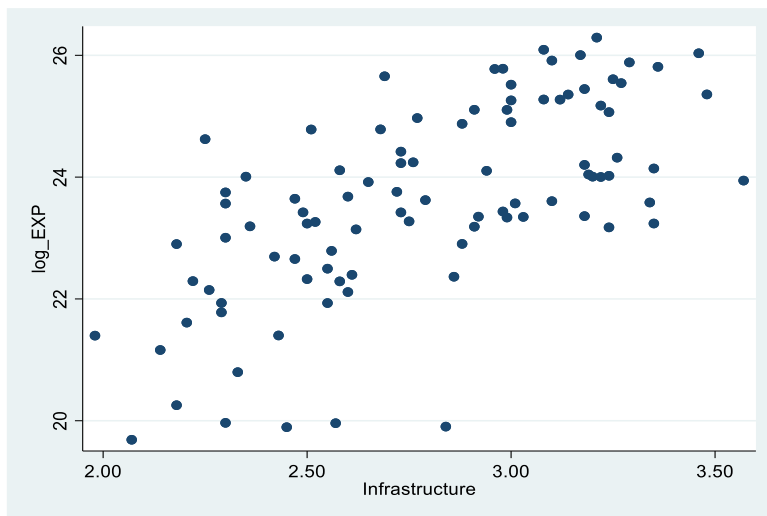
Figure 1. Scatter diagram
Source: Output from STATA

By looking at the original data in the selected sample, certain pro-
gress in the level of infrastructure development was noticed, with a simul-
taneous increase in exports in the observed period, which imposes the need
to examine the contribution of infrastructure to this trend. During the em-
pirical statistical analysis, the validity indicators of the applied model were
in favour of the justification of the obtained results (F stat. 12.21; F stat.
prob: 0.0000; R-squared: within 0.3311; between 0.4264; overall 0.3748),
which indicates the validity of their interpretation, and the presentation of
empirical conclusions and recommendations. The infrastructure component
shows a statistically significant positive impact on the volume of exports in
the observed countries, thus confirming the first hypothesis. At the same
time, the influence of the control variables on export is also positive, which
is in accordance with the initial assumptions of their relationship, but statis-
tical significance is shown only for GCI (Table 3). According to that, we
can confirm that export volume depends on the countries' global competi-
tiveness level, which is in line with Mukhtarov, Alalawneh, Ibadov and
Huseynli (2019). Despite stable assumptions (Sabra, 2021), the third hy-
pothesis, related to the impact of FDI inflow on exports, was not confirmed.
The results also justify the CEEC strategy aimed at major investment pro-
jects focusing on the development of infrastructure (European Commission,
2019). The presented results proved these initiatives in terms of promoting
exports in the selected countries.

Table 3. Summary of fixed-effects panel regression results

log_EXP	Coef.	Std. Err.	t	P>|t|
Infrastructure	0.2284272***	0.0869544	2.63	0.010
GCI	0.6919966***	0.1492349	4.64	0.000
log_FDI	0.0140242	0.0324433	0.43	0.667

Signif. codes: ***statistically significant at the 1% level.
**statistically significant at the 5% level.
*statistically significant at the 10% level.
Source: Own calculations

The obtained results are in accordance with the previously stated assumptions and evidence in literature about the positive impact of various forms of physical infrastructure on the volume of export (Erkan, 2014; Ismail & Mahyideen, 2015; Shepherd, 2016; Nikoličić et al., 2017; Rehman et al., 2020). The empirical evidence presented in this article confirms this assumption for the first time at the level of CEEC. This justifies the current strategies of the observed countries for the continuous improvement of trade infrastructure. The value of the regression coefficient, however, indicates that the initiative to improve physical infrastructure must be adequately followed by the development of other trade facilitation factors to create an appropriate environment suitable for easier access to international markets.

The further development of trade infrastructure must be harmonised and coordinated to enable the greater participation of these countries in the GVC, as shown in the example of other countries (Shepherd, 2016), considering that the geographical position and economic connection of trade partners must rest on common interests in terms of developing infrastructure to give impetus to the growth of exports, and the continuous improvement of bilateral and multilateral trade. The presented empirical evidence especially emphasises the contribution of infrastructure in stimulating exports, in accordance with the presented earlier research that dominantly confirms its role in stimulating economic growth. These findings also confirm the importance of different forms of trade infrastructure in periods of crisis (Guerrero et al., 2022), which can thus be singled out as one of the key elements of the development policies in the countries of the CEE region. This highlights the growing importance of the entire logistics system, and trade infrastructure as one of its most important elements, which have a direct impact on trade and the entire business development within a country (Aćimović, Mijušković & Bugarčić, 2022).

CONCLUSSION AND FUTURE RESEARCH DIRECTIONS

The presented importance of infrastructure for economic development, and its potential in stimulating the foreign trade of countries is em-

pirically confirmed by the example of CEEC, as a relevant region that includes both developed EU member states and developing countries that are candidates for membership. In this way, the economic policy strategy of these countries is justified in being directed towards the intensive development of physical infrastructure as a support for economic growth and development. This trend is particularly favourable for exporters, who could access foreign markets more efficiently and competitively if the economic authorities provide an adequate level of infrastructural support, which primarily refers to the development of roads, railways, and ports, as well as ICT infrastructure and the improvement of storage and logistics capacities. The level of influence, which is ascertained by the height of the regression coefficient, indicates a statistically significant and positive influence of infrastructure on export, with the fact that the height of the coefficient indicates that it is necessary to provide additional conditions regarding other parameters necessary for a greater export incentive. In this regard, this research also shows a positive contribution of the control variables, and a statistically significant and positive impact of the level of GCI on export. The impact of FDI net inflow does not show statistical significance. This can be explained by the structure of investments, where the FDI inflow in the observed period did not make an adequate contribution to stimulating export, based on the assumptions in the given model.

Based on the confirmation of the stated hypothesis, recommendations can be drawn for economic policymakers in the observed countries, primarily those focused on trade policy and export promotion, which are significantly dependent on the level of infrastructure development and its continuous improvement. This justifies intensive infrastructure investments in this area in the observed economies. Nevertheless, it is necessary to pay attention to and examine other potential determinants of export growth. One limitation of this research is reflected in the short possible period of observation and the impossibility of applying dynamic panel models, which is a consequence of the fact that changes in this area require a longer period of observation. Another limitation is reflected in the analysis of the impact of the entire trade infrastructure on the total volume of exports, from which the direction for future research can be derived. One possible direction is to examine its contribution to the export of certain sectors of the economy, such as the processing sector, which would indicate the concrete contribution of infrastructure in individual areas and branches of industry. In addition, the analysis of individual segments of infrastructure would be useful for academics and professionals in this field. Another direction for future research is the inclusion of 'soft' infrastructure components that would indicate the contribution of logistics services in stimulating export operations, but also the inflow of FDI, as another strategy and driver of economic growth and development in CEEC, which potentially depends on the level of infrastructure support.

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ВЕЗА ИЗМЕЂУ РАЗВОЈА ТРГОВИНСКЕ ИНФРАСТРУКТУРЕ И ИЗВОЗА: ПРИМЕР ЗЕМАЉА ЦЕНТРАЛНЕ И ИСТОЧНЕ ЕВРОПЕ

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Резиме

Рад је фокусиран на испитивање доприноса инфраструктуре у подстицају извоза земаља Централне и Источне Европе. Циљ рада јесте да утврди да ли развој трговинске инфраструктуре утиче на повећање извоза и у којој мери, будући да је ова групација земаља одабрана услед њихове интензивне стратегије усмерене ка унапређењу ове области. У раду се тестирају три хипотезе, које поред утврђивања директног утицаја инфраструктуре на обим извоза (X1), испитују утицај глобалне конкурентности земаља на извоз (X2), као и ефекте прилива СДИ на промоцију извоза. Претходна истраживања указују на постојање позитивног односа између развоја инфраструктуре и извоза, као и других елемената економског развоја, с тим да је непостојање истраживања која испитују овај однос на примеру одабраних земаља дало основ за емпиријску анализу.

Резултати истраживања, спроведеног коришћењем панел регресионог модела са фиксним ефектима, потврђују изнете претпоставке и указују на позитиван и статистички значајан утицај физичке компоненте у оквиру трговинске инфраструктуре на обим извоза земаља. На овај начин, може се констатовати оправданост инвестиционе активности у оквиру стратегије усмерене ка даљем развоју овог облика инфраструктуре, чиме се и на теоријској основи оправдава њена улога једне од водећих детерминанти за подстицај извоза. Главни допринос истраживања постигнут је кроз валоризацију инфраструктуних пројеката и давање смерница креаторима економске политике. Овиме се унапређује укупан тржишни амбијент у оквиру једне националне економије, чиме се омогућава ефикаснија реализација спољнотрговинске активности, кроз олакшан приступ међународним тржиштима, посебно за индустријске производе, који доминантно зависе од нивоа развијености инфраструктуре.

Изнети закључци стварају и простор за будућа истраживања, кроз предлоге за декомпоновање индивидуалних сегмената у оквиру трговинске инфраструктуре и испитивање појединачног утицаја друмске, железничке, ваздушне, складишне или комуникационе ифраструктуре на укупан обим извоза, као и на извоз појединих индустријских грана и сектора. Испитивање доприноса инфраструктуре у привлачењу страних инвестиција може бити још један од предлога за будућа истраживања на нивоу посматране групе земаља. Као недостатак истраживања, издваја се период анализе који, због ограничости података и потребног времена за реализацију инфраструктурних пројеката, не пружа могућност за примену неких од динамичких панел модела. Додатно, ниске вредности регресионих коефицијената, контролисаних у циљу добијања што поузданијих резултата, указују на императив укључивања и других, пре свега „меких“ фактора трговинских олакшица, како би се у потпуности остварио циљ у виду повећања обима извоза и укупне спољнотрговинске размене.

THE ROLE AND SIGNIFICANCE OF LIP-READING

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Abstract

Lip-reading is a complex psychophysiological process, which involves the visual perception of oral movements, their kinaesthetic memorisation, and the psychological act of recognising (identifying) words for their better understanding. The need of each person to supplement and clarify the received message is emphasised by the careful observation of the face and lips, especially in unfavourable environmental conditions. The main aim of the study is to point to the role, importance, specific features, and the benefits and limitations of lip-reading through the review of available literature. The methods of analysis and evaluation were applied to the relevant available literature. Numerous pieces of data on the characteristics, factors and features which affect lip-reading were obtained. Lip-reading, i.e. the ability to understand speech on the basis of observing the movements of speech organs is a very specific skill. It is one of the components of speech development, and it represents a part of the communication speech chain which comprises the speaker and the one who reads speech. It has a manifold application in the transcription of speech in cases when sound is not available. What can have a negative impact on the perception of speech is the possibility of sound and lip movements not being synchronised. It is of particular significance for deaf persons and persons hard of hearing who rely on this process fully in their everyday communication, which makes it easier for them to receive information from their surroundings. It enables their better communication, education, independence and coping in their daily functioning.

Key words: lip-reading, speech-reading, communication, speech, the deaf and hard of hearing.

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УЛОГА И ЗНАЧАЈ ЧИТАЊА ГОВОРА СА УСАНА

Апстракт

Читање говора са усана је сложен психофизиолошки процес који укључује визуелну перцепцију оралних покрета, њихово кинестетичко запамћивање, али и психолошки акт рекогниције (препознавања) речи ради њиховог бољег схватања. Пажљивим посматрањем лица и усана, нарочито у неповољним срединским условима, наглашена је потреба сваке особе да допуни и разјасни примљену поруку. Основни циљ рада је да се прегледом доступне литературе укаже на улогу, значај, специфичности, бенефите и ограничења читања говора са усана. Примењене су методе анализе и евалуације релевантне доступне литературе. Добијени су бројни подаци о карактеристикама, факторима и чиниоцима који утичу на читање говора са усана. Читање са усана, односно способност разумевања говора на основу посматрања покрета говорних органа, јесте веома специфична вештина. Једна је од компоненти развоја говора и представља део говорног ланца комуникације који обухвата говорника и онога који чита говор. Оно има многоструку примену у транскрипцији говора у случајевима када звук није доступан. Оно што може негативно утицати на перцепцију говора јесте могућност да звук и покрети усана нису усклађени. Посебан значај има за глуве и наглуве особе које се у својој свакодневној комуникацији пуно ослањају на овај процес, који им олакшава пријем информација из окружења. Омогућава им бољу комуникацију, образовање, самосталност и сналажење у свакодневном функционисању.

Кључне речи: читање говора са усана и лица, комуникација, говор, глуви и наглуви.

INTRODUCTION

The problem of speech-reading by observing the lips and the face of the interlocutor is not new. Many theories of speech development indicate that, in the beginning, speech used to be mouth pantomime generated by speech organs following the movements of hands through their functional movements. The opinions of many authors to date show that the first symbols of oral and voice speech directed the listener to the interlocutor's face and mouth. Even nowadays, when speech has reached a high level of development, we endeavour to obtain more information on the subject of our conversation by looking at the interlocutor's face and mouth. We are often unaware of the role the visual part has in understanding speech. We learn this in some exceptional situations, in circumstances of loud noise, when speech is muffled, or when there is an obstacle between the interlocutors. In such situations we endeavour to follow the movements of speech organs alongside listening to speech, so as to receive more information and understand the message. Chung and Zisserman (2016) state that even if the auditory input is preserved and comprehensible, visual information helps in improving performance on the occasion of recognising speech. Lip-reading, i.e. the ability to understand speech using only visual information is a very attractive skill. It has clear

application in the transcription of speech when sound is not accessible, regardless of whether everyday communication or the exchange of information between politicians and famous persons is in question. It is complementary to the audio understanding of speech, but as it is asserted (McGurk & MacDonald, 1976), it may have a negative effect on the perception if the sound and lip movements are not coordinated. Speech reading from the interlocutor's mouth and face is one of the components of speech development. It is a part of the communication speech chain which includes the speaker and the one who reads the speech.

SPEECH READING FROM THE MOUTH AND THE FACE OF THE INTERLOCUTOR

Speech reading from the mouth and the face of the interlocutor includes the speaker (expedient) and the one who reads speech (percipient). The knowledge of the language of the expedient should at least partially match the knowledge of the language of the percipient, so that the information can be understood. If the expedient's and percipient's pools of knowledge do not correlate, the information cannot be understood. That requires the listener getting accustomed to the speaker. Their attention focuses on what makes the common core in speech, which enables their communication. The primary modality of the perception of voice speech in standard listening circumstances is the auditory modality. However, in situations where the auditory perception of speech is made difficult or disabled, such as where difficulties in the perception of acoustic stimuli are greater, the visual modality assumes greater significance. For the perception of voice speech which takes place through the visual modality, i.e. for the visual perception of voice speech, we most frequently use the expression of lip-reading. In the English-speaking countries, the term *lip-reading*, or *speech-reading* is used.

The ability to identify what is being said only through visual information – lip-reading (Chung, Senior, Vinyals & Zisserman, 2017), is an impressive and challenging skill. Ambiguity already arises at the level of words (for sounds which look the same on the lips, e.g. /p/ and /b/). However, such ambiguities may be overcome, to a certain extent, through the use of the context of the adjacent words in the sentence, or through the linguistic context.

Lip-reading represents a complex psychophysiological process, of which the three elements are important: the visual perception of oral movements, the kinaesthetic memorisation of speech and the psychological act of recognising (identifying) words for their better understanding. The visual speech signal carries sufficient information for linguistic discrimination, even among very similar languages. The mechanisms lying at the core of these abilities are based on segmental, suprasegmental and

lexical processes, or on their combinations. The movements of speech organs may be useful for information on the acoustic features of sounds, while head movements bear information on the fundamental frequency, as well as information on suprasegmental features of speech (Soto-Faraco et al., 2007). From the developmental perspective, sensitivity for multi-sensory coherence is crucial for the development of adequate perceptive, cognitive and social functioning. Multisensory coherence of audio-visual speech is determined by the overlapping of auditory and visual information flows which come from the face and the vocal tract of the speaker (Soto-Faraco, Calabresi, Navarra, Werker & Lewkowicz, 2012). Shang, Zhang, Xu and Peng (2018) point to the fact that lip-reading is not easy to imitate, and they point to an important characteristic of lip-reading, which is the fact that the information relayed by a face and auditory information may be collected simultaneously. The individuality of lip-reading may be used as the basis for the identification of the speaker. In comparison to previous research, where the number of words was strictly limited, the research conducted on the possibility of recognising phrases and sentences, with or without auditory information, used an unlimited number of words. The possibilities of machine translated speech were in question, considering the development of new technologies. The 'Look, listen, attend and spell' network model, which successfully transcribes oral speech into text, was presented. The data set developed in this study was based on thousands of hours of BBC television shows, in which persons who were speaking were recorded together with the subtitles of what was being said. The authors emphasise that different discriminative signs which would be useful for deaf persons and persons hard of hearing learning lip-reading could be observed through such research.

FACTORS WHICH AFFECT THE SUCCESSFULNESS
OF LIP-READING

The condition of a person's hearing, and their knowledge of the vocabulary, sound, grammar and every day and idiomatic expressions of a spoken language, i.e. the comprehension of the language affect the lip-reading ability. The understanding of a language is of the utmost significance for a good lip-reader, because lip-reading in itself includes the ability to use context (Campbell & Mohammed, 2010; Oliveira, Soares & Chiari, 2014). The ability to use the context, or the rules of a language, may be crucial for fitting into the conversation being made. Goebel (2013) notes that context is used more through the visual than through the auditory channel. Deaf persons and persons hard of hearing are specifically directed to lip-reading. It is essential for them in the process of communicating with the hearing environment. It is underlined that they should use their remaining hearing abilities to fill in the context, or they

can rely on their visual perception in lip-reading so as to understand what is being said. The context for the improvement of speech recognition (Spehar, Goebel & Tye-Murray, 2015) exists in a lot of forms, including the current context, context based on a sentence, and situational context. Considering the fact that there are limitations in understanding context, the successfulness of lip-reading is related to a high level of working memory capacity and the skill of verbal reasoning. Bradarić-Jončić (1998) points out that the input of speech-language information in reading is partial, and that they may be compensated for only by using information from the higher cognitive levels (using the knowledge of the language being spoken and the knowledge of the world). The processing of speech-language information received visually sets considerable requirements for short-term memory. Speech-language information should be retained in short-term memory until the data is analysed, compared and synchronised sensorily with the information stored in long-term memory, and until it is connected with the incoming information to make sense. Thus, the capacity of short-term memory is significantly related to the successfulness of reading. Ortiz (2008) emphasises that the understanding of speech by lip-reading depends on the capacity of deductive reasoning. The capacity of deductive reasoning enables the understanding of speech by mentally filling in what the ear cannot hear or the eye cannot perceive. What we can conclude from this is that the skill of phonological processing and the short-term memory capacity affect the lip-reading ability. Auer (2010) examined the effect of perceptive similarity using words which were presented auditorily and visually. The accuracy of the identification decreased when the number of perceptively similar words increased. Isolated spoken words which are perceptively similar to other words in the mental lexicon are usually more difficult to recognise than words which are perceptively unique. The efficiency and the accuracy of recognition are also affected by the number and the nature of the words which are alike (Luce & Pisoni, 1998). They further point out that the main problem in the auditory identification of words is linked to the relations between sound patterns of words in the memory (the mental lexicon) and the effects those relations have on the identification of words. The successfulness of lip-reading with deaf persons and persons hard of hearing is affected to a large extent by the level of familiarity with the terms in spoken and sign language, as well as by the readability of the sounds of our language. Properly learnt and stable terms are read well, even when the visibility of the sounds they are composed of is lower.

Campbell and Mohammed (2010) point out that speech-readers keep their gaze on the eye area of the speaker's face. They move their gaze to the mouth area so as to understand a specific piece of information, which may be foreseen from the previous interpretation. Understanding most information when lip-reading includes peripheral vision. Lip-

reading is more effective when the whole face is seen, although lip-reading from the profile of a face is possible. That is a mental act based on the joint functioning of perceptive and cognitive processes.

A good lip-reader has to be motivated and self-confident, and they must have a positive attitude and relation to lip-reading. Showing interest in effective lip-reading and good knowledge of the language, and the context (the situation) which is the subject of speech are key factors for successful lip-reading. Moreover, this skill may be improved by training, i.e. by exercise. What makes a good lip-reader is the quantity of training (the greatest improvement is achieved after one to three years of training), understanding of the language (knowledge of vocabulary, grammar and everyday expressions), the duration of hearing impairment, if there is one (persons who have lost hearing at a later stage are better lip-readers), the degree of hearing impairment (better remnants of hearing help in lip-reading), as well as other factors, such as emotional factors (motivation, self-confidence) and the person's visual abilities (visual discrimination and visual memory).

The restrictions of lip-reading, that is the situation which may potentially cause problems in reading, are obvious. The very speaker, i.e. the one who speaks is an important link in lip-reading. If the speaker has limited movements of the articulator (lips and jaw), quick speech, slow speech, unclear facial expressions, or specific head and body movements, lip-reading will be more difficult. Alongside this, environmental factors (inadequate distance, poor light, noise) contribute to poor concentration and reduced attention, while we can say that the very speech and its nature have a significant effect on lip-reading. The greater the number of poorly visible or invisible sounds in a language, as it the case when words look the same or similar on the lips –homophenes (such as, for example, some of the first words children learn - *ma-ma, pa-pa, ba-ba*[1]), the more difficult the task of lip-reading. Good lip-readers overcome these problems in various ways. They use the context of speech to a great extent, they rely on good visual and auditory attention, and they also use methods which facilitate communication. These methods are particularly applied by deaf persons and persons hard of hearing. One of them involves Cued Speech, through which we can lip-read every sound with eight configurations and four positions of one hand.

Many foreign authors assert that co-articulation (the effect of preceding and succeeding the words spoken) make successful lip-reading more difficult. Furthermore, the distinction of homophenes (words that sound different, but involve the identical movements of a speaker's lips) using only visual information is difficult (e.g. English homophenes *mark*,

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[1] Serbian words meaning mother, goodbye and grandmother, respectively.

park and *bark* look the same on the lips and cannot be distinguished) (Goldschen, Garcia & Petajan, 1996). Apart from this limitation, lip-reading is a challenging problem at any rate, due to variations such as accents, the speed of speech, and slurred speech, as well as poor lighting, strong shadows, and motion (Saraswati, Winarsih, Anisa, Rokhman,& Supriyanto, 2019).

THE SPECIFIC FEATURES OF LIP-READING
WITH DEAF PERSONS AND PERSONS HARD OF HEARING

Deaf persons and persons hard of hearing face limitations in communication, especially in language communication, which results in aggravated social adjustment. They primarily use sign language, but they also use lip-reading. Saraswati et al. (2019) underline that the environment, i.e. the population at large does not know sign language, and thus lip-reading arises as necessary for the communication between the deaf and persons with normal hearing. They point out that, in Indonesia, there are several educational centres for deaf persons where lip-reading is learnt and mastered. The application (UCD) involves using pictures, video recordings of lip-reading, and texts, as well as sign language, which altogether help in understanding the content. The results of the application assessment, following its use, imply benefits and the fact that they suit the goals and the user experience of persons with hearing impairment.

In order to clarify and understand the reading strategies better, a group of authors (Pinheiro, Rocha-Toffolo & Vilhena, 2020) tested two groups of deaf students. The first group comprised users of the Brazilian sign language, and the second one comprised users of the Brazilian sign language and spoken language (including lip-reading). The second group, which used alternative means of communication, showed better results in all psycholinguistic categories in lip-reading. The conclusion is that the reading process is improved by the use of the orthographic strategy. Such results imply that the improvement of language resources with the deaf is related to building a strong linguistic basis, which is enhanced by placing emphasis not only on learning speech but also on the process and mastering lip-reading. Other research has led to similar conclusions. Delayed and aggravated learning of a language, mastering lexical and syntactic systems (Chamberlain & Maiberri, 2008) and learning the morphology a language (Trussell & Easterbrooks, 2017) affect the process of learning reading, but this can be improved by learning speech, and insisting on lip-reading. Kovačević and Isaković (2019) point out that oral and vocal speech reading from the mouth and the face of the interlocutor is an ability to receive, process and confirm the visual images of words during speech behaviour or a speech act. A person who can hear perceives and controls speech by hearing. Deaf persons and persons hard of hearing are

compelled to use lip-reading. They carefully follow the movements of the lips of the person who is speaking. Thus, they create visual images of the movements of the speech organs which take part in the articulation.

Speech-reading from the mouth and the face of the interlocutor cannot be reduced only to the visual perception of the movements of speech organs, because it also includes other auditory possibilities and the mental processing of received data. The interlocutor's speech is perceived visually and speech organs are activated at the time, and new habits for speech are thus created. Non-verbal context, and the overall situation in which a person is found are important for understanding speech. Lip-reading is a complex activity, and it is the result of the harmonious connection of the operation of various cortical structures and links. It implies not only the connection of verbal symbols but also the understanding of thought and ideas.

