

**Sixth International Scientific Conference
on Economics and Management**

EMAN 2022



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6TH INTERNATIONAL SCIENTIFIC CONFERENCE
EMAN 2022

***EMAN 2022 – Economics & Management:
How to Cope with Disrupted Times***

SELECTED PAPERS

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Preface

The purpose of the annual EMAN conference is to support the power of scientific research and dissemination of the research results with the objective to enhance society by advancing knowledge; policy-making change, lives, and ultimately, the world. Our objective is to continue to be the foremost annual conference on cutting-edge theory and practice of economics, management, law, tourism, environment, technology through encouraging advancement via excellence, and interaction.

EMAN conference aims to bring together the international academic community (experts, scientists, engineers, researchers, students, and others) and enable interactive discussions and other forms of interpersonal exchange of experiences and popularization of science and personal and collective affirmation.

The annual EMAN conference is committed to the highest standards of publishing integrity and academic honesty ensuring ethics in all its publications. Conformance to standards of ethical behavior is therefore expected of all parties involved: authors, editors, reviewers, and the publisher. The conference organizer follows the Committee on Publication Ethics (COPE) guidelines on how to deal with potential acts of misconduct.

All received full papers prior peer review process are subject to plagiarism check with iThenticate by Turnitin software. Any identified plagiarism automatically disqualifies a paper. Afterward, all full papers are double-blind peer-reviewed by the reviewers drawn from the editorial committee or external reviewers depending on the topic, title, and the subject matter of the paper. Peer reviewers provide a critical assessment of the paper and may recommend improvements. Although the author may choose not to take this advice, editors highly recommend that the author address any issues, explaining why their research process or conclusions are correct.

Association of Economists and Managers of the Balkans headquartered in Belgrade – Serbia along with the partner institutions, namely Faculty of Management Koper – Koper, Slovenia; DOBA Business School - Maribor, Slovenia; Integrated Business Faculty - Skopje, North Macedonia and Faculty of Management - Zajecar, Serbia organized Sixth International Scientific Conference on Economics and Management: *How to Cope with Disrupted Times* - EMAN 2022. Conference was held in Ljubljana, Slovenia (online/virtually).