Successful and good quality speech-reading from the mouth and the face of the interlocutor is possible if the following conditions are provided: correctly set lighting; the person who is speaking must have clear, distinct and correct pronunciation; speech must be distinct, clear, somewhat slower at the beginning, but without exaggeration, chanting and without clipping sentences; the length of the sentence should not exceed three to five words; the manner of pronunciation should be normal; the pace of speech should be natural; the position of the head should be normal; the attention of persons with hearing impairment should be focused on the one who is speaking from the very beginning; the family should be trained to assist in speech-reading; the beginning of training in speech-reading should match the communication which starts in the family in the earliest days (Isaković, Kovačević & Dimić, 2016).

Lip-reading is very difficult where unfamiliar content is concerned, when it is impossible to make a guess based on the context, and when several persons participate in the conversation. In order to make lip-reading easier for a deaf person, it is desirable to speak somewhat more slowly, making breaks after connected segments, and taking care not to stand against the light and not to be more than 1.5 metres away from the deaf person.

The development of the lip-reading ability in deaf children and children hard of hearing should be initiated as early as possible, at pre-school age. Educational content for deaf children and children hard of hearing envisions teaching them to follow the speech of the persons surrounding them so as to be able to participate in everyday communicational situations. Exercises at preschool age should be performed through play by learning certain words, sounds and sentences. In doing so, care should be taken of the order and way of learning. Reading vocals should be exercised first, followed by reading visible and then less visible consonants. Reading isolated sounds should be avoided unless they represent

a separate word or a sentence. A child should be trained to read the whole word and sentence, and to understand short commands which are required in everyday life and to give answers to posed questions. At the end of the preschool period, prior to starting school, it is necessary for a child to be able to lip-read all the words which are more frequent in everyday life, particularly short commands. Every kind of learning, including speech-reading from the mouth and the face of the interlocutor, is performed through play at preschool age. In teaching lip-reading, it is necessary that equal attention be paid to all parts of speech. They are introduced in the order in which they are learnt during regular speech and language development. It is certainly essential that each child should be afforded an individual approach, and that the capabilities and abilities of each individual are monitored. Based on that information, an adjustment of the treatment of each individual child can be made. The starting point are always objects, occurrences and events that are the closest to a child, and to which a child attaches positive emotions. The contents are subsequently, and in accordance with age, extended to objects from farther surroundings, as well as to abstract terms which always pose a greater problem for deaf children. They are harder to learn through senses and obviousness, and for that they demand greater attention (Kovačević & Isaković, 2019). The successfulness of lip-reading at preschool age is greatly influenced by the visibility (readability) of the sounds of our language, but it is also affected by the level of familiarity with the terms in spoken and sign language to a great extent. Adequately adopted and stable terms are read well even when the visibility of the sounds they are composed of is lower. The low visibility of fricatives (s-z, š-ž, h), affricates (c, ć-đ, č-dž), as well as velar sounds (k and g) in words makes the identification of terms on the lips more difficult. Adequately created words, as well as those which are frequently used and which children have had experience with do not present a problem in lip-reading despite lower visibility. Early knowledge of sign language significantly facilitates learning terms and lip-reading. Many children who responded to a pronounced term with the corresponding sign showed a higher level of understanding of what was being said than those children who did not use signs (gestures). The readability (recognition) of terms for which there is only one sign, or gesture, was also observed to be better (it is observed in the area of familiarity with the first adjectives and verbs) than of those where one sign (gesture) denotes several similar terms. In lip-reading sentences, the children perceived the length of sentences and recognised individual terms, while they gave suitable answers from the context of the pictures (Kovačević & Isaković, 2020).

Isaković, Kovačević and Dimić (2016) observed the level of successfulness of lip-reading words and sentences with deaf children and children hard of hearing of preschool age. The obtained results indicate

that the best lip-read terms are those which relate to the family. This was actually expected because the first words in the vocabulary of all children were examined, and daily contact with them facilitates identification. In lip-reading sentences, the children perceived the length of sentences and identified individual terms, while the majority of terms was recognised from the context of what was said.

The group of researchers in this study examined whether lip-reading could be improved at ages 7 through 14 and whether hearing loss affects the development of the ability to lip-read, as well as how individual differences in lip-reading are related to other abilities. The research was done on a sample of 40 children with normal hearing and 24 deaf children. Four elements, as well as measurements of perceptive, cognitive and linguistic abilities were used. For both groups, the lip-reading ability is improved with age on all four measuring instruments. Deaf children achieved better results than children with normal hearing. Age, auditory status and visual-spatial working memory were significant factors in lip-reading. Moreover, the obtained results indicate that the lip-reading ability of children is not fixed, but that it improves between the ages of 7 and 14 (Tye-Murray, 2014). Experience in lip-reading has an effect on the lip-reading ability. The finding that the deaf are better lip-readers than persons with normal hearing implies that experience has an important role in the development of this ability. The lip-reading ability of students who are deaf and hard of hearing is not fixed, but it improves with the age. The students in upper grades lip-read with more success than the students in lower grades.

Speech-reading is a skill which deaf children require so as to have access to the languages used for communication within a social community. The instrument *Test of Child Speechreading* (ToCS) is specially designed for use with deaf children and children who can hear. It is computer-based, and it measures child speech-reading on three psycho-linguistic levels: (a) words; (b) sentences; and (c) short stories. The aim of the research was to standardise the Test and to examine the effect of the condition of a child's hearing, age and linguistic complexity on the speech-reading ability. The research comprised 86 children with severe and profound pre-lingual hearing impairment, and 91 children with normal hearing ages 5 through 14. The obtained results indicate that the speech-reading skill improves with age with both groups of children. The speech-reading ability is not affected by the condition of a child's hearing (Kyle, Campbell, Mohammed, Coleman & MacSweeney, 2013).

In a case study, Andersson and Lidestam (2005) tested the hypothesis according to which the superior lip-reading skill depends on higher cognitive functions, such as verbal working memory capacity. Experienced lip-readers achieved brilliant results on all tests, even though they had not shown superior working memory and higher ability of verbal

reasoning. They were skilled in phonological processing, recognising words and phonemes, and solving semantic and phonological verbal fluency tests. The extremely high level of lip-reading was based on a highly efficient perception process (lower levels), in combination with efficient central executive functions (higher levels) due to early hearing loss. Dell'Aringa, Adachi and Dell'Aringa (2007) show that deaf persons and persons hard of hearing use lip-reading to a great extent. They examined the advantages of lip-reading with adult persons wearing hearing aids. The research was conducted on a sample of 30 examinees. All of them had a moderate bilateral sensorineural hearing impairment. The examinees achieved the best results (93.5% of correct answers) in situations when they read speech with the use of a hearing aid. The authors conclude that lip-reading is an important communicative strategy of deaf persons and persons hard of hearing, together with a suitable hearing aid.

An important characteristic of speech-reading is also its use during the use of sign language as the first and natural language of deaf persons. Regardless of whether sign language is used by a deaf person or a person who can hear, the process is always accompanied by the movements of lips, i.e. speech. Speech is always present in the use of sign language, and thus speech-reading is used as well (Isaković & Kovačević, 2015). Deaf persons consider speech-reading from the mouth and the face of the interlocutor, and oral communication to be useful skills, but sign language, as their first language, is an irreplaceable form of communication. It is a standard to strive towards, particularly in education, as understanding is much better and more successful when sign language is used. It is always accompanied by speech, because lip-reading facilitates the comprehension of a multitude of synonymous signs, and prevents misunderstandings to a great extent. What characterises the Serbian sign language is the existence of a large number of synonymous signs, which makes the comprehension of a message harder and dependent on the context of the very conversation. Its shortcomings are overcome by being complemented with the use of facial expression, speech and dactylology.

The use of speech accelerates lip-reading, and the understanding of what is being said and demonstrated.

APPROACHES TO LEARNING LIPREADING

Wickware (2014) asserts that there are four main approaches to learning the lip-reading skill: analytic, synthetic, pragmatic and holistic. The analytic approach is considered the traditional teaching method in learning the lip-reading skill. A characteristic of this approach is the fast practice of syllables with the aim of building smaller verbal units (a syllable or a viseme) into words, and then into sentences. The analytic approach focuses on the details of sounds, i.e. on learning how to identify

what they look like on the lips, and on practising their recognition in isolation and in individual words (the Mueller-Walle, Bruhn and Jena methods). The core of this theory holds that the interlocutor, who is deprived of some of the acoustic information, should interpret as much information as possible from the visible movements. The fundamental hypothesis is that speech perception is basically a process in which the first task is to analyse an incoming visual signal in its basic components, prior to assembling those components into words and sentences (bottom-up processing). However, this approach is used exclusively as support in communication, because the time required for the visual identification and interpretation of the recognisable speech movements, their arrangement into words, and their organisation into sentences is exceeded by the speed of the interlocutor's speech. This may be a frustrating experience for deaf persons and persons hard of hearing.

The synthetic approach may be characterised as an approach wherein the perception centres on unity, rather than on smaller parts (top-down processing). The methods related to this approach are the Nitchie and Kinzie methods. Common exercises for these methods include the practice of speech-reading sentences in a familiar context. The aim of the synthetic approach is to have the one who reads speech use the context and known information. The limitations of the synthetic approach involve the situations in which the interlocutor is unable to determine the context of the message or its meaning (Sweetow & Sabes, 2006).

The pragmatic approach focuses primarily on creating the ideal surroundings and context for deaf persons and persons hard of hearing in a dialogue, where communicative strategies have been established so as to ensure the maximisation of understanding the interlocutors with the remnants of hearing. The aim of this approach is to have an individual concentrate on the interaction, rather than on the reception of specific signs or sounds, on seeking the modification of the speaker's message and the context in which the dialogue takes place, and on developing specific strategies for special situations, which are found to be potentially the most difficult for communication. The limitation of this approach lies in the fact that no efforts are made to have the bimodal approach (two sensory inputs, including auditory and visual signs) incorporated in overcoming the difficulties in conversation. Another serious limitation is that there is currently no science-based evidence which would corroborate the efficiency and the effectiveness of this approach (Wickware, 2014).

The holistic approach is incorporated from the aspect of the analytic, synthetic and pragmatic approach. The main goals of the holistic approach include the evaluation and use of overall communicative abilities, psychosocial aspects of deafness, the education of parents, brothers and sisters, and the use of hearing aids, with emphasis on the improvement of conversation and interactive skills. This approach utilises the positive as-

pects of the analytic, synthetic and pragmatic approaches, and provides a programme which is adjusted to an individual, or to the needs of a group. However, a shortcoming of this approach is the lack of science-based evidence (D. Dimić & N. D. Dimić, 2003).

The group of authors applies two methods in teaching lip-reading. The sounds of each word are learnt separately (the analytic method), through the use of visual and auditory signs for each of the words to be lip-read in each sentence (the synthetic method). The sounds are learnt separately, and then lip-reading homophonic words is learnt. Homophonic words may be distinguished through visual signs. Therefore, sounds are taught in the form of words, and those who lip-read are taught how the words are produced on the lips, jaw and mouth (Ugwuanyi & Adaka, 2012).

CONCLUSION

Lip-reading is a significant skill, which is learnt and mastered. It can be acquired by anybody, by persons who can hear, and, in particular, by deaf people and people hard of hearing.

For persons who can hear, it represents an important skill, applicable in various spheres of life. Looking at the interlocutor's face and mouth, a man strives to obtain more information on the subject of the conversation. The role of the visual part in understanding speech often fails to be acknowledged. It is only in exceptional situations, which result from muffled voice or speech, or an obstacle between the interlocutors, that endeavours are made to follow the movements of speech organs alongside the speech which is being listened to so that more information is received, and the transmitted message is more easily understood. This indicates that lip-reading is a complex psychophysiological process characterised by three important elements. They comprise the visual perception of oral movements, their kinaesthetic memorisation, and the cognitive process of recognition, that is, the identification of words for their better understanding, comprehension and memorisation.

For deaf persons and persons hard of hearing, lip-reading is a path to the world that can hear and that surrounds them. It provides them with opportunities for better communication, education, independence, and coping in their everyday functioning. There are factors which facilitate the process of mastering lip-reading, but there are also those which make that process more difficult. Certain factors which slow down and aggravate lip-reading may be influenced, and may be eliminated. The use of sign language, alongside lip-reading, is the best way towards the development of functional language, the enrichment of vocabulary, and the achievement of full independence of deaf persons and persons hard of hearing.

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УЛОГА И ЗНАЧАЈ ЧИТАЊА ГОВОРА СА УСАНА

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Резиме

Читање говора са усана дуго времена интригира стручну јавност. Многи аутори указују на то да су први симболи гласовног говора упућивали слушаоца првенствено на лице и уста саговорника. И данас, када говор достиже висок степен развоја, гледањем саговорника у лице и уста настојимо да добијемо више информација о ономе што је предмет нашег разговора. Визуелни део у разумевању говора игра велику улогу, нарочито у условима велике буке и при постојању препреке између саговорника, када настојимо да слушајући говор пратимо и покрете говорних органа како бисмо примили више информација и разумели поруку. Што су тешкоће у перцепцији акустичких подражаја веће, визуелни модалитет добија веће значење.

Читање говора са усана и лица саговорника обухвата говорника (експедијента) и онога који чита говор (перципијента). Зависи од визуелне перцепције и аудитивне перцепције, те посебно од мисаоне обраде примљених података. Да би се информација разумела, фонд знања језика експедијента и перципијента морају се поклапати и један другоме прилагођавати.

Основни циљ рада је да прегледом доступне литературе укаже на улогу, значај, специфичности и бенефите и ограничења читања говора са усана.

На способност читања говора са усана утиче низ фактора. То су речник и добро познавање говорног језика, граматике и свакодневног и идиоматског изражавања. Схватање језика је најзначајније за доброг читача говора, због тога што читање говора укључује способност да се користи контекст, што може бити пресудно за уклапање у текућу конверзацију. Степен познавања појмова и читљивост гласова нашег језика су такође значајни фактори. Адекватно усвојени и стабилни појмови се добро читају и када је видљивост гласова од којих су састављени слабија. Добар читач говора узима у обзир и друге компоненте, као што су гестови, говор тела, фацијалне експресије и мотивација. Такође, тренингом, односно увежбавањем, ова вештина се може усавршавати.

Глуве и наглуве особе треба да користе и преостале слушне способности да би попуниле контекст који им недостаје. Може се рећи да доброг читача говора чине количина тренинга, схватање језика, дужина трајања слушног оштећења, степен слушног оштећења, емоционални фактори и визуелне способности.

Ограничења читања говора, односно ситуације које доводе до проблема у читању говора са усана су многобројне. Сам говорник је прва карика у читању говора. Уколико он има специфичне покрете артикулатора, брз или успорен говор, лошу мимику, и/или сувишне покрете главе и тела, читање говора са усана ће бити отежано. Затим, многи срединси фактори утичу на лошу концентрацију и слабљење пажње, док се може рећи да и сам говор и његова природа значајно утичу на читање говора са усана и лица. Што је већи број слабо видљивих или невидљивих гласова неког језика, као и у случајевима када речи на уснама изгледају исто или слично, читање је теже.

Међутим, добри читачи говора са усана ове проблеме превазилазе на различите начине. Ослањају се на контекст говора, те на добру визуелну и аудитивну пажњу, а користе се и методе које олакшавају споразумевање. У раду су приказани и различити приступи учењу читања говора с усана.

MCDM METHODS-BASED ASSESSMENT OF LEARNING MANAGEMENT SYSTEMS

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Abstract

The paper proposes a Multiple-Criteria Decision-Making (MCDM) methods-based approach to assess Learning Management Systems (LMS). The proposed approach includes the objective weighting method MEREC, used to determine the criteria weights, and CRADIS, applied in assessing alternatives and choosing the optimal one. It is revealed that the objectivity degree decreases when the qualitative type of criteria, which strongly depends on the subjective opinion of decision-makers, is used. The proposed approach gave adequate results, confirmed by conducting a sensitivity analysis based on the TOPSIS, ARAS, and MARCOS methods, and by comparing the results with similar research studies.

Key words: MCDM, MEREC, CRADIS, LMS, objective weighting method.

ОЦЕНА СИСТЕМА ЗА УПРАВЉАЊЕ УЧЕЊЕМ ЗАСНОВАНА НА МЕТОДАМА ВИШЕКРИТЕРИЈУМСКОГ ОДЛУЧИВАЊА

Апстракт

Рад предлаже приступ заснован на методама Вишекритеријумског одлучива-ња (ВКО) који је намењен оцени система за управљање учењем (енгл. *Learning Management Systems – LMS*). Предложени приступ укључује методу за објективно одређивање тежина под називом *MEREC*, која је употребљена за дефинисање зна-чаја критеријума, и методу *CRADIS*, која је искоришћена за оцену и избор опти-малне алтернативе. Утврђено је да ниво објективности опада када се користе квалитативни подаци који доста зависе од субјективног мишљења доносилаца одлука. Примењени приступ пружио је адекватне резултате који су потврђени анализом осетљивости заснованом на *TOPSIS*, *ARAS* и *MARCOS* методама, као и поређењем са сличним истраживањима.

Кључне речи: ВКО, MEREC, CRADIS, системи за управљање учењем.

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INTRODUCTION

The realisation of e-learning requires the application of a particular learning management system (LMS). This software provides a platform containing the necessary educational material, and presents the link between the students and the teachers (Haghshenas, 2019). There are many different LMSs, which can be commercial or free. Each LMS has both advantages and disadvantages, making it difficult for educational institutions to select one. Making a decision requires the observation of many different criteria, which makes the application of the Multiple-Criteria Decision-Making (MCDM) methods suitable for resolving this kind of problem. The MCDM represents a helpful approach to undertaking the decision process that leads to finding appropriate choices. Until now, the MCDM methods have been used for resolving many different problems that belong to various business fields (e. g. Sokolović et al., 2021; Štirbanović et al., 2021; Randjelović et al., 2020; Popović et al., 2018).

The main aim of this paper is to propose an objective-based and easy-to-use MCDM model that will help find the optimal LMS suitable for application in educational institutions. This model relies on the application of the objective weighting method called the MEthod based on the Removal Effects of Criteria – MEREC (Keshavarz-Ghorabaee et al., 2021), used for determining the criteria weights, and the recently proposed Compromise Ranking of Alternatives from Distance to Ideal Solution – CRADIS (Puška et al., 2022), used for the assessment of alternative LMSs. The process involved three field IT experts in the group decision environment. Six alternative LMSs were submitted for assessment against six evaluation criteria. The main research objectives that drove the whole research process are: (1) checking that the objective weighting method always gives the objective weights; (2) examining the potential of the recently proposed CRADIS method; and (3) defining the optimal LMS for application in the educational institution.

Together with an introduction, the paper comprises six sections to achieve the presented objectives. The section "Background" presents the theoretical background for explaining the research motivation, and the MEREC and CRADIS methods. The "Methodology" section explains the research process. The results obtained by using the aforementioned MCDM methods are presented in the section following that. The "Discussion" section provides observations on the obtained results and their analysis. In the end, we presented adequate conclusions, supported by the key findings.

BACKGROUND

Literature Review

The researchers focused on assessing and selecting the LMS adequate for application in a particular educational institution (Table 1).

Table 1. Assessment and selection of the LMS

	Authors	Methods
1	Ayouni et al. (2021)	Fuzzy sets, VIKOR
2	Turker et al. (2019)	Fuzzy sets, AHP, TOPSIS, and integrated model
3	Nazir and Cavus (2017)	DEMATEL and ANP
4	Radwan et al. (2016)	Neutrosophic sets, AHP
5	Işık et al. (2015)	Fuzzy sets and AHP

Source: Author's research

The MEREC (Keshavarz-Ghorabaee et al., 2021) method belongs to the objective weighting methods. Even though it is a relatively new method, it has already been used to facilitate the decision-making process in many different areas (Table 2).

Table 2. Application of the MEREC method

	Authors	Application field
1	Rani et al. (2022)	Technology selection
2	Shanmugasundar et al. (2022)	Robot selection
3	Haq et al. (2022)	Material selection
4	Ulutaş et al. (2022)	Pallet truck selection
5	Ecer & Aycin (2022)	Evaluation of the innovation performance
6	Nicolalde et al. (2022)	Material selection
7	Ecer & Zolfani (2022)	Economic freedom assessment
8	Marinković et al. (2022)	Recycling
9	Mishra et al. (2022)	Tourism strategy assessment
10	Simic et al. (2022)	Sustainable policies assessment
11	Hezam et al. (2022)	Alternative fuel vehicle assessment
12	Popović et al. (2022)	E-commerce development strategy assessment

Source: Author's research

The presented research articles show that the MEREC has gained particular popularity among researchers. It resolves problems from technology selection to e-commerce development strategy assessment. However, as Table 2 illustrates, the MEREC method has yet to be used in e-learning or LMS assessment.

The CRADIS method (Puška et al., 2022a) is another relatively new method which has gained great popularity in a short period. This method is based on the combination of the Technique for Order of Preference by Similarity to Ideal Solution – TOPSIS (Hwang & Yoon, 1981), A new additive

Ratio ASsessment – ARAS (Zavadskas & Turskis, 2010), and Measurement Alternatives and Ranking according to Compromise Solution – MARCOS (Stević et al., 2020) methods. The authors intended to retain all the good features of the constituent methods, offering an improved version capable of yielding a compromise solution. The CRADIS method has been used in several research articles presented in Table 3.

Table 3. Application of the CRADIS method

	Authors	Application field
1	Krishankumar and Ecer (2023)	IoT service provider selection
2	Wang et al. (2023)	Occupational risk assessment
3	Puška et al. (2022a)	Waste incinerator selection
4	Puška et al. (2022b)	Pear varieties market assessment
5	Puška et al. (2022c)	Green supplier selection
6	Starčević et al. (2022)	Foreign direct investment impact assessment
7	Wątróbski et al. (2022)	Extension of two developed Python packages
8	Puška et al. (2022)	Agricultural machinery assessment
9	Dordevic et al. (2022)	Production optimization
10	Stojanović et al. (2022)	Global Innovation Index analysis

Source: Author's research

As can be seen from Table 3, the possibilities of the CRADIS method have yet to be observed in the field of e-learning, making room for further elaboration.

This article represents an attempt to create such an approach, based on the MEREC and CRADIS methods, which will facilitate the decision-making process and enable the easier finding of an optimal alternative – in this case, an optimal LMS. Evidently, the methods included in this proposed approach are new, and offer enough room for examination and analysis. Besides, the topics of the LMS's assessment and selection have heretofore been relatively rarely studied, which introduces a very convenient field for the application and observation of the possibilities of the MCDM approaches.

The MEREC Method

The application of any MCDM method requires the definition of criteria weights. In the present case, the MEREC method (Keshavarz-Ghorabaee et al., 2021) is proposed for defining criteria weights. The complete computation procedure of the MEREC method could be illustrated by following a series of steps (Keshavarz-Ghorabaee et al., 2021; Ulutaş et al., 2022).

Step 1. The first step is the creation of a decision matrix that contains the values of the *n* alternatives regarding the involved *m* criteria. The created decision matrix looks like this:

$$X = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1j} & \cdots & x_{1m} \\ x_{21} & x_{22} & \cdots & x_{2j} & \cdots & x_{2m} \\ \vdots & \vdots & \ddots & \vdots & \ddots & \vdots \\ x_{i1} & x_{i2} & \cdots & x_{ij} & \cdots & x_{im} \\ \vdots & \vdots & \ddots & \vdots & \ddots & \vdots \\ x_{n1} & x_{n2} & \cdots & x_{nj} & \cdots & x_{nm} \end{bmatrix}, \tag{1}$$

where x_{ij} represents the ratings of the i-th alternative, concerning the j-th criterion ($x_{ij} > 0$).

Step 2. The second step is the normalisation of the decision matrix, which involves the calculation of the normalised ratings as follows:

$$r_{ij} = \frac{x_{ij}}{max_i x_{ij}} \ if \ j \in B, \tag{2}$$

$$r_{ij} = \frac{min_i x_{ij}}{x_{ij}} \ if \ j \in NB, \tag{3}$$

where r_{ij} remarks the normalised ratings, B is the beneficial criteria, and NB is the non-beneficial criteria.

Step 3. The third step is the calculation of the alternative overall performance S_i in the following way:

$$S_i = ln\left(1 + \left(\frac{1}{m}\sum_j |ln(r_{ij})|\right)\right). \tag{4}$$

Step 4. The fourth step is the calculation of the performance of the alternatives S'_{ij}, which involves removing criteria one at a time:

$$S'_{ij} = ln\left(1 + \left(\frac{1}{m}\sum_{k, k \neq j} |ln(r_{ij})|\right)\right). \tag{5}$$

Step 5. The fifth step is the calculation of the absolute deviation's summation E_j, which is performed in the following way:

$$E_j = \sum_i |S'_{ij} - S_i|. \tag{6}$$

Step 6. The final criteria weights w_j are calculated as follows:

$$w_j = \frac{E_j}{\sum_k E_k}. \tag{7}$$

The CRADIS Method

The CRADIS method is, as its authors have stated (Puška et al., 2022a), a relatively newly proposed approach whose computational procedure involves the following steps (Puška et al., 2022a).
Steps 1 and 2. As in the MEREC method, the procedure of the CRADIS method also requires forming the decision matrix with n alternatives and m criteria. Additionally, it requires its normalisation.
Step 3. The weighted decision matrix is achieved by using the following equation:

$$v_{ij} = r_{ij} \cdot w_j, \tag{8}$$

where v_{ij} represents the weighted normalised performance rating of the i-th alternative, regarding the j-th criterion.

Step 4. The fourth step is the definition of the ideal t_i and anti-ideal t_{ai} solution; this is performed in the following way:

$$t_i = max v_{ij}, \tag{9}$$
$$t_{ai} = min v_{ij}. \tag{10}$$

Step 5. Calculating deviations from ideal and anti-ideal solutions is done using the following equations:

$$d^+ = t_i - v_{ij}, \tag{11}$$
$$d^- = v_{ij} - t_{ai}. \tag{12}$$

Step 6. The calculation of the deviation levels of the separate alternatives from ideal and anti-ideal solutions is performed as follows:

$$s_i^+ = \sum_{j=1}^{n} d^+, \tag{13}$$
$$s_i^- = \sum_{j=1}^{n} d^-. \tag{14}$$

Step 7. The utility function relative to the deviation from the optimal alternatives should be calculated for each alternative in the following way:

$$K_i^+ = \frac{s_0^+}{s_i^+}, \tag{14}$$
$$K_i^- = \frac{s_i^-}{s_0^-}, \tag{15}$$

where s_0^+ remarks the optimal alternative that is the least distant from the ideal solution, while s_0^- denotes the optimal alternative that is the most distant from the anti-ideal solution.

Step 8. The eighth step is the determination of the final ranking order of the alternatives by using the following equation:

$$Q_i = \frac{K_i^+ + K_i^-}{2}. \tag{16}$$

METHODOLOGY

An adequate plan for the research activities is necessary to achieve the set scientific objectives. In the present case, the research process was performed through five stages to achieve the objectives presented at the beginning of the article (Figure 1).

After defining the research goal, the alternative LMSs to be assessed were determined, as well as the appropriate set of criteria against which the assessment would be performed. Then, the process required the selection of the decision-makers that will be involved in the evaluation. Three experienced IT experts from educational institutions in the field of e-learning were involved in the initial assessment of the alternative LMSs, relative to the given criteria. In that way, the input data necessary for applying the proposed MCDM model was assured.
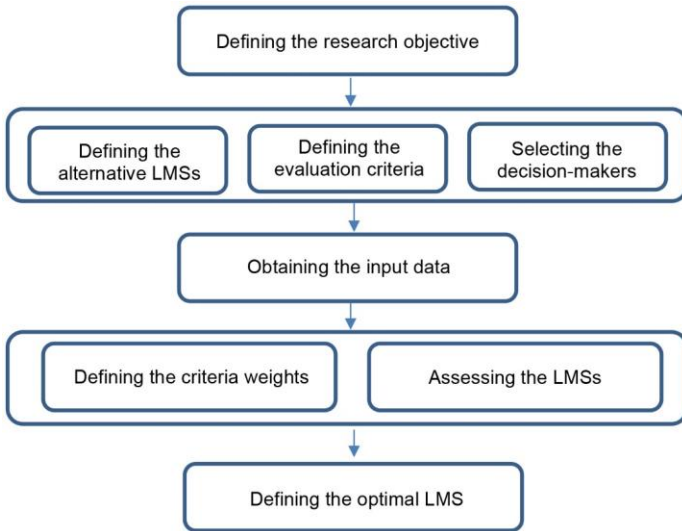
Figure 1. Research process
Source: Author's research

The next step involves defining the criteria weights. This step was achieved using the objective MEREC method, which provided a base for the final assessment of the involved LMSs, achieved using the CRADIS method. Finally, the proposed model revealed the optimal LMS as an option representing a compromise solution regarding the considered criteria.

RESULTS

To begin with, the alternative LMSs to be assessed should be selected. There are many LMSs suitable for implementing e-learning at educational institutions, but in this case, the most popular were chosen and submitted for further evaluation (Table 4).

Table 4. Alternative LMSs

	Alternative	
	Abbreviation	Full name
1	*MO*	Moodle
2	*TA*	Talent LMS
3	*GC*	Google Classroom
4	*BB*	Blackboard
5	*LO*	Looop
6	*DO*	Docebo

Source: Author's research

After a methodical examination of the available literature, a set of six criteria was selected based on the articles of Su et al. (2022), Muhammad and Cavus (2017), Zare et al. (2016), and Radwan et al. (2016). The evaluation criteria were chosen by applying the domination method. The list of the selected criteria is presented in Table 5.

Table 5. Evaluation criteria

	Criteria		Criteria type	Explanation
	Abbreviation	Full name		
1	CS	Computer skills	min	Ability to work in an online environment
2	SL	Self-regulated learning ability	max	The ability to self-motivation, set, and gain the learning objectives
3	CO	Comprehension	max	Understanding of the received information
4	CR	Creativity	max	Bringing new ideas, concepts, and methods
5	FL	Flexibility	max	Building an adaptive learning environment
6	SU	Support	max	Available assistance when it is needed

Source: Author's research

Three decision-makers, proven IT experts from the e-learning field, were asked to estimate the alternative LMSs under consideration against the involved criteria using a grade scale ranging from one to five. The decision-makers were selected based on their experience working with different LMS types. This way, the data needed for applying the introduced MCDM model was obtained and presented in Tables 6 through 8.

Table 6. Initial decision matrix – first decision-maker

	CS	SL	CO	CR	FL	SU
MO	3	4	5	5	4	5
TA	3	3	3	3	3	3
GC	2	2	3	1	1	3
BB	4	4	3	2	3	4
LO	2	3	4	3	4	3
DO	2	4	5	3	4	4

Source: Author's research

Table 7. Initial decision matrix – second decision-maker

	CS	SL	CO	CR	FL	SU
MO	4	3	3	4	3	2
TA	3	4	2	2	2	4
GC	4	5	2	2	2	4
BB	3	2	3	3	1	2
LO	4	2	4	2	3	3
DO	5	3	2	4	2	3

Source: Author's research

Table 8. Initial decision matrix – third decision-maker

	CS	SL	CO	CR	FL	SU
MO	4	3	3	4	3	2
TA	3	4	2	2	2	4
GC	4	5	2	2	2	4
BB	3	2	3	3	1	2
LO	4	2	4	2	3	3
DO	5	3	2	4	2	3

Source: Author's research

Figure 2 presents the defined criteria weights based on the standpoints of each decision-maker separately, using the MEREC method.
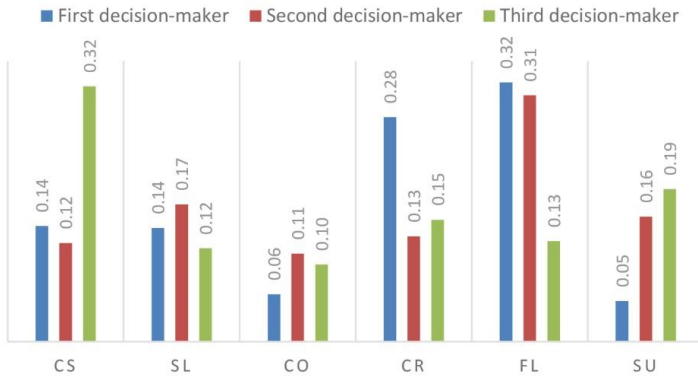

Figure 2. The criteria weights
Source: Author's research

As Figure 2 depicts, the decision-makers accorded different significance to the criteria.

The optimal LMS was defined separately for each decision-maker involved in the procedure, using the CRADIS method. Table 9 presents the results for the first decision-maker.

Table 9. Assessment results – first decision-maker

Alternatives	Q_i	Rank
MO	0.98	1
TA	0.71	4
GC	0.48	6
BB	0.67	5
LO	0.84	3
DO	0.90	2

Source: Author's research

According to the first decision-maker, the assessment results highlight the optimal alternative LMS *MO – Moodle* (0.98).

Table 10 shows the ranking results based on the input data received from the second decision-maker.

Table 10. Assessment results – second decision-maker

Alternatives	Q_i	Rank
MO	0.87	1
TA	0.71	4
GC	0.72	3
BB	0.51	6
LO	0.73	2
DO	0.65	5

Source: Author's research

Again, the first place belongs to the alternative *MO – Moodle* (0.87). Table 11 presents the ranking results from the third input data set.

Table 11. Assessment results – third decision-maker

Alternatives	Q_i	Rank
MO	0.87	1
TA	0.68	5
GC	0.79	3
BB	0.58	6
LO	0.77	4
DO	0.85	2

Source: Author's research

Table 11 illustrates the assessment results obtained by the input data of the third decision-maker. As can be seen, the alternative *MO – Moodle*, is again in first place (0.87).

The previous weights, as well as the ranking results, were obtained based on the input data gained from each decision-maker separately. By observing the results, it can be concluded that the alternative *MO – Moodle* is optimal for use in the educational institution. However, to check this conclusion, the geometric mean of the data obtained from the decision-makers was calculated by using the following equation:

$$x_{ij} = \left(\prod_{j=1}^{k} x_{ij}^{k}\right)^{\frac{1}{K}}, \tag{17}$$

where x_{ij}^{k} represents the performance rating of the *i*-th alternative relative to the *j*-th criterion, obtained from the *k*-th respondent ($k = 1, 2, \ldots, K$), and K denotes the number of decision-makers.

After that, the MEREC and CRADIS methods were applied. The obtained results are presented in Table 12, while their comparison is presented in Figure 3.

Table 12. Results obtained by using the geometric mean of the data received from all three decision-makers

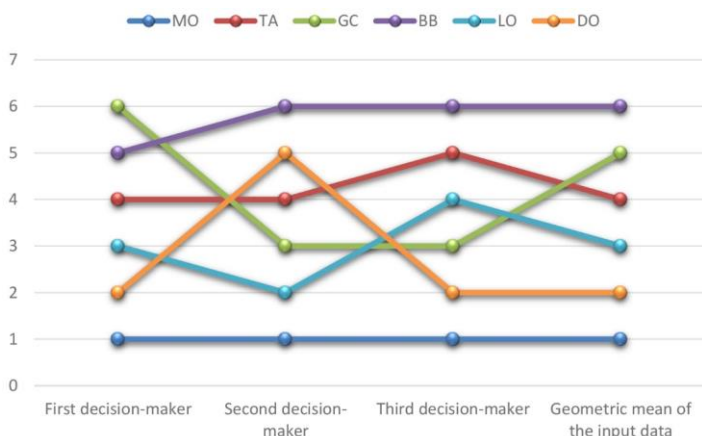| Criteria	w_j	Alternatives	Q_i	Rank
CS	0.10	MO	0.96	1
SL	0.17	TA	0.65	4
CO	0.14	GC	0.58	5
CR	0.23	BB	0.54	6
FL	0.26	LO	0.77	3
SU	0.10	DO	0.82	2

Source: Author's research

Figure 3. Comparison of the obtained ranking results
Source: Author's research

Figure 3 illustrates that the ranking results match entirely where the first positioned alternative is concerned (*Moodle*). There are some modest variations of the ranking positions of the other alternatives. However, they do not affect the conclusion that alternative *MO – Moodle* is the most acceptable in the present conditions.

DISCUSSION

Performing e-learning requires adequate LMSs that are logical, flexible, and convenient for the end users, i.e., students. Various LMS with different features exist on the market, and selecting one that will meet the

user's needs is essential. In this paper, the MCDM assessment of the LMSs based on the MEREC and CRADIS methods was conducted.

The MEREC method was applied to define the criteria weights to reduce the subjectivity of the decision process. However, in this particular case, qualitative criteria were used to evaluate the alternatives, so the input data was obtained from three decision-makers. This fact raises the question of whether the objective weighting method can express its full potential if the data needed for further analysis is gathered from decision-makers, i.e., respondents. Involving more decision-makers in gathering the initial data would reduce subjectivity, but they are inevitably biased to a certain extent. In this situation, the objective type of the MCDM methods could be designated as 'semi-objective'.

The result regarding the criteria weights showed the fluctuations aroused by the input data obtained from the decision-makers. According to the first and second decision-makers, the criterion *FL – Flexibility* is of the highest importance, while the third decision-maker saw *CS – Computer skills* as the most important. When the geometric mean of the obtained weights was determined, it showed that the most crucial criterion is *FL – Flexibility* (0.26). It is entirely acceptable that flexibility is the most significant because the ability to adapt to user requirements and changes in the working environment is vital in current business conditions. The results of the other authors who observed the topic of LMS selection gave priority to the other evaluation criteria. For example, Su et al. (2022) considered the self-regulated learning ability the essential criterion. The existing difference in the criteria weights is caused by the following: (1) different sets of criteria were used, and (2) the decision-makers' opinions varied. Although different approaches to defining the criteria weights were applied, the prevailing opinion is that there are other reasons for the existing differences. Namely, the main objective of the methods is to give optimal solutions, so the standpoint is that all of them should give approximately unique results if they are correctly created and similar input data is used.

For the assessment of the alternative LMSs, the new CRADIS method was used. To check the obtained results, the TOPSIS (Hwang & Yoon, 1981), the ARAS (Zavadskas & Turskis, 2010), and the MARCOS (Stević et al., 2020) methods were used. The rest of the places varied, but the first place belonged to *MO – Moodle* in all observations (Figure 4).

As the input data shows, *Moodle* did not have the best performance ratings regarding all criteria. However, despite that, *Moodle* fulfills all the requirements to a satisfying degree, and represents a compromise solution. The authors of the articles that considered the same topic obtained similar results, emphasising *Moodle* as the most convenient LMS (Ayouni et al., 2021; Turker et al., 2019; Radwan et al., 2016). This statement confirms that *Moodle* is most frequently used in many educational institutions for conducting e-learning courses.
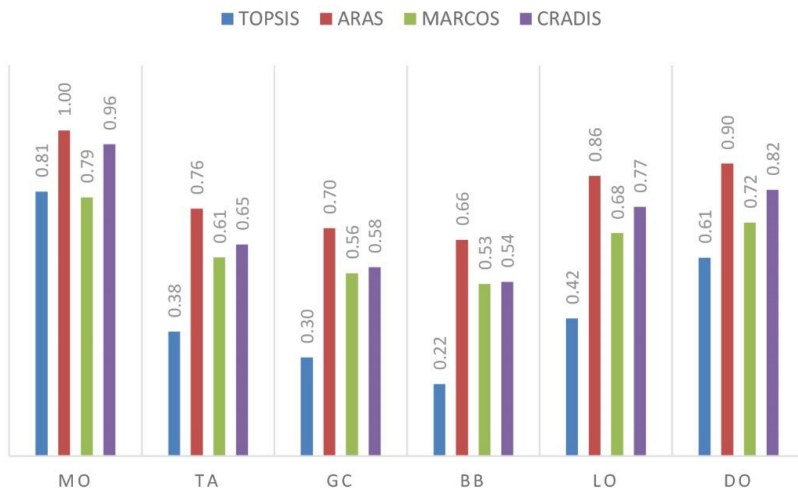
Figure 4. Comparison of the results obtained by chosen MCDM methods
Source: Author's research

This study sheds light on the potential and usefulness of the recently introduced MEREC and CRADIS methods. It gives an overview of their former usage, and confirms their applicability in the field of information technologies. Also, the study justifies the need for the application of mathematically based methods in scientific research. As far as practice is concerned, applying the MCDM approach in the case of LMS selection enables educational institutions to make more informed and reliable decisions regarding the available options. Additionally, applying the proposed approach could provide valuable and helpful support for resolving other problems related to making business decisions.

CONCLUSION

The main objective of this article was to propose the MCDM model for the assessment and determination of the optimal LMS convenient for application in educational institutions for the purpose of implementing e-learning. To that end, six alternative LMSs were assessed against six evaluation criteria with the help of the MEREC and CRADIS methods. Theory and practice confirm the results' reliability regarding the selection of *Moodle* as the optimal LMS.

The main conclusions are as follows. Firstly, the objectivity of the objective weighting methods depends on the input data. When the input data is exact and quantitatively expressed, a higher degree of objectivity is reached. When input data is qualitative and depends on the opinions of decision-makers, the final results are 'semi-objective'. The degree of subjec-

tivity could be decreased by involving more decision-makers. Secondly, the CRADIS method successfully incorporates the good aspects of the TOPSIS, ARAS, and MARCOS methods, and enables the determination of the compromise solution quickly and efficiently. Besides, it is understandable and easy to use, making it very convenient for resolving various problems. Thirdly, the optimal LMS for application is defined by using the proposed MCDM approach. The results pointed towards *Moodle* as the optimal solution in relation to the given conditions. This choice is verified by applying the other known MCDM methods, and comparing them with the studies performed by the other authors.

Besides the obtained scientific results, this article has some limitations, too. These limitations are the following. Only six criteria were involved in the decision-making process. As can be seen in other articles (e.g., Muhammad & Cavus, 2017; Zare et al., 2016; Radwan et al., 2016), introducing a more significant number of criteria and sub-criteria in the evaluation would increase the relevance of the process. Additionally, the model is based on crisp numbers, which do not adequately express the environment's vagueness. As the papers by Krishankumar and Ecer (2023), and Puška et al. (2022b, 2022c) show, it would be adequate to use a fuzzy, grey, or neutrosophic extended model. Furthermore, the criteria weights were defined by using only one method. They would be more relevant if the objective-subjective approach were applied. Finally, the results would be more representative if more than only three decision-makers were involved.

Despite the mentioned limitations, the proposed MCDM model based on the MEREC and CRADIS methods proved its applicability in assessing LMSs. Besides, it could also be used for assessing and determining the optimal solutions for other business problems. All these limitations automatically represent propositions for future research.

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ОЦЕНА СИСТЕМА ЗА УПРАВЉАЊЕ УЧЕЊЕМ ЗАСНОВАНА НА МЕТОДАМА ВИШЕКРИТЕРИЈУМСКОГ ОДЛУЧИВАЊА

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Резиме

У циљу извођења учења на даљину неопходна је примена одговарајућег система за управљање учењем (Learning Management System – LMS) – платформе која садржи неопходан наставни материјал те представља спону између предавача и студената. У понуди је више различитих бесплатних и комерцијалних LMS система намењених управљању активностима учења на даљину и контроли оствареног напретка. С обзиром на чињеницу да сваки од њих има своје особености, веома је сложен задатак изабрати један који ће у највећој мери задовољити постављене критеријуме. У овом раду предложена је примена једноставног објек-

тивног модела заснованог на методама вишекритеријумског одлучивања који може помоћи у проналажењу оптималног LMS система погодног за примену у образовним институцијама. Предложени модел заснива се на објективној методи за дефинисање тежина критеријума под називом MEREC (MEthod based on the Removal Effects of Criteria) (Keshavarz-Ghorabaee et al., 2021) и недавно предложеној CRADIS методи (Compromise Ranking of Alternatives from Distance to Ideal Solution) (Puška et al., 2022), која је искоришћена за коначну оцену алтернативних LMS система. Шест алтернативних LMS система подвргнуто је евалуацији у односу на шест критеријума, а у сам процес била су укључена три стручњака из области информационих технологија који се непосредно баве учењем на даљину. Основни циљеви спроведеног истраживања били су: утврђивање степена објективности метода за дефинисање тежина које су означене као „објективне", опсервирање потенцијала CRADIS методе и дефинисање LMS система оптималног за коришћење у образовним институцијама. Спроведено истраживање је довело до следећих закључака: (1) степен објективности метода за дефинисање тежина условљен је нивоом поузданости коришћених података; (2) нова CRADIS метода обједила је добре аспекте TOPSIS, ARAS и MARCOS метода и омогућила је дефинисање компромисног решења у складу са постављеним условима; и (3) примена предложеног вишекритеријумског приступа означила је Moodle као оптималан LMS за коришћење у образовним институцијама.

THE INFLUENCE OF THE MOTIVATIONAL FACTOR OF CULTURAL INTELLIGENCE ON THE ACCEPTANCE OF FOREIGN BRANDS IN THE REPUBLIC OF SERBIA

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Abstract

Cultural intelligence represents a set of competencies and skills that enable a person to adapt in situations that are multicultural in nature. It consists of four basic factors, namely the metacognitive, cognitive, motivational and behavioural factors. The main goal of this paper is to examine the influence of the motivational factor of cultural intelligence on the decision of consumers from the Republic of Serbia to accept foreign brands. Empirical research was carried out using the survey method, the total number of respondents in the sample is 122, their answers were analysed using statistical software SPSS, and the statistical analyses used were reliability analysis, correlation analysis, simple regression analysis, the ANOVA test, and the T-test for two independent samples. The results of the research show that the motivational factor of cultural intelligence achieves a positive influence on the decision of consumers to accept foreign brands, that the degree of cultural intelligence is equally pronounced among people belonging to Generations X, Y and Z, as well as that the degree of cultural intelligence is more pronounced among people with a university level education compared to people with a high school education. The existing research gap in scientific literature is filled by the results of this research, while the managerial implications of the study are reflected in the provision of information to marketers about the importance of the cultural intelligence of consumers. In other words, it is emphasised that this group of consumers has cosmopolitan views, that they are part of a global consumer culture, that they are innovative, and that they buy foreign brands, which should be taken into account when formulating a marketing strategy.

Key words: consumer behaviour, intercultural marketing, cultural intelligence, motivational factor, foreign brands.

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УТИЦАЈ МОТИВАЦИОНОГ ФАКТОРА КУЛТУРАЛНЕ ИНТЕЛИГЕНЦИЈЕ НА ПРИХВАТАЊЕ СТРАНИХ БРЕНДОВА У РЕПУБЛИЦИ СРБИЈИ

Апстракт

Културална интелигенција представља скуп компетенција и вештина које особи омогућавају да се прилагоди у ситуацијама које су мултикултуралне природе и састоји се од четири базична фактора, а то су метакогнитивни, когнитивни, мотивациони и бихевиорални фактор. Основни циљ овог рада је да испита утицај мотивационог фактора културалне интелигенције на одлуку потрошача из Републике Србије да прихвате стране брендове. Спроведено је емпиријско истраживање методом анкете, укупан број испитаника у узорку је 122, њихови одговори су анализирани путем статистичког софтвера СПСС, а од статистичких анализа примењене су анализа поузданости, корелациона анализа, проста регресиона анализа, Анова тест и Т тест за два независна узорка. Резултати истраживања су показали да мотивациони фактор културалне интелигенције остварује позитиван утицај на одлуку потрошача да прихвате стране брендове, да је степен културалне интелигенције подједнако изражен код особа које припадају генерацијама *X*, *Y* и *Z*, као и да је степен културалне интелигенције израженији код особа са факултетским образовањем у односу на особе са средњошколским образовањем. На основу резултата истраживања се попуњава истраживачки геп који постоји у научној литератури, док се менаџерске импликације студије огледају у обезбеђивању информација маркетарима о значају културалне интелигенције потрошача. Другим речима, истиче се да ова група потрошача има космополитска схватања, да је део глобалне потрошачке културе, те да су потрошачи иновативни и да купују стране брендове, што треба имати у виду приликом формулисања маркетинг стратегије.

Кључне речи: понашање потрошача, интеркултурални маркетинг, културална интелигенција, мотивациони фактор, страни брендови.

INTRODUCTION

The contemporary era implies the ability to work and function in different intercultural environments. A high degree of development of cultural intelligence enables an individual to adapt in situations that are multicultural in nature (Pratono & Arli, 2020). Culture affects all aspects of an individual's behaviour. People growing up in different countries, with their respective cultural norms, develop different ways of behaving and thinking. Values, beliefs and rules of behaviour differ from one part of the world to another, which can be problematic in situations in which members of different cultures communicate and exchange knowledge (Beerli-Palacio & Martin Santana, 2018). The concept of cultural intelligence, with its characteristics, realises *multicultural implications* in various business, academic, social, tourism and marketing aspects (Berraies, 2020). The focus in the literature review will be on the *field of marketing* – that is, the main goal of the work is to determine whether *motivational cultural intelligence* has an impact on the consumers' intention to buy *foreign brands*.

The global economy imposes the need for marketers to come from different cultural backgrounds, and to have a positive impact on the company's financial performance with their complementary knowledge and multicultural skills, which are seen as intellectual capital (Kromidha et al., 2022). Employees within multinational companies come from different cultural backgrounds, and their different proposals and ideas, as well as a high degree of cultural intelligence, imply an improvement in work performance, the company's better positioning in the market and, ultimately, a higher profit rate (Koksal et al., 2023). Niu et al. (2022) state that companies with a larger number of employees from different cultural areas achieve better business performance, that business tasks are performed very efficiently, that employees show a higher degree of responsibility, reliability and empathy towards customers, and that the aforementioned has a positive effect on the image of the company on the market. Vlajčić et al. (2019) state that, due to the process of globalisation, a large number of companies internationalise their operations, and that branches operate on the principles defined by the parent company. However, each foreign market is characterised by different cultural characteristics, and it is necessary for there to be feedback from branches to the parent company, which can then improve its business based on that information. In this way, the company's marketers gain international experience, develop their degree of cultural intelligence, and improve the company's operations by transferring knowledge. Cultural intelligence realises its implications within the academic aspect, because many students use the opportunity to complete their studies abroad during exchange programmes, and get to know other cultures, and achieve interaction and cooperation with people from different cultural areas (Phau, et al., 2014). Krstić and Masliković (2019) point out that cultural institutions, such as museums, theatres, cultural centres, galleries, and libraries, have a significant impact on people's cultural intelligence. Investing in cultural institutions is very important, because citizens should first get to know their cultural heritage, and then travel to other countries, learn foreign languages, and get to know other cultures, thus developing their cultural intelligence.

Cultural intelligence has significant implications in the field of tourism, because people with a high level of cultural intelligence often travel abroad, get to know the cultural heritage of other countries, and visit their most important museums and cultural monuments (Hu et al., 2021). *From the perspective of marketing*, consumers who have a developed cultural intelligence, global consumer culture, and cosmopolitan understandings and thoughts follow technological innovations and have a desire to buy new products when they appear on the market, including foreign brands, and those brands that have recognition and availability on the global market (Frias-Jamilena et al., 2018).

After the introductory part, the concept of cultural intelligence, and the basic factors of cultural intelligence, metacognitive, cognitive, behavioural and motivational factors are listed and defined within the literature review. Within that same part of the paper, the research hypotheses are formulated, and a research model is presented as well. Then, the research methodology and the structure of the sample are presented. Within the framework of the empirical research, the focus is placed on examining the influence of the motivational factor of cultural intelligence on the acceptance of foreign brands in the Republic of Serbia. In other words, by applying appropriate statistical analysis, this study aims to determine whether the motivational factor of cultural intelligence achieves a positive influence on consumers' decision to buy foreign brands, whether there are differences in the level of expression of motivational cultural intelligence among people belonging to Generations X, Y and Z, as well as whether motivational cultural intelligence is more pronounced among people who have a higher level of education (university) compared to people who have a lower level of education (high school).

LITERATURE REVIEW

Cultural intelligence is defined as a set of competencies, abilities and skills that help an individual adapt to a situation that is multicultural in nature, as it includes interactions and communication between people from different cultural areas (Lam et al., 2022). According to Earley and Ang (2003), the concept of cultural intelligence consists of four basic factors: metacognitive, cognitive, behavioural, and motivational. Metacognitive processes imply a certain level of cultural knowledge that a person possesses, as well as their desire to continuously improve his cultural knowledge (Tuan, 2016). Cognitive cultural intelligence reflects one's knowledge about the norms and practices of other cultures, as well as one's knowledge of the economic, legal and other social systems of other countries (Lorenz, et al., 2018). The behavioural factor of cultural intelligence includes a set of verbal (accent) and non-verbal abilities (body language) that help a person adapt during interactions with people from different cultural areas (Rahman et al., 2021). Motivational cultural intelligence implies a person's desire and enthusiasm to visit foreign tourist destinations, learn foreign languages, and communicate with people from other countries and, thus, develop their cosmopolitan understanding (Yang, 2023).

Within the research portion of this paper, our focus is on examining the influence of the motivational factor of cultural intelligence on the decision of consumers to accept foreign brands. Earlier papers have analysed the implications of motivational cultural intelligence in various aspects. Chen et al. (2012) state that motivational cultural intelligence is a very important factor within multinational companies, as it contributes to improv-

ing business cooperation with stakeholders, and to increasing sales and profits. In the aforementioned study, it is emphasised that it is very important that employees of multinational companies in the field of real estate have a high degree of motivational cultural intelligence, as well as that the management of the company organises training and courses which emphasise teamwork among employees who come from different cultural backgrounds, and who improve cultural intelligence at the level of the entire multinational company with their intercultural knowledge and skills. Ricicot and Ferry (2016) point out that students who have a high degree of motivational cultural intelligence want to get to know other cultures, learn foreign languages, and make friends with people from other cultures, and that the aforementioned is a valuable asset for students, because it enables them to acquire international competences and abilities that enable them to have a successful international business career. Coves-Martinez et al. (2022) point out that people with developed motivational cultural intelligence have a desire to visit exotic foreign tourist destinations, and to get to know the cultural heritage of other countries. Zdravković and Peković (2021a) determined that the behavioural factor of cultural intelligence achieves a positive influence on the decision of consumers to buy foreign and global brands, as well as products that represent technological innovations. On the other hand, in the aforementioned study, the influence of the metacognitive factor of cultural intelligence on the acceptance of foreign brands was not statistically significant. Frias-Jamilena et al. (2018) point out that people with a high degree of motivational cultural intelligence have preferences for brands that are globally recognisable, and state that motivational cultural intelligence has a positive impact on the perceived value of the offer of foreign tourist destinations, which is measured through functional value (quality of service, accommodation, transportation), affective values (social component, interaction with other tourists from the group), and hedonic values (getting out of the 'comfort' zone, experiencing authentic experiences).

On the basis of previous works, the formulated subject and the main goal of the research, as well as the attempt to improve theoretical and practical knowledge about the aspects that motivational cultural intelligence affects, the first research hypothesis is formulated as follows: *H1 – the motivational factor of cultural intelligence has a positive statistically significant influence on the acceptance of foreign brands by consumers on the market of the Republic of Serbia.*

Tešin et al. (2020) state that older people have a greater desire than young people to get to know foreign cultures, and to visit the most famous museums, historical buildings and cultural monuments of other countries. Ricicot and Ferry (2016) state that young people such as high school students and college students have a greater desire to travel abroad compared to older people. Šagovnović and Kovačić (2020) point out that travelling

abroad and developing cultural intelligence by visiting the opera, the ballet, and museums requires significant financial resources, so that older people have better financial opportunities and payment capabilities than young people who have yet to build their business career. Frias-Jamilena et al. (2018) point out that young people have much more energy, strength and mobility compared to older people, so they have a more pronounced cultural intelligence and desire to travel abroad.

In their study, Zdravković and Peković (2021b) analysed whether *cultural intelligence as a push factor* that implies people's desire to travel abroad, to meet people from other cultures, and learn foreign languages, and *cultural heritage as a pull factor* that implies visiting museums, architectural buildings, and cultural monuments of other states impact the intention of tourists to visit foreign destinations. The research results showed that there is a statistically significant positive correlation between the mentioned variables. In addition to the above mentioned, the respondents in the study were classified according to their belonging to Generation X (people born in the period between 1960 and 1980), Generation Y (people born in the period between 1981 and 1995), and Generation Z (people born after 1995). The results showed that the impact of cultural intelligence and cultural heritage on the intention of tourists to visit foreign destinations is more pronounced among members of Generation Z compared to members of Generation X.

 In this research, the emphasis is placed on the motivational factor of cultural intelligence, which primarily refers to the desire of young people to learn about other cultures and their history, and the intentions of students to complete their studies abroad, as well as the desire of older people who have a lot of free time and financial resources, which enables them to travel abroad and develop their cultural intelligence. Based on the aforementioned, the second research hypothesis is formulated as follows: *H2 – there is a difference in the degree of expression of motivational cultural intelligence between people belonging to Generations X, Y and Z.*

In their study, Pandey and Charoensukmongkol (2019) point out that people with a university education want to develop their cultural intelligence and often travel abroad for tourism, and build a successful international career on the business front, while people with a lower level of education generally base their employment in their home country, and they mostly visit domestic tourist destinations during vacation. Rambocas and Mahabir (2021) point out that people with a higher degree of education buy brands that are recognisable on the world market for their characteristics and quality, as well as luxury brands that provide them with a certain status and prestige in society. On the other hand, people with a lower level of education generally have pronounced ethnocentric tendencies, and decide to buy domestic products and services in order to support the stable functioning of the domestic economy. In this study, the emphasis is on motiva-

tional cultural intelligence, and people with a higher level of education generally have global thinking, greater versatility, as well as broader views and interests compared to people with a lower level of education. Therefore, based on the above mentioned, the third research hypothesis is formulated as follows: *H3 – the motivational factor of cultural intelligence is more pronounced in people who have a higher level of education (university) compared to people who have a lower level of education (high school).*

Based on the formulated research hypotheses, the research model of the study was constructed (Figure 1).
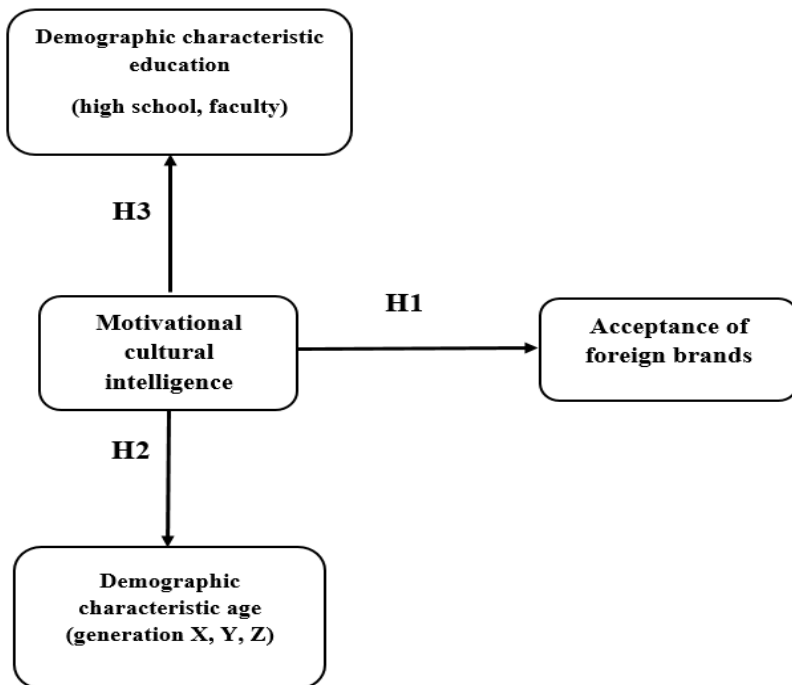

Figure 1. Research model
Source: Authors

In the following section of the paper, we present the research methodology and the demographic structure of the respondents from the sample.

RESEARCH METHODOLOGY

The self-assessment method is most often used to measure the cultural intelligence of individuals, and it includes 20 statements (5 statements for each of the four factors of cultural intelligence) that the person evaluates. It is on the basis of these answers that the development of cultural

intelligence is measured (Ang et al., 2007). Another method that is used is the observer's report, and the essential difference is that a person does not personally evaluate the findings with this method; on the contrary, experts are hired for this purpose. After talking with the person, the experts evaluate the findings and, based on that, draw conclusions about the level of cultural intelligence of that person (Van Dyne et al., 2008). The third method used to measure cultural intelligence is the cultural situation assessment test. This test presents respondents with certain images of cultural situations related to work, and asks them how they would react in a certain situation (Ang et al., 2014). The fourth method implies a complementary combination of the aforementioned methods, but it should be noted that such a method requires the investment of significant funds and a lot of time (Leung et al., 2014).

Empirical research was conducted using the survey method on the territory of the Republic of Serbia (Kragujevac, Belgrade and Novi Sad) at the beginning of 2023. It was conducted on a simple random sample, and the questionnaire was distributed to respondents in person, as well as online. The total number of respondents in the sample is 122. The respondents were segmented according to the demographic characteristics of gender, age, level of education and status (Table 1). There are 68 women and 54 men in the sample. When it comes to the demographic characteristic of age, the respondents were segmented according to the classification of authors Yang and Lau (2015), according to which Generation X includes people born in the period between 1960 and 1980, Generation Y includes people born in the period between 1981 and 1995, and Generation Z includes people born after 1995. The respondents in the sample are equally represented across the aforementioned generations. The largest number of respondents in the sample have completed high school (63 respondents, or 51.6% of the sample), followed by those with a university education (48 respondents, or 39.3% of the sample). When it comes to the demographic characteristic of status, the sample mostly consists of employed persons (50 respondents, or 41% of the sample), as opposed to retired persons (15 respondents, or 12.2% of the sample).

The independent variable in the research model – motivational cultural intelligence, and the dependent variable – acceptance of foreign brands were measured with five statements, each of which was taken from the relevant literature in the field of marketing and management. This is an established approach within the field of marketing, as research in the field is often carried out using the survey method. The respondents evaluated the statements from the questionnaire using a Likert-type scale with grades ranging from 1 to 7 (1- I absolutely do not agree with the stated statement; 7- I absolutely agree with the stated statement). An overview of the statements used in the questionnaire is given in Table 2. The respondents' answers were processed using the statistical software SPSS. Of the statistical

analyses, reliability analysis, correlation analysis, simple regression analysis, the ANOVA test (segmentation criterion demographic characteristic age) and the T-test for two independent samples (segmentation criterion demographic characteristic education) were applied. The research hypotheses were considered in the context of the obtained results.

Table 1. Demographic structure of respondents from the sample

		Number	% respondents
Gender	Female	68	55.7%
	Male	54	44.3%
	Total	122	100.0%
Age	Generation X	39	32.0%
	Generation Y	40	32.8%
	Generation Z	43	35.2%
	Total	122	100.0%
Education	Primary school	11	9.1%
	High school	63	51.6%
	University degree	48	39.3%
	Total	122	100.0%
Status	Unemployed	23	18.9%
	Employed	50	41.0%
	Student	34	27.9%
	Retiree	15	12.2%
	Total	122	100.0%

Source: Authors

Table 2. Overview of statements used in the questionnaire

Research variables	Statements	Source
Motivational cultural intelligence	1. I enjoy interacting with people from different cultures. 2. I have confidence in situations that are multicultural in nature. 3. I can adapt to shopping conditions in other cultures. 4. I have enthusiasm to know the history and cultural heritage of other countries. 5. I want to learn foreign languages.	Ang et al. (2007) Frias-Jamilena et al. (2018) Coves-Martinez et al. (2022)
Acceptance of foreign brands	1. I often buy foreign brands. 2. Foreign brands have excellent technical characteristics. 3. Foreign brands have a high level of quality. 4. I am willing to recommend the foreign brands which I use to my friends and family members. 5. I will continue to buy foreign brands in the future.	Son et al. (2013) Rambocas & Mahabir (2021) Zdravković & Peković (2021a).

Source: Authors based on a review of previous research

In the following section of the paper, we present the results of the empirical research, on the basis of which the decision on whether or not to confirm the research hypotheses is made.

RESEARCH RESULTS

The first statistical analysis that was applied within the research is the reliability analysis, based on which it can be determined whether the statements by which the research variables, motivational cultural intelligence and acceptance of foreign brands, are measured are internally consistent with each other (Table 3).

Table 3. Reliability analysis

Research variables	Cronbach's Alpha coefficient
Motivational cultural intelligence	0.79
Acceptance of foreign brands	0.72

Source: Authors

It can be concluded that the value of *Cronbach's Alpha coefficient* is higher than the necessary statistical threshold of 0.70 in both cases. Therefore, the variables are measured through adequate findings, and the conceived research model is relevant (Nunnally, 1978).

Correlation analysis was applied in this research in order to determine the nature of the relationship between the observed research variables, as well as their degree of mutual concurrence. The results of the aforementioned statistical analysis are shown in Table 4.

Table 4. Correlation matrix

	Motivational cultural intelligence	Acceptance of foreign brands
Motivational cultural intelligence	1	0.506[**]
Acceptance of foreign brands	0.506[**]	1

Source: Authors

Note: **- coefficients are statistically significant at the level 0.01

Correlation analysis is viewed through the *Pearson coefficient* of linear correlation, the value of which is 0.506, which means that there is a positive statistically significant linear correlation between the research variables – motivational cultural intelligence and acceptance of foreign brands.

In this research, a simple regression analysis was applied in order to examine the influence of motivational cultural intelligence on the acceptance of foreign brands, and the results of the aforementioned analysis are presented in Table 5.

Table 5. Simple regression analysis
(dependent variable: acceptance of foreign brands)

Independent variable	Unstandardised beta coefficient	Standardised beta coefficient	T test	Sig value
Motivational cultural intelligence	0.495[**]	0.506[**]	6.431[**]	0.000

Source: Authors

Note: [**]- coefficients are statistically significant at the level 0.01; $R^2 = 0.256$

The value of the coefficient of determination R^2 is 0.256, which means that 25.6% of the variability of the dependent variable is explained by the set regression model. Motivational cultural intelligence has a positive statistically significant influence on the acceptance of foreign brands (unstandardised β coefficient=0.495; standardised β coefficient=0.506; T test= 6.431; Sig= 0.000). Thus, it can be concluded that *research hypothesis H1 is confirmed*.

In order to determine whether there are differences in the level of expression of motivational cultural intelligence among people belonging to Generations X, Y and Z, the ANOVA test was applied. The results of the test are presented in Table 6.

Table 6. ANOVA test - motivational cultural intelligence
(criterion: age of the respondent's - Generations X, Y, Z)

Statements	F	Sig
1. I enjoy interacting with people from different cultures.	1.783	0.173
2. I have confidence in situations that are multicultural in nature.	0.665	0.516
3. I can adapt to shopping conditions in other cultures.	1.211	0.302
4. I have enthusiasm to know the history and cultural heritage of other countries.	0.507	0.604
5. I want to learn foreign languages.	0.648	0.525

Source: Authors

Based on the results of the ANOVA test, it can be concluded that there are no statistically significant differences in the expression of motivational cultural intelligence among people belonging to Generations X, Y and Z (for all statements related to motivational cultural intelligence, and where age is the chosen demographic characteristic as a criterion for segmentation, the Sig value is higher than the statistical thresholds 0.01 and 0.05), so it is not necessary to apply the Post hoc Scheffe test. However, according to the ANOVA test, it can be concluded that *research hypothesis H2 is not confirmed*.

In order to determine whether motivational cultural intelligence is more pronounced in persons with a university education compared to per-

sons with a high school education, this research employed the T-test for two independent samples (Table 7).

Table 7. T-test for two independent samples - motivational cultural intelligence (criterion: respondent's education)

Statements	AS		T	Sig
	High school	Faculty		
1. I enjoy interacting with people from different cultures.	3.73	4.45	-1.796*	0.042
2. I have confidence in situations that are multicultural in nature.	4.38	5.02	-1.746*	0.048
3. I can adapt to shopping conditions in other cultures.	4.69	4.98	-0.760	0.449
4. I have enthusiasm to know the history and cultural heritage of other countries.	4.42	5.31	-1.821*	0.039
5. I want to learn foreign languages.	4.22	4.42	-0.409	0.683

Source: Authors

Note: *- coefficients are statistically significant at the level 0.05

Based on the results of the T-test for two independent samples, it can be concluded that respondents with a university education have a higher degree of motivational cultural intelligence compared to respondents who have completed high school (higher value of the arithmetic mean for all five statements related to motivational cultural intelligence). However, the mentioned differences are statistically significant in the first, second and fourth statements (Sig value less than the statistical threshold of 0.05), while the differences are not statistically significant in the third and fifth statements. Based on the above mentioned, it can be concluded that *research hypothesis H3 is partially confirmed*. The obtained results should be interpreted with caution. However, it can be expected that a more representative and uniform sample would yield values which would be more stable and statistically significant at a higher level; therefore, the results would be more precise.

CONCLUSION

This research was conducted with the main objective of examining the effect of the motivational factor of cultural intelligence on the decision of consumers to accept foreign brands, and of determining whether there is a difference in the degree of expression of motivational cultural intelligence among people belonging to Generations X, Y and Z, and whether motivational cultural intelligence is more pronounced in people with a university education compared to people with a high school education. The results of the empirical research that was carried out on the territory of the

Republic of Serbia showed that the motivational factor of cultural intelligence has a statistically significant positive influence on the decision of consumers to accept foreign brands, so *the first research hypothesis of the paper was confirmed*. Additionally, similar results were obtained in previous studies (Coves-Martinez et al., 2022; Frias-Jamilena et al., 2018). On the other hand, the results of this research showed that there are no statistically significant differences in the expressiveness of motivational cultural intelligence among respondents belonging to Generations X, Y and Z, so *the second research hypothesis was not confirmed*. In their research, Zdravković and Peković (2021b) obtained results that show that the influence of cultural intelligence and cultural heritage on the intention of tourists to visit foreign destinations is more pronounced among members of Generation Z compared to members of Generation X. In this study, different results were obtained, which can be explained by the fact that only the motivational factor of cultural intelligence was analysed, while the metacognitive, cognitive and behavioural factors were omitted. Also, the stated results can be explained by the fact that young people have more energy, mobility and desire to travel abroad. However, tours of cultural monuments and museums, and visits to the opera, require significant financial resources, so young people such as students cannot afford many such trips during the year. Older people, on the other hand, have established business careers and financial opportunities for travelling abroad, but they do not have much time to devote to visiting other countries and getting to know their cultural heritage due to their business obligations. Based on the aforementioned observations, it can be concluded that the degree of motivational cultural intelligence is uniform in younger and older people due to different life circumstances. In addition, the results showed that the degree of motivational cultural intelligence is more pronounced in persons with a university education compared to persons with a high school education, but it should be noted that statistically significant differences occurred based on three out of a total of five findings in which motivational cultural intelligence was measured. Thus, the *third research hypothesis was partially confirmed*, and the stated result should be interpreted with caution. People with a university education often buy luxury and globally recognised brands. Similar results were obtained in previous studies (Pandey & Charoensukmongkol, 2019; Rambocas & Mahabir, 2021)

The originality of the conducted research, as well as its *theoretical implications*, are based on the fact that cultural intelligence is a relatively new concept in literature in the field of marketing and management, and on the fact that foreign literature contains a certain number of works that deal with this topic, while domestic literature contains practically no works that deal with this thematic problem area. Therefore, this study expands the theoretical knowledge about the influence of motivational cultural intelligence on the acceptance of foreign brands, and fills the research gap that exists in

scientific literature. *The practical contribution* of the conducted research is based on helping marketers in creating a marketing strategy for the market of the Republic of Serbia. Culture, with its implications, has a significant impact on people's lifestyles, their behavioural frameworks, and their decisions in the purchasing process. People who have developed motivational cultural intelligence are very innovative, they have developed cosmopolitan understandings, and they are part of a global consumer culture, which implies preferences towards foreign brands. Also, people with a higher level of education are informed, follow technological innovations and buy well-known foreign brands that give them status and prestige. *The limitation of the conducted research* is based on the fact that it was conducted on a relatively small sample of respondents, and on the territory of one country. When considering the statistical results, it should be borne in mind that Cronbach's Alpha coefficient is a function of the number of items in a test. This means that the Alpha value of even poorly reliable data can be improved to become acceptable by increasing the number of items and the recollection of the data set. Also, it is possible to apply other tests that measure the internal consistency of data, such as Split-half reliability and Odd-even reliability. *Directions for future studies* could be based on expanding the sample, on conducting empirical research on the territory of another European country, on examining the influence of other factors of cultural intelligence (metacognitive, cognitive, behavioural) on the consumers' decision to buy foreign brands, and on the inclusion of other variables into a conceptual model. The variables in question, such as consumer ethnocentrism, cosmopolitanism, and the image of the country of origin, can be significant determinants of the acceptance of foreign brands.

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УТИЦАЈ МОТИВАЦИОНОГ ФАКТОРА КУЛТУРАЛНЕ ИНТЕЛИГЕНЦИЈЕ НА ПРИХВАТАЊЕ СТРАНИХ БРЕНДОВА У РЕПУБЛИЦИ СРБИЈИ

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Резиме

Култура утиче на све аспекте понашања појединца. Људи који одрастају у различитим државама, од којих свака има одговарајуће културалне норме, развијају различите начине понашања и размишљања. Из перспективе маркетинга, потрошачи који имају развијену културалну интелигенцију, који су део глобалне потрошачке културе, и који имају космополитска схватања и размишљања прате технолошке иновације и имају жељу да купе нове производе када се појаве на тржишту. Ово се односи на стране брендове и на оне брендове који имају препознатљивост и доступност на глобалном тржишту. Резултати емпиријског истраживања које је реализовано на територији Републике Србије су показали да мотивациони фактор културалне интелигенције остварује статистички значајан позитиван утицај на одлуку потрошача да прихвате стране брендове, као и да не постоје статистички значајне разлике у степену изражености мотивационе културалне интелигенције међу испитаницима који припадају генерацијама „Y“ и „Z“ у односу на испитанике који припадају генерацији „X“. Резултати су такође показали да је степен мотивационе културалне интелигенције израженији код особа које имају факултетско образовање у односу на особе које имају средњошколско образовање. Оригиналност спроведеног истраживања и његове теоријске импликације се заснивају на чињеници да је културална интелигенција релативно нов појам у литератури, тако да ова студија проширује теоријско сазнање о утицају мотивационе културалне интелигенције на прихватање страних брендова и попуњава истраживачки геп који постоји у научној литератури. Практични допринос спроведеног истраживања се огледа у помоћи маркетарима приликом креирања маркетинг стратегије за наступ на тржишту Републике Србије.

CRYPTOCURRENCIES AND CRIME

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Abstract

In the introductory part of the paper, the author briefly explores the emergence of the first cryptocurrency (Bitcoin), which was initially devised for the purpose of securing easier transactions without intermediaries. Criminals soon realised that cryptocurrencies, due to their inherent characteristics, could provide them with anonymity. As other cryptocurrencies (altcoins) emerged, it was necessary to define their conceptual framework. While cryptocurrencies were initially used in illegal sales of narcotics, their application soon spread to a number of other criminal activities. In that context, the author first presents the reasons that led criminals to turn to cryptocurrencies in their financial transactions, and then explains the possible uses of cryptocurrencies in the commission of crime. The central part of the paper provides examples of criminal activities committed by using cryptocurrencies. It is reasonable to expect that, in the future, the use of cryptocurrencies will extend to other criminal activities, which are still unaffected by the trend that has existed for the last ten years.

Key words: cryptocurrencies, Bitcoin, crime.

КРИПТОВАЛУТЕ И КРИМИНАЛИТЕТ

Апстракт

Аутор рада на почетку излаже када је настала прва криптовалута - биткоин, уз образложење шта је била сврха његовог креирања. Како су се после биткоина јавиле и друге криптовалуте било је неопходно одредити његов појам. Иако су замишљене с циљем олакшавања трансакција без посредника, криминалци су убрзо схватили да криптовалуте захваљући својим карактеристикама могу да им обезбеде анонимност. Мада су првобитно коришћене зарад продаје наркотика, употреба криптовалута се убрзо проширила на бројне друге криминалне актив-ности. С тим у вези, аутор представља разлоге због којих су се криминалци опре-делили да се окрену криптовалутама, те у другом делу рада наводећи примере образлаже у којим криминалним активностима се развила учестала употреба криптовалута. Са разлогом се може очекивати да употреба криптовалута буде проширена и на друге криминалне активности, које су још увек незахваћене трен-дом који постоји последњих десетак година.

Кључне речи: криптовалуте, биктоин, криминалитет.

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INTRODUCTION

Bitcoin is a type of cryptocurrency created by the mysterious Satoshi Nakamoto in 2009. It was created for the purpose of facilitating cashless transactions without any compensation. Unlike standard currencies managed by state governments worldwide, it is the first digital currency and payment system managed by decentralised governance (by all Bitcoin holders). Bitcoin can be sent from user to user without the need for any intermediaries; the transaction is verified on the so-called network nodes, via cryptography, and recorded in a publicly distributed ledger of transactions called a blockchain (Investopedia, 2022).

In order to explain what is meant by a blockchain, we should look at the common transaction methods. The problem of mistrust, quite common in transactions, was solved by involving an intermediary, which was often embodied in the intermediary role of a bank. In order to limit the power of banks, states became involved in mediation. Yet, it did not prevent some banks from becoming even more powerful than some states. In this regard, there was a desire to liberalise the standard business transactions model. This aspiration is reflected in the creation of blockchain technology which enables transition from the centralised to the so-called peer-to-peer (P2P) model. Blockchain technology is structured as a single linked body of data given in chronological order and organised in a digital chain of blocks containing information about each transaction (Investopedia, 2022). It enables transactions without any intermediaries; transaction data is recorded in blockchain nodes, while data protection is ensured by cryptographic methods. Blockchain nodes store the data of all recorded transactions; they serve as infrastructure because they constantly communicate with each other, synchronise, and exchange and verify the latest data. In case individual data blocks do not pass verification by certain nodes in charge of verifying the authenticity of records in the chain, the proposed data blocks are rejected. In other words, the network cannot be compromised by placing false data (Minović, 2017, p. 22).

Other cryptocurrencies, known under the generic name *altcoins*, were created soon afterwards. To ensure better understanding, we should first define this concept. The term *cryptocurrency* refers to digital or virtual currency that is protected by cryptography, which makes it almost impossible to counterfeit or double-spend. In other words, cryptocurrency is a form of network-based digital assets, distributed across a large number of computers (Investopedia, 2022).[1] The basic feature of all cryptocurrencies is the fact that it is almost impossible for state authorities to control them; as a result, they only have to accept or reject cryptocurrencies as a legitimate means of trading (Milutinović, 2018, p. 107).

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[1] Investopedia (2022): Cryptocurrency, J. Frankenfield (updated January 11, 2022); Retrieved 28 March 2022 from: https://www.investopedia.com/terms/c/cryptocurrency.asp

Although designed to facilitate transactions without intermediaries, cryptocurrencies provided an ideal opportunity for criminals around the world to engage in illegal activities by using blockchain technology, which provides absolute anonymity and thus makes it impossible for government agencies to seize cryptocurrencies. Access to cryptocurrencies is provided only to persons who have the appropriate key (code). In 2011, Ross Ulbricht made a 'pioneering endeavour' to use cryptocurrencies in criminal activities. Along with creating the website called *Silk Road*, he started the production of psychedelic mushrooms, with the goal of selling them through the site by using Bitcoin. He used the Tor browser, which allows users to surf the web anonymously, without revealing their identity and location. In this case, the identity of the buyer could possibly be revealed by referring to the postal address where the mushrooms would be delivered, but this problem was solved by using an anonymous *post restante*. Soon, other illegal products began to be sold through this website (Poper, 2017, pp. 89-91). The presented example illustrates the unlimited possibilities of using cryptocurrencies in the commission of illegal activities, while the identity of the perpetrator remains undiscovered. In this context, the paper analyses the reasons for using cryptocurrencies, examines their possible uses in different criminal activities, provides examples of crimes committed by using cryptocurrencies, and discusses future trends concerning the use of cryptocurrencies in criminal activities.

WHY DO CRIMINALS LIKE CRYPTOCURRENCIES?

There are five reasons why criminals have turned to cryptocurrencies. Although all transactions are recorded on the blockchain, which is a public record, the identities of the creators of transactions remain unknown. In this way, criminals can engage in completely anonymous criminal activities, such as drug trafficking, trading weapons, or child pornography. At the same time, anonymity makes it much easier for terrorist organisations to raise funds for attacks.

The second reason for the growing use of cryptocurrencies in criminal activities is the lack of any links between participants. Those participating in criminal activities do not need to know one another; the transfer of cryptocurrencies occurs in a virtual space, without any intermediaries.

The third reason is twofold – ease of access and speed of transactions. To make use of cryptocurrencies, one only needs to have an Internet connection and use the appropriate application. Since cryptocurrencies are digital assets, there is no need for transactions to be validated by third parties (e.g. banks, exchanges, brokers). Consequently, cryptocurrencies are transferred within just a few minutes, with no possibility of cancelling transactions (Cognyte, 2021). In order to illustrate the advantage of cryptocurrency trading in relation to the traditional transfer of money through

a bank, we can note that in the traditional banking environment it is not possible to transfer money at all times. There are several reasons for a delayed transfer of money between banks. Among other things, delays may occur due to non-working hours, weekends, holidays, and many other reasons, such as natural disasters, different time zones, lack of validation/certification/verification, different currencies, inaccurate transfer data, and inadequate fraud prevention procedures (Statrys, 2021). On the other hand, there are no such problems in a cryptocurrency transaction, which is automatic and fully decentralised.

Easier storage and transfer are the fourth reason criminals have turned to cryptocurrencies. Namely, cryptocurrencies are easy to store (in digital wallets) because no physical space is needed to store information about them. In this way, the attention of thieves is not attracted, but neither is the attention of the authorities. Transactions with cryptocurrencies are easy because there are no borders/restrictions preventing their trade, which also implies that they cannot be seized. For example, the Lazarus Group, a cybercrime organisation linked to North Korea, is estimated to be responsible for stealing cryptocurrencies worth over 1.75 billion US dollars. A major theft was recorded in 2020, when 275 million US dollars of cryptocurrency disappeared from the KuCoin stock exchange as cybercriminals hacked private keys to the exchange's hot wallets (Chainalysis, 2021).[2] Another example is the hacking of the blockchain-based Poly Network website in August 2021, when more than 600 million US dollars' worth of different cryptocurrencies were stolen, which is considered to be one of the largest cryptocurrency thefts in history so far (CoinDesk, 2021).[3]

The lack of borders is the fifth reason for criminals' willingness to turn to cryptocurrencies. From all of the above, we can conclude that cryptocurrency transactions can be made even in spite of existing borders. To illustrate the ease of the global transfer of cryptocurrencies, we may refer to an example of cryptocurrency money laundering worth 16 million US dollars, committed by a Swedish citizen, who was subsequently sentenced to 15 years' imprisonment (Cognyte, 2021).

THE USE OF CRYPTOCURRENCIES IN CRIMINAL ACTIVITIES

Before we turn to a detailed analysis of the use of cryptocurrencies in criminal activities, it is important to note that the criminal use of crypto-

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[2] Chainalysis (2021): Lazarus Group Pulled Off 2020's Biggest Exchange Hack and Appears to be Exploring New Money Laundering Options, 2/9/2021, Retrieved 01 April 2022 from: https://blog.chainalysis.com/reports/lazarus-group-kucoin-exchange-hack/

[3] CoinDesk (2021): Cross-Chain DeFi Site Poly Network Hacked; Hundreds of Millions Potentially Lost, E. Gkritsi, M.Shen, 9/ 10/2021; Retrieved 1 April 2022 from: https://www.coindesk.com/markets/2021/08/10/cross-chain-defi-site-poly-network-hacked-hundreds-of-millions-potentially-lost/

currencies is no longer primarily limited to cybercrime activities. In other words, the criminal use of cryptocurrencies refers to all criminal activities that require a monetary transaction. Based on the above, we can conclude that the possibilities of using cryptocurrencies in criminal activities are unlimited. Although there are estimates of relevant national and foreign bodies regarding the criminal use of cryptocurrencies, it should be emphasised that the 'dark figure' of crime is quite high because the possibilities of detecting such activities are rather narrow. Yet, we should be cautious when making estimates because criminals still like cash, and the use of cash for criminal activities is still significantly higher than the criminal use of cryptocurrencies. We may conclude that cryptocurrencies have given criminal offenders more opportunities to engage in their activities. At the same time, the largest obstacle to a greater use of cryptocurrencies in criminal activities is high volatility, i.e. the range and the speed of movement of cryptocurrency values (Europol, 2021, p. 2).

According to the private sector estimates, the illegal use of cryptocurrencies makes up a small part of their overall use. Namely, only 0.34% of cryptocurrency transactions are related to illegal use. According to the academic community estimates, 23% of total transactions pertain to the illegal use of cryptocurrencies, which is a significantly higher share compared to the private sector estimate. The reason for this discrepancy in estimates should be partly sought in different approaches to conducting research. Even though the share of illegal use of cryptocurrencies in criminal activities has decreased compared to their legal use (because the share of legal use is growing much faster than the share of illegal use), it should be noted that the tendency of illegal use of cryptocurrencies is growing (Europol, 2021, pp. 4-5).

Members of organised crime soon realised all the advantages of using cryptocurrencies in their activities. Cryptocurrencies are used to facilitate criminal activities in the context of drug trafficking, human trafficking, and the import and export of illicit products, fraud and money laundering. Members of state authorities realised that it was necessary to take additional steps to prevent the activities of criminal groups in a newly established field. In this regard, for example, the Italian politician Lucrezia Ricchiuti started a discussion about the mafia's connections with gambling and cryptocurrencies. She claimed that the mafia launders illegal money through gambling sites by using digital currencies that are anonymous and often cannot be tracked. Therefore, it is necessary to work on preventing such activities, because the lack of control and the absence of criminal liability inevitably leads to gambling being a safe place for money laundering by the mafia (Jones, 2018, p. 2).

According to the report of the blockchain data company Chainalysis, criminals laundered 8.6 billion US dollars (6.4 billion pounds) of cryptocurrency in 2021, which is 30 % more than the previous year. One of the

reason for the significant increase in money laundering should be sought in the fact that criminal networks specialising in large-scale money laundering have adopted cryptocurrencies and offer their services to other criminals (Chainalysis, 2022, p. 2). In addition, Europol has seen an increase in the use of cryptocurrencies in money laundering schemes, especially during the COVID-19 pandemic. Criminals used the so-called ransomware, a type of malicious software that restricts access to a computer system or stored data, and demands ransom from the victim in order to obtain cryptocurrencies from the victim. However, money earned from trafficking in psychoactive substances and converted into cryptocurrencies for the purpose of laundering is not included in the report, which suggests that the volume of money laundering by using cryptocurrencies is significantly higher. This claim may be supported by the example of a criminal group from Northern England that distributed drugs to dealers. The money laundering scheme operated as follows: first, a courier would take cash from the dealer and take it to a broker; then, the broker would buy certain cryptocurrency, and send it to an address previously designated by the criminal group. Notably, the broker's fee was 4%, which is fairly low when compared to a broker's fee in more traditional forms of money laundering. It shows that money laundering based on cryptocurrencies has a great profit-making potential. Consequently, we may reasonably fear that such criminal activity will increase in the period to come. Another reason for the expected increase is the quick and easy conversion of one cryptocurrency into another, which makes it impossible to monitor cash flows (BBC, 2022).

In addition to money laundering, there are a number of scams involving cryptocurrencies. Namely, according to Europol's estimates, fraud related to cryptocurrencies is the most common crime committed in the illegal use of cryptocurrencies. Cryptocurrency investment fraud schemes have been identified in several countries across the European Union. Fraudsters create fake websites intended for investments in cryptocurrencies, or advertise lucrative investments and encourage investors to create accounts on online trading platforms. At the same time, victims of fraud are convinced that they can track their investments thanks to the platform they used to invest money. On the platform itself, cryptocurrency trading is simulated in order to gain the investors' trust, including the inevitable use of social engineering techniques by brokers. There have been cases of fraudsters using social networks to advertise their Internet platforms by using fake messages from public figures. For example, the Australian mining magnate Andrew 'Twiggy' Forrest filed a criminal complaint against Facebook because it "failed to prevent false cryptocurrency advertisements that used his image" (Independent, 2022). Fraudsters also ask investors to invest money in order to launch a new cryptocurrency, which is expected to bring huge profits in the future but which does not actually exist. Another technique for extracting money is the so-called pyramid scheme, where in-

vestors are promised high returns which will come from new investors they are expected to bring into the game; thus, while "the increase in value promised to investors is just an illusion, any disbursements to investors are merely funds transferred from investors who are further down the pyramid structure" (Europol, 2021, pp. 13-15).

The best evidence of the dangers of cryptocurrency fraud are examples from practice. In July 2021, an interesting case was recorded in the Republic of Serbia. More than a dozen of Serbian hackers were suspected of and charged with cryptocurrency-related fraud. Although they were citizens of several states (Serbia, Montenegro, Australia and the Philippines), they all had their place of residence in the City of Niš (Južne vesti, 2020). They were suspected of targeting people around the world, urging them to invest money in fake cryptocurrency mining. They launched more than 20 fake cryptocurrency investment and trading platforms. They advertised themselves as world leaders in the binary options market, claiming that investors could expect a profit of as much as 80% of the amount of invested money. They created fake profiles of fake companies' personnel, fabricated trade activities, and held online conference meetings in order to convince potential investors that the company was legitimate. In case a person decided to invest money, he/she was instructed to transfer money via an international bank account, and was directed to monitor the investment via a fake online investment platform, which showed a positive return on investments. It is assumed that they managed to collect over 70 million dollars. All these facts indicate that their fraudulent scheme was well-established (Sloboden pečat, 2021).

Drug trafficking is another crime which has undergone certain changes in terms of *modus operandi*. At the beginning of discussing possible uses of cryptocurrencies in criminal activities, we presented the example of the Silk Road platform and its founder Ross Ulbricht, but other drug traffickers soon realised all the advantages of using cryptocurrencies. Thus, in order to provide a better insight into the prevalence of this form of trading in narcotics, we should explore some other examples as well. First of all, we may refer to the estimates of the US Government Accountability Office (GAO), which reported that between 80 and 90% of all illegal sales on the so-called dark web (part of the Internet network that can be accessed only by using specific software, configuration or permission) are related to illegal drugs, while all transactions are performed by using cryptocurrencies (Forbes, 2022). At the same time, it should be pointed out that many drug traffickers do not use the dark web because the use of cryptocurrencies provides them with sufficient security that their transactions are very difficult to track. For example, a Bitcoin millionaire Aaron Shamo, started 'mining' in 2009, soon after Bitcoin was created, and the value of his property soon grew to 10 million dollars. Yet, state authorities suspected that part of his wealth was generated by illegal activities. In 2016, he was ar-

rested and accused of trafficking the deadly opioid fentanyl from China, financing operations with Bitcoins, and funding a vast underground drug trafficking organisation that distributed more than a half million counterfeit pills on the dark net. Shamo and five of his friends were considered to be part of a new generation of 'entrepreneur' criminals who buy and sell drugs online, covering their tracks by using cryptocurrencies. Procuring drugs from China, which entered the United States through the post office at the JFK airport in New York, they turned the Internet into one of the main arteries for fentanyl travel in the United States. In the fiscal year 2016, the volume of fentanyl trade was evidenced by the fact that customs officers detected seven shipments of fentanyl at the airport; in 2017, the number rose to 86 shipments and, in 2018, they seized 146 shipments. Drug addicts soon realised that it was possible to get drugs delivered to a home address via US postal services, which resulted in 20,000 people dying from fentanyl overdose in 2016 alone (CNBC. 2018). In 2019, Shamo was found guilty and sentenced to life imprisonment (US Department of Justice, 2020).

In addition to trafficking in psychoactive substances, criminals have begun to use cryptocurrencies in human trafficking. It was only in the last decade of the 20th century that the international community took the first systematic steps to combat this form of crime (Konstantinović Vilić, Nikolić Ristanović, Kostić, 2012, p. 205). Two decades later, additional efforts are needed to fight human traffickers because the contemporary tech-savvy generations use cryptocurrencies to make it even more difficult for competent state authorities to track these illicit activities and take appropriate measures.

It is estimated that trafficking in human beings generates about 150 billion dollars per year, which makes it one of the most profitable criminal activities. In this regard, an international body called the Financial Action Task Force (FATF), based in Paris, estimated that about 24.9 million people are subjected to forced labour and sexual exploitation at any given time, which indicates the great possibilities of using cryptocurrencies in human trafficking (FATF, 2018, p. 9). Thus, the Financial Crimes Enforcement Network (FinCEN) pointed out that members of organised criminal groups involved in human trafficking are increasingly using 'alternative' payment mechanisms, including cryptocurrencies (GAO, 2021). At the same time, according to the US GAO estimates, in the period between 2017 and 2020, transactions in cryptocurrencies related to human trafficking quadrupled. During the same four-year period, the tax administration identified six investigations involving virtual currency that were linked to human trafficking (GAO, 2021, pp. 27-28). In the future, a real explosion of human trafficking that includes the use of cryptocurrencies can be reasonably expected to occur.

Cryptocurrencies have also found their application in child pornography. During 2019, a non-governmental organisation called the Internet Watch Foundation (IWF) confirmed the existence of 132,676 URLs or websites with child sexual abuse content on 4,956 domains traced to 58 countries, which constitutes an increase of 27% when compared to the year 2018. In 2019, there was a new increase in the number of websites on the dark net as the IWF identified 288 new dark web sites with child pornography. In 2018, the IWF identified a significantly smaller number of such websites (85). Comparing the number of websites on the dark net in these two years, an increase of 238% can be noted. Interestingly, 197 of the 288 sites identified in 2019 accepted only cryptocurrency payments to allow the users access to their content. This is precisely an indication of how cryptocurrencies can be used for another illegal purpose. The true extent of using cryptocurrencies to provide access to the contents of child pornography websites may be illustrated by the available data. In 2019, Chainalysis tracked payments (in the total amount of slightly less than 930,000 US dollars) effected in cryptocurrencies to web addresses related to child pornography. Thus, in 2019, there was an increase of 32% when compared to 2018; in turn, in 2018, there was an increase of 212% when compared to 2017 (ICMEC, 2021, p. 4).

In order to illustrate how criminals use cryptocurrencies in child pornography, we may refer to a case from judicial practice. In October 2019, the US Department of Justice filed an indictment against a 23-year-old South Korean citizen, Jong Woo Son, who was accused of running a dark web site exclusively dedicated to child pornography. He founded the site in 2015, and only three years later, he had over 200,000 video files on his server. He allowed its users to create free accounts on the site and download the contents by using points. The site users purchased points with Bitcoin, or earned points by recommending the website to new users and by posting videos with child pornography, which only increased the number of users and the hours of video recordings. During its three-year operation, the website received 420 Bitcoins and had over 7,300 transactions worth over 370,000 US dollars at the time of the respective transactions, which means that the profit increased over time as the value of Bitcoin grew. Jong Woo Son was identified by an undercover investigator who sent Bitcoins to the Bitcoin addresses listed on the website. Within a few days, Son transferred the cryptocurrencies to another address that was linked to his account at an online exchange office. The indictment also covered more than 337 users living in the United States and 11 other countries. As a result, over 250,000 videos were removed from the website (ICMEC, 2021, pp. 6-7).

Another interesting case occurred in the United States in March 2020, when 32-year-old Dutch citizen Michael Rahim Mohammad was indicted for running a website, *DarkScandals*, featuring child pornography on the dark net (since 2012). Users could access the website content either

by paying in cryptocurrencies or by uploading their videos of sexual abuse of children. The scale of the illegal activity may be illustrated by the fact that the site contained over 2,000 videos and images of sexual exploitation of children, and received 188.6 Bitcoins worth approximately 1.6 million US dollars at the time, as well as 26.7 Etheriums worth approximately 5,730 US dollars. Many of the virtual currency addresses linked to this site were primarily used for paying for the website's content, but many of them were also used for paying for other illegal activities on the dark net, such as purchasing narcotics, stolen data, and other illicit products. The site founder was identified because he made a mistake; namely, he instructed the site users to send payments in cryptocurrencies to specific crypto addresses, and then he used his identification data to create bank accounts in order to convert cryptocurrencies into money (ICMEC, 2021, pp. 9-11). All these transactions clearly illustrate the social danger of activities committed by using cryptocurrencies.

The US judicial practice illustrates that cryptocurrencies have also been used as a means of paying a hired hit-man to commit murder. The first suspicion that Biotcoin was used for these purposes was related to Ross Ulbricht, the founder of the Silk Road website; the investigators retrieved private messages from the server about paying hit-men a total of 650,000 US dollars to kill several people, but the prosecution could not prove the execution because the victims' bodies were never found (Wired, 2015). Soon, there were several other cases where cryptocurrency was used to pay the hit-men. In 2016, Kristy Lynn Felkins (aged 37) used the dark web *Besa Mafia* platform to order the murder of her ex-husband. She paid 12 Bitcoins, worth 5,000 US dollars, for the hit-man's services, provided precise information about the target's whereabouts, and even suggested that the hit-man could stage it as a robbery (while she was out of town). The case was discovered when federal investigators received information that a person named "KBGMKN" (who turned out to be Felkins) commissioned a murder. This platform offered various illegal services (including murder, kidnapping and assault) in exchange for cryptocurrency payments, but it should be noted that the platform was designed by fraudsters to entice as many people as possible to pay them in cryptocurrencies, while the services were never performed (Oxygen, 2022). In another similar case, a US citizen, Nelson Replogle, hired a hit-man to kill his wife and sent a Bitcoin to the potential killer, together with a description of his wife's car and the time when she would be out of the house. The murder was not committed because the FBI investigators reacted in time. They analysed the Bitcoin blockchain, established that the Bitcoin was stored in the Coinbase platform, and obtained information from Coinbase about the account, transaction history, Replogle's name, photo and internet address, but they could not locate the hit-man (Decrypt, 2021).

The greatest danger of using cryptocurrencies in illegal activities is related to terrorism. The use of cryptocurrencies by terrorist groups enables them to expand the scope of activities which do not necessarily have to be confined to one territory, particularly in terms of providing logistics and finances, so that their activities may be performed in other territories. Namely, the use of cryptocurrencies enables a rapid distribution of funds to other regions, while facilitating the recruitment process and reducing the role of intermediary terrorist organisations. It may be reasonably assumed that the traditional methods of financing terrorism will always exist; however, the digitalisation of money, and particularly the increasing use of cryptocurrencies, will significantly complicate the work on preventing terrorist attacks (Hassan, Nafees, 2022). To illustrate the difficult task of preventing terrorism when digital money is used as a financial tool, we may refer to some examples. As shown in the research on the financing of 40 Jihadi terrorist cells in Europe, in the period between 1994 and 2014, terrorists raised money from territories under their control (e.g. the Islamic State), from their own resources (self-financing), and by illegal trade in drugs, weapons and other goods. The results show that that terrorist acts in Europe were inexpensive in a large number of cases, as it was estimated that one attack cost less than 10,000 US dollars (Oftedal, 2015, p. 45). In the past years, many terrorist groups have adapted to greater state control and a greater use of digital money. Now, they raise funds through legal sources and methods that are difficult to associate with terrorism. The use of digital currency makes both legal and illegal financial transaction harder to detect. Moreover, money kept in personal digital currency accounts does not raise much suspicion from government agencies (Dimovski, 2021, pp. 230-231). Starting from the fact that state authorities are powerless in the prevention of terrorist acts financed with digital money, counteracting terrorism is further frustrated when terrorist groups use cryptocurrencies. Terrorist groups always endeavour to develop strategic advantages in relation to state authorities. In the future, one of these advantages will be cryptocurrencies, as a 'lucrative alternative mode of financing' their activities, particularly given the anonymity in financial transactions, lack of regulations, and insufficient control of the state apparatus. In that context, the Philippine Institute for Peace, Violence and Terrorism Research (PIPTVR) reported that a local terrorist group, supported by the Islamic State, carried out the first cryptocurrency transaction in May 2020 in order to fund its activities in the conflict-stricken region of Mindanao in the southern Philippines (Hassan, Nafees, 2022).

At the same time, there are platforms on the dark net, such as *Finance Islamic Fight without leaving a trace*, through which one can transfer cryptocurrencies to jihadists in order to finance their terrorist activities. Interestingly, one extremist published a book called *Bitcoin wa Sadaqat al Jihad,* where he explains how to make the transfer of North American and

Western European Bitcoin to jihadists. In June 2015, an American teenager admitted that he taught members of the Islamic State how to use Bitcoin, by giving them guidelines on how to make Bitcoin wallets for potential donors. Shortly afterwards, terrorist organisations started using cryptocurrencies to finance terrorist attacks. Bahrun Naim, the organiser of the terrorist attacks in Jakarta in 2016, used Bitcoin for virtual payments, transfer of funds to armed units, and financing terrorist activities (Wang, Zhu, 2021, p. 2330). It was also revealed that members of the Islamic State demanded payment in Bitcoin as a ransom for the kidnapped people, and they used the collected funds to further finance their terrorist activities. Studies have shown that whenever traditional ways of raising money to finance terrorist activities were in jeopardy, terrorists always turned to cryptocurrencies. Although the Islamic State, Al Qaeda and Hezbollah continue to dominate traditional ways of raising money, cryptocurrencies are increasingly being used for financing terrorist activities. Thus, the use of cryptocurrencies for these purposes may be reasonably expected to increase in the future, provided that the *status quo* is preserved in terms of the characteristics of cryptocurrencies and their (currently high) values. In addition, it is essential to improve the existing infrastructure of ATMs (automated teller machines for withdrawing money) where users can exchange cryptocurrencies for cash, because the existing ATM infrastructure is particularly bad in areas where terrorist groups operate in the Middle East (Wang, Zhu, 2021, pp. 2333-2334).

CONCLUSION

The analysed criminal law areas indicate that all comparative advantages of cryptocurrencies have started to be used in the commission of many forms of crime. It should be noted that it is necessary to conduct organised and systematic criminological research which should provide a broader and more detailed picture of the actual scope of the use of cryptocurrencies in criminal activities. Once the cryptocurrency market was established, some criminals saw the advantages of cryptocurrencies and their profit-making potential. The owner of the Silk Road platform, Ross Ulbricht, who earned over one billion dollars from drug trafficking, was discovered because he made a mistake when creating the site – he left a job ad using an IP address instead of using the Tor browser, which ensures anonymity and makes transactions almost impossible to detect (BBC, 2013).

Following this case, there has been a rapid increase in the use of cryptocurrencies, not only in drug trafficking but also in many other criminal activities. Organised criminal groups started using cryptocurrencies in activities such as human trafficking, kidnapping, and gambling. The situation was further aggravated when cryptocurrencies started being used by

terrorist groups; the intrinsic characteristics of cryptocurrencies (anonymity, ease of access, speed of transactions, easy storage and transfer, and lack of control) have made it much more difficult for competent authorities to fight against criminal activities involving the use of cryptocurrencies. To this effect, it is essential to start coordinated operations in countries throughout the world as soon as possible. It is the only way to preclude the expansion of the use of cryptocurrencies in criminal activities. Another issue of particular concern is the fact that cryptocurrencies facilitate the commission of the most serious crimes by individuals, including murder, because one may easily hire a hit-man who is paid in cryptocurrencies. As shown in this paper, these financial transactions are rather difficult to trace, and the competent state authorities encounter many challenges, not only in terms of crime detection but also in prosecuting the perpetrators and other responsible persons.

There is no doubt that the Republic of Serbia is also facing the problem of criminal activities committed by using cryptocurrencies. In many countries, including Serbia, the use of cryptocurrencies is still under-regulated and insufficiently controlled. Although cryptocurrency has been legally recognised under the Digital Property Act (2020) as digital property, which may be used as a means of exchange for investment purposes (BBC News, 2021), this Act does not regulate a range of criminal offences that may be committed by using cryptocurrencies. In the future, we may reasonably expect a further increase in the use of cryptocurrencies in the commission of criminal activities. Therefore, competent state authorities should prepare and adjust their activities in order to adequately face the great challenges in the fight against the use of cryptocurrencies for criminal purposes.

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КРИПТОВАЛУТЕ И КРИМИНАЛИТЕТ

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Резиме

Биткоин, створен 2009. године од стране Сатошиа Накамота, је прва крипто-валута чија се сврха огледа у обављању трансакција без икаквих надокнада, при чему њоме не управља нека централна власт. Како бисмо боље разумели шта се

подразумева под биткоином, али и другим криптовалутама које су убрзо након тога креиране, неопходно је одредити шта се под криптовалутама подразумева. Може се рећи да су криптовалуте дигитална или виртуелна валута која је заштићена криптографијом, што фалсификовање или дупло трошење чини готово немогућим. Криминалци су схватили да је криптовалуте могуће користити за обављање нелегалних активности. Наиме, постоје одређени разлози из којих се криминалци опредељују за што чешћу употребу криптовалута. Ти разлози се огледају у постојању анонимности, непостојању посредника, могућности вршења преноса у било које време, лакшем складиштењу и преносу, и непостојању граница. С тим у вези, криминалци широм света су почели да користе криптовалуте за обављање криминалних активности. Стога криптовалуте се користе за олакшавање криминалног пословања у оквиру трговине наркотицима, трговине људима, и увоза и извоза недозвољених производа. Поред тога криптовалуте се користе за прање новца, што је нарочито интензивирано за време трајања пандемије вируса ковид-19. До експанзије употребе криптовалута дошло је и код кривичних дела преваре, при чему се штета мери у више десетина милиона долара. Исто тако, употреба криптовалута је знатно олакшала трговину наркотицима, али и трговину људима. Уједно, корисницима дечије порнографије су криптовалуте омогућиле знатно већи степен анонимности, што је довело до повећања броја интернет сајтова са дечијом порнографијом. Криптовалуте су коришћене и као начин исплате зарад извршења убистава. Највећи степен друштвене опасности забележен је код извршења терористичких аката, јер употреба криптовалута омогућава брзу дистрибуцију финансија у друге регионе. На основу изложеног, може се очекивати даљи пораст употребе криптовалута у наведеним активностима, али и њена употреба и у другим активностима криминалаца, што ће захтевати даље прилагођавање државних органа у борби против нелегалне употребе криптовалута.

THE ELIMINATION OF THE LEGAL DEFECIENCIES OF FINAL JUDGMENTS

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Abstract

The final convicting verdict marks the beginning of the process of enforcing the final court decision, as stated in the formal pronouncement of the judgment passed by the court. The court verdict evolves from a thorough and meticulous factual reonstruction of the criminal act, and the application of the criminal code norms to the determined facts. The institutionalised reaction to the offender's suspected wrongdoing is crowned by the final verdict, passed in the closing stages of the court proceedings. Filing an appeal against the final verdict ensures the supervision of the legality and the regularity of the verdict rendered during the first-instance proceedings. The court's decision about the legal remedy is final and executive. The consequences of any deficiencies present in the final verdict may be removed only by a decision passed by a high court in the proceeding initiated by extraordinary legal remedies. The final verdict can be annulled because of its factual or legal deficiencies. This paper examines the deficiencies of the legal grounds of the final verdict.

Key words: final verdict, legal grounds of the verdict, legal remedies, request for the protection of legality, legal deficiencies of the verdict.

ОТКЛАЊАЊЕ ПРАВНИХ НЕДОСТАТАКА ПРАВНОСНАЖНИХ ПРЕСУДА

Апстракт

Правноснажност пресуде означава моменат којим започиње поступак извршења одлуке о казненоправном захтеву, садржане у изреци ове судске одлуке. Донета пресуда је резултат темељне чињеничне реконструкције кривичног догађаја и примене норми кривичног законодавства на утврђено чињенично стање. Круну институционалног реаговања на сумњу да је окривљени својим понашањем остварио биће одређеног кривичног дела чини пресуда донета у завршној фази спроведеног кривичног поступка. Изјављивањем жалбе против првостепене пресуде омогућава се контрола законитости и правилности одлуке донете у првостепеном поступку. Одлука суда правног лека је правноснажна и извршна.

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Последице произашле из извршења правноснажне пресуде, изузетно и по закону стриктно прописаној процедури могу бити отклоњене једино одговарајућом одлуком врховне судске инстанце, донетом у поступку иницираном ванредним правним лековима. Правноснажна пресуда може бити анулирана због чињеничних или правних недостатака. Недостаци правне основице правноснажне пресуде биће фокус излагања које следи.

Кључне речи: пресуда, правноснажност, правна основица пресуде, правни
                    лекови, захтев за заштиту законитости, правни недостаци пресуде.

INTRODUCTION

The first-instance verdict is based on legally valid facts, and on the legal subsumption of the factual construction of the criminal act under the appropriate provisions of the Criminal Code. The factual and legal foundation of the first-instance verdict may be assessed in the meritorious decision included in the first-instance verdict. The final verdict gives legitimacy to all decisions made in relation to the penal charges against the offender imposed by the state. The only legally valid instrument for disputing the legality and legitimacy of the final verdict is the application for an extraordinary legal remedy.

The system of extraordinary legal remedies is a system of special solutions used to remove any possible flaws or deficiencies present in the factual and legal construction of the final verdict. Factual deficiencies of the final verdict may be remedied by the renewal of the criminal proceedings, initiated by the appeal of authorised subjects unsatisfied with the determined factual grounds used for rendering the final verdict. The renewal of the criminal proceedings makes possible the revision of the conclusive facts on which the final verdict is based.

The legal flaws of the final verdict involve the incorrect application of the provisions of the substantive and procedural law concerning the determined factual grounds of the final verdict. An inadequate application of the provisions of the Criminal Code means that the final verdict is unlawful. Moreover, an incorrect application of the procedural provisions undermines the legality of the rendered verdict. As regards the Serbian positive law, any flaws in the proceedings of rendering the final verdict can be remedied by the decisions made upon the request for the protection of legality. Unlike the Serbian positive law, certain legislations retained the possibility of applying extraordinary legal remedies that enable the convicted persons (the offenders) to contest any legal deficiencies of the final verdict.

The application of extraordinary legal remedies relativises the principle of claim preclusion (*res iudicata*). Therefore, appropriate interational laws, constitutions of modern states and procedural laws allow for the possibility of the suspension of citizens' legal security through the initiative for 'reopening a case' which has already been concluded by rendering a final verdict. This possibility is prescribed by the Additional Protocol to the Europen Convention for the Protection of Human Rights and Fundamental Free-

doms (Additional Protocol to the Europen Convention for the Protection of Human Rights and Fundamental Freedoms, 2010 and 2015, Art. 4, para. 2).

Besides the violaton of the substantive and procedural law, certain legislations, including the Serbian positive law, prescribe the lawful influence that the decisions made by the Constitutional Court and the European Court for Human Rights have on the decisions made by criminal courts. This is evidently reflected on the grounds on which the application for an extraordinary legal remedy is based. The comparative law also presupposes the possibility of eliminating any legal deficiencies in final verdicts. Various forms of cassation are applied for annulling any violation of the law and proceedings determined during the revision of the legality of final verdicts, as well as any deficiencies ascertained by the verdicts rendered by the European Court for Human Rights.

THE ELIMINATION OF THE VIOLATION OF LAW AND COURT PROCEEDINGS

A final verdict may be based on valid and legally proven facts, as well as on the wrong application of law onto factual grounds. Moreover, the provisions of the procedural law may be impaired when making a decision about the appealed case. Therefore, the legal ground of the final verdict is re-examined by means of extraordinary legal remedies. As already mentioned, the Serbian criminal and penalty law prescribes that any request for the protection of legality is an exclusive extraordinary legal remedy aimed at eliminating the legal deficiencies of final verdicts.

The very possibility of re-examining the legal ground of the final verdict initiates some dilemmas in the theory of the criminal procedural law. Namely, the question is how to justify the violation of the principle of claim preclusion, particularly in cases whose final verdicts are not characterised by significant factual deficiencies. Moreover, unlike the various ways of final verdict revision (including the reopening of a proceeding), a re-examination of the legal deficiencies of the final verdict is not founded on any new evidence or facts. It is simply a legal opinion, founded on the litigants' reasonable suspicion that the legal basis of the final verdict is not valid. Contrary to facts, which are real and not open to interpretation, legal opinions are 'variable and aleatory'. When creating the normative framework for a potential contesting of the legal basis of the final verdict, it is of utmost importance that it be clearly differentiated from the possibility of reopening a proceeding. The grounds for re-examing the legal basis of the final verdict have to be undoubtedly stated, whereas the very re-examination of the legal basis of the final verdict must not become an incessant and continuous violation of the principle of claim preclusion. Thus, both the public interest and the legal interests of the litigants are protected (Vasiljević, 1981, pp. 663-664).

The Request for the Protection of Legality as a Legal Mechanism for Eliminating the Legal Deficiencies of Final Verdicts

The request for the protection of legality is an extraordinary legal remedy which may refute the final verdict because of the *violation of law or proceedings* preceding the rendering of the final verdict. As regards the fact that it exclusively considers the *legal deficiencies* of the final verdict, the request for the protection of legality is not a true legal remedy. This extraordinary legal remedy is a devolutive, not suspensive, legal remedy.

The Criminal Procedure Code of the Republic of Serbia (CPC, 2011-2021) significantly changed the aspect and manifestation of this legal remedy. The public prosecutor of the highest rank (Supreme Public Prosecutor) no longer holds the exclusive titulary right to apply for the request for the protection of legality. According to the law, this legal remedy, used for contesting the legal basis of the final verdict, may be submitted by the convicted person and their defence counsel, which introduces the claimant aspect. However, certain limitations imposed on the right of the convicted to submit a request for the protection of legality impair the principle of the 'equality of arms'. Not only is the convicted party constrained when applying for this legal remedy but they are also conditioned by the demand that they may file the request for the protection of legality only after they *have previously exercised* their right to apply for ordinary legal remedies. In addition, the convicted party is allowed to file the appeal *exclusively based on legal grounds* (CPC, Art. 485, para. 1, it. 2 and 3, para. 4), and the deadline for the appeal is 30 days after the Notice of Entry of Judgment has been served to them. The Supreme Public Prosecutor has to respect the deadline for appeal only in case the final verdict is contested because of the application of the *law held unconstitutional*, or because the decisions made by the Constitutional Court or the European Court for Human Rights *determined the violation of the human rights* of the convicted party or any other party involved in a lawsuit (CPC, Art. 485, para. 1, it. 2 and 3). Then, the deadline for appeal is three months after the Notice of Entry of Judgment has been delivered by the Constitutional Court or by the European Court for Human Rights.

The request for the protection of legality can be filed against all court decisions – *verdicts, decrees and orders,* regardless of the position that the court passing the judgment occupies in the hierarchy of courts (including the decisions of the Supreme Court of the Republic of Serbia, with the exception of the decisions brought on the request for the protection of legality). Decisions are then refuted because of unlawfulness in the application of law or in the procedure preceding the final verdict. The deisions of the procedural authorities, courts and public prosecutor can be the subject matter of revision and re-examination. The initiation of the procedure for re-examining the final verdict's legality is conditioned by the existence of both the formal and the substantive legal effectiveness of the verdict. Therefore, decisions which do not have the legal force of

claim preclusion cannot be refuted on the basis of the request for the protection of legality. This is further supported by the provisions of the Supreme Court of the Republic of Serbia, which prescribe that this appeal is not permitted to be filed against the verdicts that are not final, but only against the verdicts rendered as final verdicts, which means that the criminal procedure is meritoriously concluded (Serbian Supreme Court, 1972). This is the reason why this extraordinary legal remedy cannot be filed against *the dismissal of the criminal complaint* (regarded as in internal act performed by public prosecution offices), *the order to initiate an investigation* and *the order to stop an investigation.* Also, the request for the protection of legality cannot be filed against *the verdict revoked per appeal,* which has no force of claim preclusion, and which is sent back to the court of first instance to render the judicial decision. Considering the fact that public prosecutor's decisions also refer to third parties, some authors think that they can be revoked by the request for the protection of legality. The decisions made by the public prosecutor can be revoked "only in case of the violation of the offender's rights" (Ilić, 2016, pp. 367-369), i.e., in order to render the final verdict according to Article 493 of the Criminal Procedure Code.

Legal Grounds for Filing the Request for the Protection of Legality

Generally speaking, the grounds for filing the request for the protection of legality in the positive law framework include legal solutions that are actually a symbiosis of the grounds for applying for the three legal remedies as prescribed in the earlier procedural code. Besides the violation of law (CPC, Art. 485, para. 1, it. 1), which was considered a valid ground for filing for this legal remedy in the earlier legislation, the normative milieu for the protection of legality is extended to include the grounds that were earlier assumed as *a special case of the retrial of a criminal case,* or were the basis for expressing *an extraordinary legal remedy – appeal for the re-examination of the verdict.*

The grounds for filing the request for the protection of legality (CPC, Art. 485) are the following: (a) the *violation of law* – resulting from the wrong application or even the non-application of the norms of the substantive or procedural law; (b) the application of the law that was determined as unconstitutional by the *Constitutional Court,* the generally recognised rules of international law and acknowledged international contracts; (c) the violation or denial of the human rights of the convicted party or any other party involved in a lawsuit, which are granted by the *Constitution* or *the European Court for Human Rights;* and (d) violations of law in the first-instance proceeding and in the Appellate Court, *listed comprehensively and prone to revocation by the defendant* by means of the request for the protection of legality. These violations are the following: (a) *critical violation of the criminal procedure provisions* in relation to mandatory defence; obsolescence of prosecution or its termination due

to permanent obstacles (amnesty, pardon, first-instance verdict); the trial is presided over by a judge that had to be exempt from the case; the court violated the legal provisions in relation to the prosecutor's charges, i.e., permission granted by the competent authority; the verdict did not bring any final resolution to the trial; the verdict exceeds the accusation; the prohibition *reformatio in peius* is violated; the verdict is based on evidence it cannot be based on, unless the same verdict would have been evidently rendered even without that evidence (*relatively critical violation of the criminal procedure*); and (b) *violations of the criminal code* – the question whether the act with which the accused is charged is a criminal act; whether the criminal act, which is the object of prosecution, is tried by the application of the adequate law; whether the criminal sanctions imposed, or confiscation of property benefit or parole revocation violated the law; *unlawful* decisions upon the property claim, confiscation of property acquired by crime, as well as *unlawful and improper* decisions concerning the costs of the criminal proceedings.

The change of the aspects of this legal remedy is also reflected in the restrictions imposed on the Supreme Court regarding its decisions if the request for the protection of legality is filed because of the *violation of law*. In that case, the Supreme Court makes decisions *only about the issues that are considered significant for the correct and unifrom application of the law* (CPC, Art. 486 para. 2). Therefore, the court passes a decree that disclaims the request for the protection of legality if it is not significant for a proper or uniform application of law, even though it is filed because of a violation of law (CPC, Art. 487 para. 1 it. 4), or even though it is a violation to the detriment of the defendant. The court is thus enabled to select the cases for which it will hold trial on merits. This conceptual approach to one of the fundamental principles for initiating the procedure for the supervision of the legality of the final verdict "*makes room for the acceptance of unlawful decisions or procedures, which is inadmissible from the point of view of legal order*" (Bugarski, 2016, p. 93). The effectiveness of this legal remedy is thus diminished and the constitutional norm requiring that all court decisions be based on law is violated (Constitution of the Republic of Serbia, 2006-2021, Art. 145 para. 2). Moreover, the dismissal of the request for the protection of legality of the verdict rendered to the detriment of the defendant unless it considers "*the issue significant for the correct and unifrom application of the law*" (Brkić, 2014, p. 177) is a deviation from a long practice of the Public Prosecutor who has always used this legal remedy to react to the violation of law undertaken to the detriment of the defendant (*ibid.*). Finally, the legal protection of the legality of final verdicts is executed within the framework of the correct and unifrom application of the law, so that the defined purpose of filing the request for the protection of legality is in contrast to the very name of this extraordinary legal remedy. This legal remedy has to subsist as a legal mechanism aimed at eliminating any legal

deficiencies present in final verdicts and at reestablishing legality, not as a means for creating regularity and uniformity in the application of law.

Proceeding on Request for the Protection of Legality

The filed appeal states the reason (grounds) for revoking the final verdict. In case the final verdict is revoked by the decisions of the Constituional Court or the European Court for Human Rights, it is necessary to submit these decisions as well. The request for the protection of legality, together with possible decisions made by relevant courts, is submitted to the *Supreme Court*, which decides on the submitted appeal.

The Supreme Court holds a session of the Council, which is composed of five judges. The Council president appoints a *judge reporter*, who is in charge of preparing the procedure necessary for passing a judicial decision. Based on his/her report, the Council decides on the grounds for the dismissal of the request for the protection of legality. If it is not dismissed, the judge reporter submits a copy of the filed legal remedy to the public prosecutor or defence counsel. Prior to the meritorious decision, he/she can obtain certain information about the reasons for the revocation of the final verdict. The Council of the Supreme Court makes an unbiased assessment whether to inform the public prosecutor and defence counsel about its session.

The Supreme Court examines the revocation of the final verdict in relation to the reasons stated in the request for the protection of legality, and referring to the revocation required by this legal remedy. The law does not allow the expansion of the scope of this examination even in case any form of violation is perceived. On the other hand, the policy of *benefits of cohesion* (*beneficium cohaesionis*) enables an extensive impact of the filed request for the protection of legality in the form of the *subjective extension* of the legal remedy. This is possible if the request for the protection of legality is filed to the benefit of the defendant.

Decisions of Court of Legal Remedy Concerning the Request for the Protection of Legality

The Supreme Court can decide (a) to dismiss (issuing a decree), (b) to reject, and (c) to accept the request for the protection of legality. The decisions are passed in the form of judgment.

The Supreme Court passes a decree by which the request for the protection of legality is rejected for the following reasons: (a) it is not submitted within a prescribed deadline period, in case the deadline period is binding (always when the titular is the defendant, and sometimes when the appeal is submitted by the public prosecutor); (b) it is unlawful (submitted contrary to the Supreme Court decision passed upon the request for the protection of legality); (c) its contents are not proper; and (d) it is submitted because of the violation of law that is not significant for a

proper or uniform application of law. It is not necessary that the decree by which the request for the protection of legality is rejected be accompanied by an explanation (CPC, Art. 487).

The Supreme Court passes a judgment that the request for the protection of legality is rejected as ungrounded if it ascertains that the appeal does not state the reason that the appellant refers to. If the appeal is submitted because of the violation of law that was ungroundedly emphasised in the proceeding on the ordinary legal remedy, and if the Supreme Court accepts the reasons stated by the Appellate Court, the explanation of the verdict focuses on these reasons (CPC, Art. 491).

Accepting the request for the protection of legality, the Supreme Court passes a judicial decision to revoke or partially revoke the final verdict and the verdict rendered in the proceeding on the ordinary legal remedy, or only the verdict rendered in the proceeding on the ordinary legal remedy, and to return the case to the court whose verdict has been revoked (first-instance or appellate court). The case is returned to the stage of the first hearing in the first-instance court, or to inquest in the second-instance court. This decision is based on previous charges, or the part related to the revoked part of the verdict. The court in question is obliged to respect all the procedural regulations and discuss the issues indicated by the Supreme Court. During a retrial, in the first-instance court, i.e. Appellate Court, the litigants are allowed to state new facts and submit new evidence. When rendering a new verdict, the corresponding court is legally bound not to render a verdict to the worse, in case the proceeding is retried on the request for the protection of legality submitted to the benefit of the defendant. The court of legal remedy may order that a new trial be held in the presence of a completely changed council. This is frequently decided in case of significant violations of the criminal procedure provisions.

Accepting the request for the protection of legality, the Supreme Court can pass a judgment to reverse, partially or in full, the final verdict and the verdict rendered in the proceeding on the ordinary legal remedy, or only the verdict rendered in the proceeding on the ordinary legal remedy. Also, it is possible to reverse only a conviction. This judgment is passed on conditions that there is a violation of law or proceeding the appellant refers to in their request for the protection of legality, and that the appeal is submitted to the benefit of the defendant. The possibility of reversing verdicts, not just deeming them unlawful and revoked so that the case is returned to lower courts for reconsideration, expands the domain of the Supreme Court intervention beyond the regular system of cassation.

When the Supreme Court passes a judicial decision by which it determines that there exists a violation of law, and when it adopts the request for the protection of legality that is submitted to the detriment of the defendant, it does not contest the final verdict. It is the so called detrmining (declaratory) judgment. It does not ascertain any violation of law. This is the reinforcement of the constitutional principle that it is not pos-

sible to reverse a verdict in the proceeding on the extraordinary legal remedies to the detriment of the defendant and of one of the procedural concessions of the defendant partaining to the *favor defensionis*.

With respect to the law, the Supreme Court can revoke even a legal decision. This is made possible by the legal restrictions imposed upon the scope of examination of the revoked verdict in the proceeding on appeal. Namely, during the proceeding on appeal, the second-instance court has to reject the appeal and confirm the verdict if it was not authorised to eliminate the violation executed in the revoked verdict or in the proceeding (the violations not referred to by the appellant nor liable to be eliminated by court). Therefore, the decision of the Court of legal remedy is lawful. However, upon adopting the appeal for the protection of legality filed to the benefit of the defendant, if the appeal is deemed well-grounded and if the contested verdict is to be either revoked or reversed with the purpose of eliminating the violation of law, the Supreme Court will revoke or reverse this decision, passed in the proceedin on ordinary legal remedy even though it does not violate the law (CPC, Art. 492 para. 2).

INSTRUMENTS FOR ELIMINATING THE LEGAL DEFICIENCIES OF FINAL VERDICTS IN COMPARATIVE LAW SYSTEMS

The Elimination of the Legal Deficiencies of Final Verdicts – Practice Exercised in Former Yugoslav Republics

The request for the protection of legality is used as an instrument for the elimination of legal flaws in the legislations of the states evolved from the former Yugoslav federation. However, the aspect of this legal remedy has not been changed in the legal systems of these newly-formed states. Filing a request for the protection of legality may annul a violation of law and proceeding, without intending to have an impact on the correct and unifrom application of the law. Besides, the Supreme Public Prosecutor still holds the titular position regarding the submission of this legal remedy, which has transformed it into the litigants' legal remedy. The same conceptual approach is adopted by the legislations with the adversarial system of criminal proceedings (North Macedonia, in the first place). It is interesting that the CPA of Bosnia and Herzegovina prescribes a request for the repetition of criminal proceedings as the only extraordinary legal remedy (Criminal Procedure Act of Bosnia and Herzegovina, 2003-2018). There is no legal possibility of refuting the exclusively legal basis of a legally binding judgment. On the other hand, the CPC of the Republic of Srpska foresees the possibility of submitting a request for the protection of legality (Criminal Procedure Code of the Republic of Srpska, 2012-2021, Art. 350-358). Holders of the right to submit this legal remedy are the Republic Public Prosecutor, the convicted person and the defense attorney. In addition, the number of grounds for initiating the procedure for reviewing the legal basis of the final verdict

has been reduced. This is possible only because of violations of the criminal law and the violation of the right to defense. Other elements of the positive legal regime of requirements for the protection of legality are identical to the legal solutions of the Procedural Code of Serbia, except that the decision on violations of the criminal law is not reduced only if it is an issue of importance for the correct or uniform application of the law. The Criminal Procedure Act of the Federation of Bosnia and Herzegovina does not recognise extraordinary legal remedies intended to refute the legal deficiencies of the final verdict. The transitional provisions of this law only foresee the possibility of ending the procedure initiated by the request for the protection of legality which was submitted before the entry into force of the current procedural law (Criminal Procedure Act of the Federation of BiH, 2003-2020, Art. 456).

The procedural law of North Macedonia allows the possibility of submitting a request for the protection of legality against final verdicts due to violations of the constitution, laws and provisions of international treaties, ratified in accordance with the Constitution (Criminal Procedure Act, 2010-2022, Art. 457). The sole holder of the right to submit this legal remedy is the Public Prosecutor of North Macedonia, and the decision on the merits of the submitted request is made by the Supreme Court of the Republic of North Macedonia (Criminal Procedure Act, Article 458). At the same time, the Supreme Court can make decisions identical to those that exist in the legal system of Serbia.

Unlike the positive criminal procedural legislation of Serbia, the positive legal regime of extraordinary remedies in the legislation of North Macedonia retained the possibility of refuting the legal basis of the final verdict by submitting a request for an extraordinary review of the final verdict. The convicted (defendant) can submit this extraordinary legal remedy on their own, or through a lawyer, if they have been sentenced to at least one year in prison or juvenile prison, within 30 days of the date of receiving the final verdict. The condition for submitting this legal remedy is that the defendant has previously used the right to regular legal remedies, unless the second-instance verdict has acquitted him from punishment, court warning, or suspended sentence, or unless a fine has been replaced by a prison sentence or an educational measure has been replaced by a juvenile prison sentence. A request for an extraordinary review of the final verdict is not possible against the judgment of the Supreme Court (Criminal Procedure Act, Article 463). Similar to the former Yugoslav legislation, the Macedonian legislation reduces the range of grounds for filing this extraordinary legal remedy, namely to the exhaustively enumerated violations of the criminal law committed to the detriment of the defendant, expressly stated violations of the criminal procedure, and violations of the right to defense and violations of the appeal procedure, if they were of significance for the legal and proper judgment (Criminal Procedure Act, Art. 465).

The Criminal Procedure Code of Montenegro foresees the possibility of refuting the legal basis of the final verdict by submitting a request for the protection of legality. The grounds for filing this remedy are identical to those that exist in the positive law of Serbia (Criminal Procedure Code of Montenegro, 2009-2020, Article 437). However, this code does not provide that the violation that is the basis for challenging the final verdict is a matter of importance for the correct or uniform application of law. In contrast, the Montenegrin legislator also prescribed the procedural legitimacy of the defendant and the defense attorney to, albeit indirectly, refute the legal basis of the final verdict. Namely, the defendant and the defense attorney can request that the Supreme State Prosecutor's Office submits a request for the protection of legality. If the Supreme State Prosecutor's Office rejects the proposal, the defendant and the defense attorney can appeal the decision of the Supreme Court. The appreciation of the appeal implies that the defendant's or defense counsel's proposal is considered a validly submitted request for the protection of legality. Like our legislator, the Montenegrin legislation, considering the grounds for submitting a request for the protection of the legislator (through the submission of a proposal by the defendant or defense counsel), includes those grounds that were prescribed for the submission of a previous request for the examination of the legality of the final verdict (Criminal Procedure Code of Montenegro, Art. 438). Unlike the CPC of Serbia, Montenegrin legislation allows for the possibility of repeating the criminal procedure on the basis of a request for the protection of legality, if there is considerable doubt about the veracity of the decisive facts established in the decision against which the request was submitted (Criminal Procedure Code of Montenegro, Article 444). The system of extraordinary remedies in the Montenegrin procedural legislation, in contrast to the positive law of Serbia, retained the extraordinary mitigation of punishment.

The removal of the legal deficiencies of a legally binding judgment in Croatian legislation is initiated by submitting two extraordinary legal remedies – a request for the protection of legality and a request for an extraordinary review of a legally binding judgment. Therefore, the approach to the system of extraordinary legal remedies that existed in the former Yugoslav law remained in place. The exclusive holder of the right to submit a request for the protection of legality is the Chief State Prosecutor. He/she can submit this legal remedy due to violations of the law and the court decision "which was made in the procedure in a way that represents a violation of fundamental human rights and freedoms guaranteed by the Constitution, international law or the law" (Criminal Procedure Act, 2008-2022, Art. 509). The procedure according to the request, as well as the decisions made in this procedure, are identical to the positive legal regime of this extraordinary legal remedy in our legislation.

The basic principles of 'equality of arms' in the procedure initiated by extraordinary legal remedies in Croatian law are implemented through

the possibility of the convicted person and the defense attorney refuting the legal basis of the final verdict by submitting a request for an extraordinary review of the final judgment. The authority to submit this legal remedy within one month of receiving the verdict is available to a convicted person who has been sentenced to prison, or juvenile prison, as well as to a person who has been ordered to be placed in forced accommodation as a medical safety measure. The condition for reviewing the legal basis of the final verdict by the convicted person and the defense attorney is the prior use of regular legal remedies. The grounds for overturning the legal basis of the final verdict with this remedy are identical to those prescribed in the former Yugoslav law, and represented in the positive law of North Macedonia (expressly stated violations of the criminal law, certain violations of the provisions of the criminal procedure, violation of the right to defense and relatively important violations of the appeal procedure). The procedure and decisions on the submitted request for an extraordinary review of the legally binding verdict fully correspond to the physiognomy of this legal remedy profiled in the law of the former Yugoslav state (Criminal Procedure Act, Art. 515-520).

The positive law of Slovenia, as well as the legislation of Serbia, envisages a request for the protection of legality as an exclusive legal remedy for refuting the legal foundation of the final verdict. This legal remedy can be submitted for violations of the criminal law, absolutely essential violations of the provisions of the criminal procedure, as well as relatively essential violations of the procedure (if they affected the legality of the verdict). In addition, the request can also be submitted if the judgment of the European Court for Human Rights has established a violation of human rights provided for in the European Convention. It is curious that this extraordinary legal remedy can be submitted in a procedure that has not been legally concluded. Namely, a request for the protection of legality can be filed against a final verdict on detention, except if the detention was ordered by the Supreme Court, if it was extended by a decision of the Senate of the Supreme Court, or in the case of the extension of detention after the indictment (Criminal Procedure Act, 2003-2021, Article 420). Holders of the right to submit requests for the protection of legality are the State Prosecutor, the convicted person and the defense attorney. At the same time, the legislator does not reduce the grounds for submitting this legal remedy submitted by the convicted person and the defense attorney. The Slovenian legislation has retained the possibility of repeating the criminal proceedings in the proceedings initiated by the request for the protection of legality, if there is considerable doubt about the decisive facts on which the final judgment is based. The procedure under this legal remedy, as well as decisions that can be made in the process of reviewing the legal basis of a final verdict, correspond to the positive legal decisions of other countries in the South Slavic legal area (Criminal Procedure Act, Art. 420-429).

Mechanisms for Eliminating Legal Deficiencies
in the Most Important European Legislations

The Criminal Procedure Code of the Federal Republic of Germany provides for a specific system of legal remedies. Regular legal remedies include: the appeal against judgment (Strafprozessordnung der Bundesrepublik Deutchland – StPO, 1987-2023, § 312-332), and the review (StPO, § 333-358) and appeal against conclusions and orders (StPO, § 304-311a). It is interesting that the review refutes only the legal basis of the first-instance verdict. Namely, the reason for contesting the judgment by review is a violation of the law, which consists in the non-application or improper application of a legal norm (StPO, § 337). However, the system of extraordinary legal remedies in German law does not provide for the refutation of the legal basis of a final judgment. Repetition of the criminal procedure (StPO, § 359-373a) is the only extraordinary legal remedy, which primarily refutes the factual basis of the final verdict. In addition to the factual grounds that allow the possibility of a legally concluded criminal procedure, the German procedural law also prescribes the repetition of the criminal procedure in favor of the convicted person, if the judgment of the European Court of Human Rights establishes a violation of the European Convention for the Protection of Human Rights and Fundamental Freedoms in the judgment of the domestic court, which is based on that violation (StPO, § 359 para. 6). Therefore, the refutation of the legal basis of the legally binding judgment of the German court is indirectly allowed. The legal defects of a final judgment can be annulled by applying the Act on the Federal Constitutional Court of Germany (Gesetz über die Bundesverfassungsgerichs – BverfGG, 1951-2019, § 79 para. 1). The provisions of this Article of the Law allow the repetition of criminal proceedings against final judgments based on regulations that are contrary to the Constitution or regulations that were declared null and void by the decisions of the Constitutional Court, or judgments based on the interpretation of regulations that the Constitutional Court declared null and void (Haller & Conzen, 2001, p. 655). The positive legal regime of repetition of criminal proceedings to the detriment of the convicted person does not even allow the indirect possibility of reviewing the legal foundation of the final verdict of the German criminal courts (StPO, § 362). In addition, the possibility of repeating the criminal procedure "for a different assessment of the punishment based on the same provision of the criminal code" is excluded, as is true of reduced sanity (StPO, § 363).

The system of legal remedies in the French criminal procedure prescribes the division of legal remedies into regular and extraordinary. However, this classification is not based on the criteria prescribed in our law. Ordinary legal remedies (*les voies du recours ordinaires*) are declared for any reason (factual or legal), and can cause the procedure to be repeated. On the other hand, extraordinary legal remedies (*les voies du recours extraordinaires*) are filed to review the legality and regularity of

court decisions in cases provided by law, when it is not possible to declare regular legal remedies (Pradel, 2000, p. 712).

The refutation of the legal basis of final judgments in French law (*pour raison de droit*) is possible by submitting a cassation request in the interest of the law, and a request for a review of the criminal judgment following the pronouncement of the decision of the European Court for Human Rights (*le pourvoi en cassation dans í intérét de la loi*). The legal basis of the final judgment is refuted and therefore it is a 'real' extraordinary legal remedy. On the other hand, the cassation request in the interest of the party, although the French procedural code classifies it as an extraordinary remedy, is by its legal nature a regular remedy. It is filed against non-legally binding judgments that cannot be challenged by other regular legal remedies (objection or appeal).

A cassation request in the interest of the law can be filed by the Supreme Prosecutor acting before the Court of Cassation against final judgments of the Appellate, Jury, Correctional or Police courts, against which the authorised persons did not file a cassation request in a timely manner in the interest of the party. When deciding on this extraordinary legal remedy, the Court of Cassation cannot worsen the position of the parties, and the goal of the decision is to standardise judicial practice and respect the law. The physiognomy of the cassation request in the interest of the law conceived in this way inspired French theorists to label this legal remedy as a 'real' cassation request in the interest of the law. On the contrary, the 'false' cassation request in the interest of the law is, in fact, the annulment order of the Minister of Justice, by which he orders the Supreme Prosecutor to refer the first-instance or second-instance judgment that violates the law to the criminal panel of the Court of Cassation. The Court of Cassation, in this situation, can cancel the judgment and refer the case for a retrial to another court of the same type and degree as the court that made the challenged decision, with the prohibition of *reformatio in peius* being valid in the repeated proceedings (Mathias, 2007, p. 219).

The legality of legally binding court decisions (judgments, decrees and orders) in Russian law is reviewed by supervisory appeals and petitions. This extraordinary legal remedy is submitted due to significant violations of criminal material or procedural law, which may affect the outcome of the proceedings (Criminal Code of Russian Federation, 2002-2023, Art. 412). Supervisory appeals and petitions may be filed against: (a) decisions of first-instance courts of federal subjects against which an appellate appeal or petition to the Supreme Court of the Russian Federation was used; (b) the decision of district (*maritime*) courts against which an appellate appeal or a petition to the Supreme Court of the Russian Federation was used; (c) the decision of the appeal panel, the judicial collegium for criminal offenses and the military collegium of the Supreme Court of the Russian Federation made in the appellate procedure; (d) de-

cisions of the judicial collegium for criminal offenses and the military collegium of the Supreme Court of the Russian Federation made in cassation proceedings; and (e) orders of the Presidency of the Supreme Court of the Russian Federation.

The authorised holders to initiate the procedure for reviewing the legal basis of a legally binding judgment by submitting a supervisory appeal are: the convicted person, the defense attorney, the legal representative of the convicted person, the injured party, the Private Prosecutor, the legal representative, and the attorney of the Private Prosecutor, along with other persons to the extent to which the disputed issues affect their rights and interests. The right to submit an evidentiary petition, on the other hand, belongs to the Supreme Public Prosecutor of the Russian Federation and his deputies, Prosecutors of subjects of the Russian Federation, and Military Prosecutors and their deputies. A legally binding judgment in the part related to a civil lawsuit is held by both the applicant of the civil lawsuit and the civil defendant (Lupinskaja, 2009, p. 890). Deciding on this legal remedy consists of a preliminary procedure, in which the formal correctness of the filed supervision of appeals and petitions is assessed, and a supervisory procedure in which a meritorious decision is made. The Presidency of the Supreme Court can reject, cancel and return the final decision to the first-instance court, or the Appellate court, or it can return it to the cassation stage, and can even change the contested decision.

Similar to German law, Italian criminal procedure legislation creates an optimal normative framework for eliminating legal deficiencies in the procedure by regular legal remedies. The Italian Code of Criminal Procedure, in addition to appeals, provides for the possibility of filing a cassation appeal as a regular legal remedy (Codice di procedura penale – CPP, 1988-2022). At the same time, the cassation trial, apart from the decisions of the Appellate courts, decides on the merits of the first-instance courts against which no appeal or direct cassational appeal can be filed. Thus, the Italian legislation allows the possibility of reviewing the application of law and the substance of the accusation, which form the legal backbone of the second-instance decision. This postpones the entry into force of court decisions and, generally speaking, puts an end to any further possibility of changing the legal basis of the judgment after it becomes final. Revision, as the only extraordinary remedy represented in Italian law, allows the possibility of 'reopening the case' based on gross factual deficiencies. Exceptionally, if a conviction or a criminal order was based on a decision of a Civil or Administrative court that was later revoked (and had the status of a preliminary issue when deciding in a criminal proceeding), this constitutes grounds for revision (CPP, art. 630 com. 2). This is the only legal possibility to review the legal foundation of a final judgment in the Italian criminal procedure legislation in the procedure for an extraordinary remedy (Sfrappini, 2002, pp. 251-256).

CONCLUSION

A legally binding judgment represents the crown of the factual and legal establishment of a criminal case. Therefore, the legal basis of the final verdict, not even its factual basis, must leave no doubt as to its correctness. The system of extraordinary legal remedies in Serbian law, unlike some comparative legal systems, allows the legal basis of a legally binding judgment to be refuted by submitting a request for the protection of legality. However, the change in the physiognomy of this extraordinary legal remedy makes it difficult to achieve optimal results in the field of eliminating the illegality of excessive judgments. First of all, stipulating the possibility of refuting the legal basis of a final judgment on the fact that some circumstance was of significance for the correct or uniform application of law objectively narrows the scope of the effort to completely remove the legal deficiencies of the final judgment. Then, the loss of the exclusivity of the Supreme Prosecutor's instance to submit a request for the protection of legality, in parallel with the possibility that the holder of this legal remedy be both the convicted and the defense attorney, violates the very meaning of legality as primarily an instrument of public interest. The return of the request to examine the legality of the final verdict, as a counterpart to the request for the protection of legality, would improve the institutional possibilities of the convicted person to refute the legal basis of the final verdict, but would also respect the basic postulates of the principle of equality of arms in criminal proceedings. Likewise, there is no valid reason for eliminating the possibility of repeating the criminal procedure on the basis of the submitted request for the protection of legality, which is part of the positive legal regulation of many countries. It is not possible to create an optimal legal environment for the annulment of the legal defects of a legally binding judgment if there is no possibility to remove gross factual defects (substantial doubts about the existence of decisive facts) to which the law was applied in the process of reviewing the legal basis of the legally binding judgment.

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ОТКЛАЊАЊЕ ПРАВНИХ НЕДОСТАТАКА ПРАВНОСНАЖНИХ ПРЕСУДА

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Резиме

Моменат наступања правноснажности пресуде подразумева да је донета судска одлука, као резултат законитог и правилно спроведеног поступка утврђивања чињеничне основице кривичног догађаја и на њу примењених норми кривичног закона. Међутим, то не искључује могућност да и у правноснажној пресуди могу опстати правни недостаци. Стога, наше позитивно право, али и упоредноправни системи, предвиђају могућност побијања правне основице правноснажне пресуде. То се може постићи подношењем захтева за заштиту законитости, али и применом других законских решења у прописаном систему правних лекова.

Правна неутемељеност правноснажне пресуде огледа се у погрешној примени одредаба материјалног и процесног права на утврђену чињеничну основицу правноснажне пресуде. Неадекватна примена одредаба Кривичног законика чини правноснажну пресуду незаконитом. Исто тако, непоштовање законских одредаба о поступку у коме је донета правноснажна пресуда нарушава законитост донете одлуке. У позитивном праву Србије, недостаци у примени права и у поступку доношења правноснажне пресуде отклањају се одлукама донетим у поступку иницираном захтевом за заштиту законитости. За разлику од позитивног права Србије, поједина законодавства предвиђају ванредне правне лекове којима ексклузивно осуђени (окривљени) може побијати правне недостатке правноснажне пресуде.

Захтев за заштиту законитости је ванредни правни лек којим Врховни јавни тужилац и осуђени, уз помоћ браниоца, побијају правноснажну пресуду услед мањкавости у поступку примене материјалног и процесног закона. Условљавање могућности побијања правне основице правноснажне пресуде чињеницом да је нека околност била „од значаја за правилну или уједначену примену права" објективно сужава хоризонт васпостављања нарушене законитости. Повратак захтева за испитивање законитости правноснажне пресуде у наше законодавство побољшао би институционалне могућности осуђеног да побије правну основицу правноснажне пресуде.

Основни принципи „једнакости оружја" у поступку иницираном ванредним правним лековима у појединим компаративноправним системима реализују се кроз могућност осуђеног и браниоца да побију правну основицу правноснажне пресуде подношењем ванредних правних лекова, чији су ексклузивни титулари окривљени и бранилац. Реч је превасходно о захтеву за ванредно преиспитивање правноснажне пресуде.

У појединим позитивним законодавствима, међу којима је и немачко позитивно законодавство, правни недостаци се побијају искључиво редовним правним леком – ревизијом. Разлог за оспоравање пресуде ревизијом јесте повреда закона, која се састоји у непримењивању, или у неправилној примени правне норме. Насупрот томе, систем ванредних правних лекова не предвиђа нормативни оквир за побијање правне основице правноснажне пресуде.

Компаративноправна законодавства, али и српско законодавство, предвиђају законом прописани утицај одлука Европског суда за људска права на иницирање поступака по ванредним правним лековима, којима се омогућава отклањање правних недостатака правноснажних пресуда.

IRREGULAR MIGRANTS ON THE ROADS OF SERBIA

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Abstract

With the onset of the migrant crisis in Europe, irregular migration is becoming a significant security problem for European leaders and citizens. As a result, there has also been a change in the public opinion of European countries, because many citizens associate irregular migration with terrorism and other security problems. In line with the growing importance of irregular migration as a security problem, the research aimed to determine changes in migration trends in Serbia, that is, on the 'Balkan route' of migration since 2015, when the migrant crisis in Europe began. Results that can roughly indicate the profile of an irregular migrant found on the territory of the Republic of Serbia were obtained in this research, conducted between June and August 2020 on a sample of 50 irregular migrants. An irregular migrant is a person from Afghanistan, of Islamic religion, uneducated, and of a poor financial status. They want to go to Germany for money, and they cross the borders of the countries located on the 'Balkan route' on foot, occasionally using the services of smugglers. Additionally, they have no problems with the border police of Serbia. The conducted research can contribute to gaining new knowledge about the problem of irregular migration, primarily about the trends that are different than they were at the time of the migrant crisis in 2015. Unlike previous research, this research is unique in that it also refers to the work of the border police and the attitude of border police officers toward irregular migrants.

Key words: irregular migration, migrant crisis, border police, irregular migrants, Balkan route.

ИРЕГУЛАРНИ МИГРАНТИ НА ПУТЕВИМА СРБИЈЕ

Апстракт

Ирегуларне миграције постале су значајан безбедносни проблем за европске лидере и грађане са наступањем мигрантске кризе у Европи. Услед тога дошло је и до промене у јавном мњењу европских држава јер велики број грађана повезује ирегуларне миграције са тероризмом и другим безбедносним проблемима. У складу са променом значаја ирегуларних миграција као безбедносног пробле-ма, циљ истраживања је био утврђивање промена у мигрантским трендовима у Србији, односно на „Балканској рути" миграција, од 2015. године када је ми-

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грантска криза у Европи почела. У истраживању спроведеном између јуна и августа 2020. године на узорку од 50 ирегуларних миграната дошло се до резултата који могу оквирно да укажу на профил ирегуларних миграната затечених на територији Републике Србије. То су необразована лица из Авганистана, исламске вероисповести и слабог материјалног статуса, која због новца желе да оду у Немачку, а границе држава које се налазе на Балканској рути прелазе пешке, уз повремено коришћење услуга кријумчара. Типично су то лица која немају проблема са граничном полицијом Србије. Спроведено истраживање може допринети доласку до нових сазнања о проблему ирегуларних миграција, пре свега о трендовима који су другачији но што је то био случај у време мигрантске кризе 2015. године. За разлику од претходних истраживања, ово истраживање је јединствено у делу који се односи на рад граничне полиције и на однос граничних полицајаца према ирегуларним мигрантима.

Кључне речи: ирегуларне миграције, мигрантска криза, гранична полиција, ирегуларни мигранти, Балканска рута.

INTRODUCTION

Until 2015 and the the onset of the migrant crisis, with migrants pouring into Europe from Africa, the Middle East, and South Asia (Ćopić & Ćopić, 2017; Djurović, 2017; Janković & Todorović, 2017), irregular migration did not pose a significant security problem for European leaders and its citizens. However, it was precisely that year that recorded a change in public opinion and the attitudes of politicians toward irregular migration. A change of attitude could also be observed in the Republic of Serbia, and it is expressed in the National Security Strategy of the Republic of Serbia, in which it is stated that one of the biggest threats on the international level is, among others, the migrant crisis, i.e., irregular migrants (Dragišić, 2021).

The term 'irregular migrant' denotes a foreigner who illegally entered the territory of a country (for example, entering a country outside a border crossing, or entering at a border crossing but with forged travel or other documents). An 'irregular migrant' is also a foreigner who entered a country legally, but remained in it after the expiration of legal residence (Ćopić & Ćopić, 2017). Illegal crossings of the state borders of European countries during the migrant crisis took place along established routes - the Mediterranean route (Ilias, Leivaditi, Papatzani, & Petracou, 2019; Janković & Todorović, 2017; Terlizzi, 2019; Turanjanin & Soković, 2019), which migrants crossed by sea, and the 'Balkan route', either following the Turkey - Greece - North Macedonia - Serbia (Janković & Todorović, 2017) or the Turkey - Bulgaria - Serbia route (Stoynova, Bezlov, Dahl, & Bjelland, 2019). In 2015 alone, depending on the data source, between 579,518 (Ćopić & Ćopić, 2017) and 764,038 migrants (Janković & Todorović, 2017) crossed the 'Balkan route'. The most significant number of irregular migrants came from Syria and Iraq, and a minor number came from Afghanistan and Pakistan (Mijalković & Pe-

trović, 2016; Stoynova et al., 2019; Umek, Minca, & Šantić, 2019). At the same time, the percentage of European Union citizens who see terrorism and religious extremism as one of the most critical security challenges increased by 16% - from 33% in 2011 to 49% in 2015 (Djurdjević & Radović, 2015).

The most significant number of irregular migrants wanted to reach rich European countries, primarily Germany, France, the Netherlands, and Sweden (Djurović, 2017; Stoynova et al., 2019; Umek et al., 2019). The main entity in preventing illegal border crossings on the way to the mentioned countries is the border police (Janković, 2014; Janković, Milojević, & Račić, 2013; Milojević & Janković, 2012). At the beginning of the migrant crisis in 2015, members of the border police performed independent surveillance of the state border. However, due to the enormous increase in irregular migrants, the border police were assisted in monitoring the state border by the Gendarmerie, the army, and FRONTEKS (Janković & Cvetković, 2016; Stevčić, 2019; Stoynova et al., 2019). On their way, irregular migrants encounter numerous problems, among which are: paying high sums of money to smugglers for their transfer from one country to another (Giljević et al., 2020; Stoynova et al., 2019), bribing members of the border police (Jancsics, 2019; Janković & Milojević, 2017; Stoynova et al., 2019), and physical abuse by members of the border police (Giljević et al., 2020).

This research aimed to determine the changes in migration trends in Serbia, i.e., on the 'Balkan route' of migration, since 2015, when the migrant crisis in Europe began. These changes may be changes in movement routes, movement directions, the origin of migrants, and security risks that the mentioned migrations carry. The results obtained from the research could help the state authorities of Serbia and other countries located on the 'Balkan route' solve the problem of irregular migration in the most pleasing way.

METHODS

The research was conducted between June and August 2020 on a sample of 50 irregular migrants found on the territory of the Smederevo Police Department. All migrants were male because, at the time of the research, there were no female migrants in the surveyed area. The research method applied is the anonymous survey technique. Migrants were surveyed with a questionnaire written in Serbian, and translated into English and Pashto. The respondents' were offered to fill out the survey in the language they knew. In case they did not know any of the offered languages, they received help with filling in the questionnaire from translators who had not previously been in contact with the researchers. Only irregular migrants who voluntarily agreed to the survey took part in the research.

RESULTS

By analysing the survey questionnaires, it can be noted that the age of the respondents ranged from 14 to 44 at the time the research was conducted. Graph 1 shows the age of the respondents, and it is noticeable that the most significant number of the surveyed irregular migrants were between 18 and 26 years old during this research. The average age of the respondents is 21.34 years. Of the total number of respondents, 9 were minors, and 41 were adults. If the examined irregular migrants are classified according to the decade of life, it can be noted that the second and third decades of life almost wholly dominate. Among the respondents, most persons are between the ages of 10 and 30 (Graph 2).
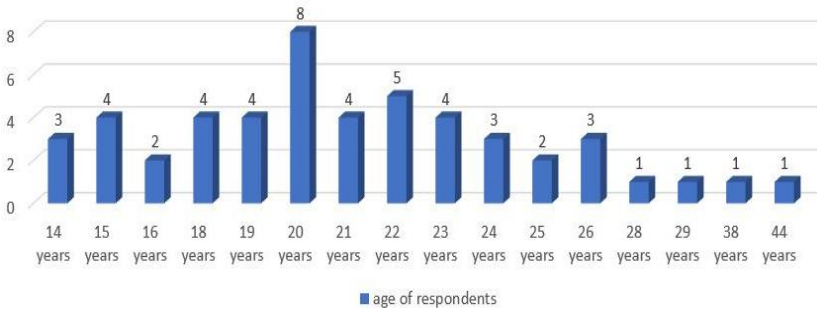
Graph 1. Age of respondents by years of age
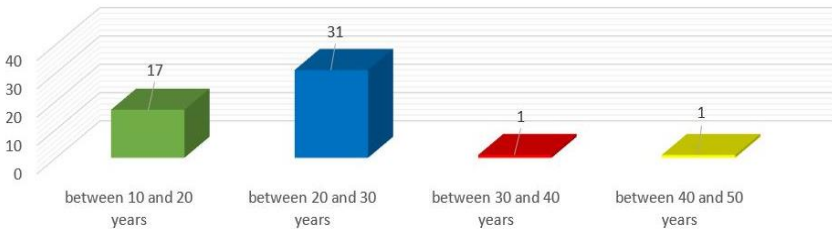
Graph 2. Age of respondents by decade of life

Further analysis of the survey questionnaires found that out of 50 respondents, 41 are from Afghanistan, five are from Bangladesh, three are from Iran, and one is from Pakistan. So, out of all of the respondents, 86% are citizens of Afghanistan. The most significant number of respondents, i.e., 39, declared themselves as Muslims, while 11 declared themselves as atheists. Regarding the respondents' level of education, it was determined that 28 respondents have no education (uneducated), 13 have completed elementary school, and nine have completed secondary education. There were no respondents with a higher education.

When asked whether they were a military or police organisation member, seven out of the 50 surveyed migrants answered that they were a member of a military or police organisation. Such a broad question includes regular military service and possible membership in paramilitary units in the country of origin. A positive answer of only 14% can be justified by the fact that there were nine minors among the respondents, and the fact that the average age of the respondents is 21.3, so not all of the surveyed migrants had the opportunity to serve in the military or participate in combat operations or terrorist activities.

When it comes to the reasons why the respondents left their home country and became irregular migrants, they can be grouped into three groups: (1) lack of funds, (2) impossibility of employment, and (3) wartime environment. As many as 34 respondents cited money as a reason for leaving, ten cited war as a reason, while six stated that lack of work was their reason for leaving (Chart 3).
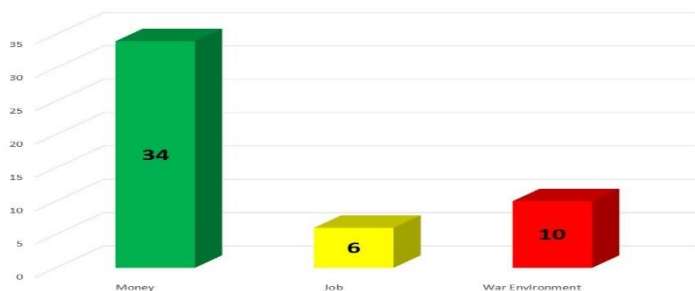

Chart 3. The respondents' reason for leaving their country of origin

In order to determine the movement routes of irregular migrants, respondents were asked to name the countries they moved through before entering the territory of Serbia. The most significant number of respondents (42 of them) entered the Republic of Serbia from North Macedonia. In contrast, eight respondents declared that they entered the Republic of Serbia from Bulgaria. Further analysis established regularity in the movement, i.e., irregular migrants from Central Asia move via Iran to Turkey, where the route splits, and the majority of the migrants go to Serbia via Greece and North Macedonia, while the rest of the migrants from Turkey reach Serbia via Bulgaria. The next question was related to the means of transportation by which they entered the territory of the Republic of Serbia. Out of a total of 50 surveyed respondents, 30 declared that they entered Serbia on foot, 18 declared that they entered Serbia by truck, and two declared that they entered Serbia by train, while there were no respondents who entered by car, plane, or other means.

When asked what the desired final destination of irregular migrants is, 41 respondents declared that it was Germany, five declared that it was

Great Britain, two declared that it was France, and two declared that it was Switzerland. Chart 4 indicates the desired destination of irregular migrants in Western Europe (as a geopolitical region, not only as a geographical term), with Germany leading the way as a desired destination.
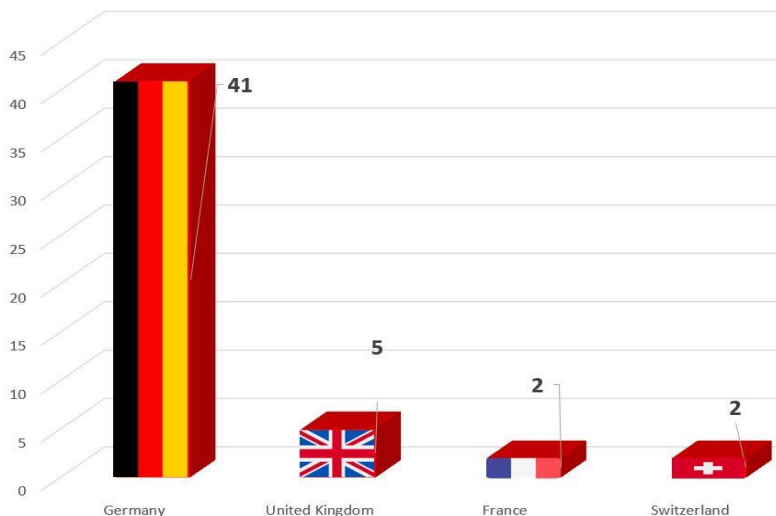

Chart 4. Desired destination countries of irregular migrants

One of the possible ways for migrants to cross the border is with the help of smugglers who charge a high price for their 'services'. Thirteen respondents stated that they paid smugglers to take them across the border, while 37 of them stated that they did not do so. Thus, as many as 26% of the respondents (every fourth respondent) gave a positive answer to this question. Out of the 13 persons who answered the question positively, five respondents declared that they used the services of people smugglers in Turkey, four used these services in Greece, and four used them in Bulgaria. In most cases, the modus operandi related to the smugglers' paid services involved the crossing of borders by truck.

In the questionnaire, a group of questions concerned the attitude of members of the border police towards migrants. The first of those questions was whether police officers and the border police applied coercive measures because some media showed that some police units used excessive force to prevent migrants from crossing the state border. Three respondents gave a positive answer, while 47 answered negatively. When asked the question of whether they bribed border police officers in the Republic of Serbia, only one of the 50 respondents gave a positive answer.

DISCUSSION

The profile of an irregular migrant found on the territory of the Republic of Serbia can be roughly described according to the obtained results. An irregular migrant is a person from Afghanistan, of the Islamic religion, uneducated, and of a poor financial status. They want to go to Germany for money, and they cross the borders of the countries on the 'Balkan route' on foot, occasionally using the services of smugglers. Typically, they do not experience any inconvenience from the Serbian police when crossing the border.

Fifty respondents participated in the conducted research. The majority of the respondents are young people. Their average age was 21.3 years at the time of this research. When the obtained data is considered in connection with the fact that all of the the respondents are male, the motive of irregular migration can come under doubt. It is a strong indicator that the motive of migration should not be sought in the state of war in the country of origin, or in the fear of religious, national, and political persecution, because if the motive were to escape war or persecution, then the entire population of a country or a particular region within a country, or all members of a particular ethnic group would migrate. Consequently, the migrant population would also include women, children, and the elderly. In this regard, state authorities, and above all, members of the border police must take this information into account when monitoring the state border in order to prevent illegal border crossings, and while planning actions to suppress irregular migration deeper into the territory of the Republic of Serbia. Particular attention should be paid to the fact that irregular migrants are at an age when they can provide adequate resistance to police officers. Because of that, it is necessary to adequately plan the treatment of migrants in the form of an increased level of caution and an adequate number of hired police officers. It should be emphasised that the analysis of gender comes to the fore only if it is observed cumulatively with the analysis of the age of irregular migrants, because it is only then that a complete picture of persons against whom adequate measures and actions should be taken is created.

Regarding the origin of the respondents, most of the surveyed irregular migrants are from Afghanistan. What is interesting is that the majority of migrants were Syrians after the escalation of the war in Syria in 2015 and the increase in the volume of migration to Europe (Mijalković & Petrović, 2016; Stoynova et al., 2019; Umek et al., 2019), while Afghans took over the primacy five years later. As for migrants from other countries (Iran, Bangladesh, and Pakistan), they come from countries that are not at war. From this, it can be concluded that these are economic migrants whose lives are not threatened by war events. Analysing the origin of irregular migrants can be helpful to border police officers when controlling flights from countries from which many irregular migrants come.

Such flights are especially controlled because it is not uncommon for irregular migrants to falsify travel documents to cross the borders of different countries (Milojević & Janković, 2017). On such flights, before the regular border check that takes place at a particular counter, a pre-border check is carried out, during which passenger profiling takes place. The primary purpose of profiling-based checks is to determine the absence of usual (expected) behaviour or the presence of abnormal behaviour during the process of checking documents (for example, passports), and to analyse the behaviour of the controlled passenger.

As the dominant religion among irregular migrants is Islam, security services must pay special attention to the fact that religious fanatics can infiltrate migrants, which would be a serious threat to the security of the Republic of Serbia. Other authors state this is a possible danger (Stevčić, 2019; Vukonjanski & Sekulović, 2019). They explain that Islamic fundamentalism infiltrating the Balkans and Europe, with the ultimate intention of latent political and cultural weakening of Christian Europe, is a possible scenario threatening the security of the Republic of Serbia. The action of the Italian police on the island of Sardinia showed that migrants from Afghanistan and Pakistan are being recruited for terrorist activities on Italian soil, so this possibility must also be taken into account on the 'Balkan route' (Janković & Todorović, 2017). In particular, it must be taken into account that several irregular migrants participated in hostilities or were members of military or paramilitary formations, as indicated by the collected data. The security services of Serbia and other countries must keep this fact in mind, and mark such persons for primary monitoring by security.

As for the economic status of migrants, it is evident that persons with a poor financial status dominate, which is not surprising considering that they come from countries that are not developed countries. This data, viewed in interaction with other collected data, indicates that the real reason for migration should be sought in economic factors, and not in security factors. According to the research results, the main motives for migration are not war and fear for one's safety, but money, that is, economic reasons and the search for better material conditions. This motive can be significant when conducting the procedure for obtaining asylum before the Asylum Office. The Law on Asylum and Temporary Protection (2018) excludes the possibility of obtaining asylum in the Republic of Serbia for economic reasons. Asylum is granted only in cases where the person is at risk of persecution in their country of origin because of their race, gender, language, religion, nationality, specific political belief or belonging to a particular social group, due to which they cannot or do not want to accept the protection of their country of origin. The final destination of residents who migrate out of fear for their lives is the closest country in which they are safe during 'real migrations'. In contrast, during

economic migrations, the final destination is a highly developed country, such as, for example, Germany.

Regarding the movement routes of irregular migrants, they have not generally changed compared to 2015, when the migrant crisis was at its peak (Janković & Todorović, 2017; Stoynova et al., 2019). In the following period, members of the border police should work on identifying micro-locations where migrants illegally cross the state border. This can be important information that can be used to prepare risk analyses during state border surveillance, i.e., determining the critical points on the borders where the most attention should be paid. However, this information could also indicate which countries should intensify cooperation to suppress irregular migration.

During the research, it was found that irregular migrants most often cross the state border on foot. This modus operandi of movement can be essential in detecting irregular crossings of the state border and suppressing the crime of 'people smuggling'. Also, if the analysis of the mode of entry is observed together with the analysis of the movement routes, it can be concluded that irregular migrants most often enter Serbia from North Macedonia, on foot through rural areas, or by truck, hiding in the cargo areas of vehicles. This fact can direct the activities of border police officers along the borderline and at border crossings more precisely.

Earlier research (Jancsics, 2019; Janković & Milojević, 2017) indicated a high level of corruption in the border police of the Republic of Serbia. In this research, it was shown that only one respondent stated that he had bribed members of the Serbian border police. Even just one case of corruption is worrying, but this is an indicator that the level of corruption is not high and that members of the border police generally perform their work conscientiously. The fact that only one migrant bribed border police officers globally is not a cause for concern. However, we should strive for the complete eradication of corrupt phenomena in the border police by identifying high-risk processes and positions in the work of the Border Police Administration, where there exists a risk that border police officers will be corrupt. Furthermore, anti-corruption measures can be implemented in places in which the increased risk has been determined. Also, earlier research indicated that members of the border police physically abused migrants (Giljević et al., 2020), which was not determined in this research. It has been shown that the members of the Serbian border police respect the Code of Police Ethics (2017). However, the education of the members of the border police regarding the treatment of irregular migrants should be continued.

CONCLUSION

The results of empirical research conducted in 2020 indicate that economic migrations occur through the territory of the Republic of Serbia, and that most irregular migrants in our country cannot obtain asylum due to the correct legal solutions that regulate that area. Also, determining the profile of the average irregular migrant and the average irregular migration, while also taking into account that there is a possibility that terrorists use the flows of irregular migration to achieve their goals, can significantly indicate the core of the problem, which can direct the work of the state authorities of the Republic of Serbia.

The research of irregular migration routes has almost established a regularity in the movement of irregular migrants arriving in Turkey from their country of origin via Iran. The route to Serbia is divided into two directions, the first of which goes through Greece and North Macedonia, while the second goes through Bulgaria. The research determined that the dominant direction of migration is from North Macedonia; that is, this border is the most threatened from the point of view of irregular migration. This fact can be of great importance for police officers of the border police at the operational, tactical, and strategic levels. The degree of threat to the borders and the issue of the critical points on them should be taken into account when drawing up plans to combat irregular migration, and while determining and deploying police officers and material resources. In correlation with that, one can also consider the information established by the research, which notes that irregular migrants during 2020 predominantly entered the territory of the Republic of Serbia on foot via the 'green belt' and avoided police officers and border control on those occasions.

Given that the end of the migratory process is not in sight, it is necessary for all countries on the migratory route to achieve absolute cooperation in taking the necessary steps to solve this very complex problem. Transit countries must maintain adequate mutual communication, they must harmonise legal regulations and, to the greatest extent possible, they must standardise the treatment of irregular migrants. It would be desirable for each country to have a liaison officer in neighbouring countries from which an influx of irregular migrants is expected. In the case of Serbia, these countries are North Macedonia and Bulgaria. The liaison officer would monitor the state of irregular migration in the country where he is located and quickly and efficiently forward the collected data to plan measures and actions to adequately combat irregular migration. In addition, Serbia must sign readmission agreements with the irregular migrants' countries of origin. These agreements would open up the possibility of returning irregular migrants to their countries of origin if they are not in interstate or civil war, and if irregular migrants are not in danger of any persecution. This possibility would effectively solve the problem of

the so-called 'economic migrants' who, abusing the right to asylum, move irregularly from their countries of origin to the countries of Western Europe. Applying the readmission system would demotivate irregular migrants and significantly reduce their number.

The conducted research gathered new knowledge about the problem of irregular migration, primarily about trends that are currently different than they were during the migrant crisis in 2015. Unlike previous research, this research is unique in that it refers to the work of the border police and their attitude towards irregular migrants. Indeed, this initial research in this area only provides a framework for further research. In future research, the number of respondents should be increased, because the authors encountered the problem of selecting respondents since a significant number of migrants were not willing to cooperate. Also, the number of survey questions in future research should be increased and directed more precisely towards the parts of the research subject that are the focus of the researcher, in order to obtain even more precise information.

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ИРЕГУЛАРНИ МИГРАНТИ НА ПУТЕВИМА СРБИЈЕ

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Резиме

Циљ истраживања је био утврђивање промена у мигрантским трендовима у Србији које су се догодиле након 2015. године када је мигрантска криза у Европи почела. Другим речима, циљ истраживања било је испитивање потенцијалних промена у рутама кретања, правцима кретања, пореклу миграната и безбедносним ризицима које носе поменуте миграције.

Истраживање је спроведено између јуна и августа 2020. године на узорку од 50 ирегуларних миграната затечених на територији Полицијске управе Смедерево. Сви мигранти у узорку су мушког пола. Примењена је метода испитивања техником анонимног анкетирања. Мигранти су анкетирани анкетним упитником који је сачињен на српском, а затим је преведен на енглески и паштунски језик. У анкетирању су учествовали само ирегуларни мигранти који су добровољно пристали на анкетирање.

Анализом анкетних упитника може се уочити да се узраст испитаника креће у распону од 14 до 44 године. Просечна старост испитаника износи 21.34 године. Међу испитаницима је највише лица од 10 до 30 година старости. Утврђено је да је њих 41 пореклом из Авганистана, пет из Бангладеша, три из Ирана и један из Пакистана. Њих 39 изјаснило се да су исламске вероисповести, док се 11 испитаника изјаснило да су атеисти. Такође, утврђено је да 28 испитаника нема никакав вид образовања (необразовано), 13 испитаника има завршену основну школу, а 9 испитаника има завршено средње образовање.

Према добијеним резултатима може се оквирно описати профил ирегуларних миграната затечених на територији Републике Србије. То су необразована лица из Авганистана, исламске вероисповести и слабог материјалног статуса, која због новца желе да оду у Немачку, а границе држава које се налазе на Балканској рути прелазе пешке, уз повремено коришћење услуга кријумчара. Типично су то лица која немају проблема са граничном полицијом Србије.

Мотив миграције не треба тражити у ратном стању у држави порекла или у страху од верског, националног и политичког прогона, већ у економским разлозима. Ирегуларни мигранти се налазе у животној доби када могу пружити адекватан отпор полицијским службеницима, те је неопходно на адекватан начин планирати поступање према њима у виду повећаног степена опрезности и адекватног броја полицијских службеника које треба ангажовати. Међу мигранте могу да се инфилтрирају верски фанатици што би било веома опасно угрожавање безбедности Републике Србије. Руте кретања ирегуларних миграната се нису генерално промениле у односу на 2015. годину када је мигрантска криза била на врхунцу. Ирегуларни мигранти најчешће државну границу прелазе пешке. Само је један испитаник изјавио да је дао мито припадницима граничне полиције Србије. Такође, ни један испитаник није био физички злостављан од стране припадника служби безбедности Србије.

Преко територије Републике Србије одвијају се економске миграције и већина ирегуларних миграната у нашој држави не може добити азил. С обзиром на то да се крај миграторног процеса не види у скоријој будућности, неопходно је да све државе које се налазе на миграторној рути постигну апсолутно садејство у предузимању неопходних корака ка решавању тог веома сложеног проблема. Неопходно је да Србија потпише уговоре о реадмисији са државама порекла ирегу-

ларних миграната, што би демотивисало ирегуларне мигранте и значајно умањило њихов број. За разлику од претходних истраживања ово истраживање је јединствено у делу који се односи на рад граничне полиције и њихов односа према ирегуларним мигрантима.

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In-text citation:
(Manouselis, 2008), i.e. (Manouselis, 2008, p. 55)
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Manouselis, N. (2008). Deploying and evaluating multiattribute product recommendation in e-markets. *International Journal of Management & Decision Making, 9*, 43-61. doi:10.1504/IJMDM.2008.016041

Journal papers and articles – 2 to 6 authors

In-text citation:
First reference: (Uxó, Paúl, & Febrero, 2011)
Subsequent references: (Uxó et al., 2011)
In 'References':
Uxó, J., Paúl, J., & Febrero, E. (2011). Current account imbalances in the monetary union and the great recession: Causes and policies. *Panoeconomicus*, 58(5), 571-592.

Journal papers and articles – more than 6 authors

In-text citation:
(Cummings et al., 2010, p. 833)
In 'References':
Cummings, E., Schermerhorn, A., Merrilees, C., Goeke-Morey, M., Shirlow, P., & Cairns, E. (2010). Political violence and child adjustment in Northern Ireland: Testing pathways in a social–ecological model including single-and two-parent families. *Developmental Psychology, 46*, 827-841. doi: 10.1037/a0019668

Book – 1 author

In-text citation:
(Heschl, 2001, p. 33)
In 'References':
Heschl, A. (2001). *The intelligent genome: On the origin of the human mind by mutation and selection*. New York, NY: Springer-Verlag.

Book – edited volume

In-text citation:
(Lenzenweger & Hooley, 2002)

In 'References':

Lenzenweger, M. F., & Hooley, J. M. (Eds.). (2002). *Principles of experimental psychopathology: Essays in honor of Brendan A. Maher*. Washington, DC: American Psychological Association.

Paper or chapter in an edited volume

In-text citation:

(Cvitković, 2007)

In 'References':

Cvitkovic, I. (2007). Katolicizam [Catholicism]. U A. Mimica i M. Bogdanović (Prir.), *Sociološki rečnik* [*Dictionary of Sociology*] (str. 226-227). Beograd: Zavod za udžbenike.

Encyclopaedia entry

In-text citation:

(Lindgren, 2001)

In 'References':

Lindgren, H. C. (2001). Stereotyping. In *The Corsini encyclopedia of psychology and behavioral science* (Vol. 4, pp. 1617-1618). New York, NY: Wiley.

Papers in Conference Proceedings

In-text citation:

(Bubanj, 2010)

In 'References':

Bubanj, S., Milenković, S., Stanković, R., Bubanj, R., Atanasković, A., Živanović, P. et al. (2010). Correlation of explosive strength and frontal postural status. In: Stanković, R. (Ed.): *XIV International Scientific Congress FIS Comunications 2010 in Sport, Physical Education and Recreation* (191-196). Niš: University of Niš, Faculty of Sport and Physical Education.

PhD Dissertations, MA Theses

In-text citation:

(Gibson, 2007)

In 'References':

Gibson, L. S. (2007). *Considering critical thinking and History 12: One teacher's story* (Master's thesis). Retrieved from https://circle.ubc.ca/

Institutions as authors

In-text citation:

(Републички завод за статистику, 2011)

In 'References':

Републички завод за статистику. *Месечни статистички билтен*. Бр. 11 (2011).

Laws

In-text citation:

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In 'References':

Закон о основама система васпитања и образовања, Службени гласник РС. Бр. 62 (2004)

Legal and other documents

In-text citation:

(Legal Consequences for States of the Continued Presence of South Africa in Namibia (South West Africa) notwithstanding Security Council Resolution 276, 1971)

In 'References':

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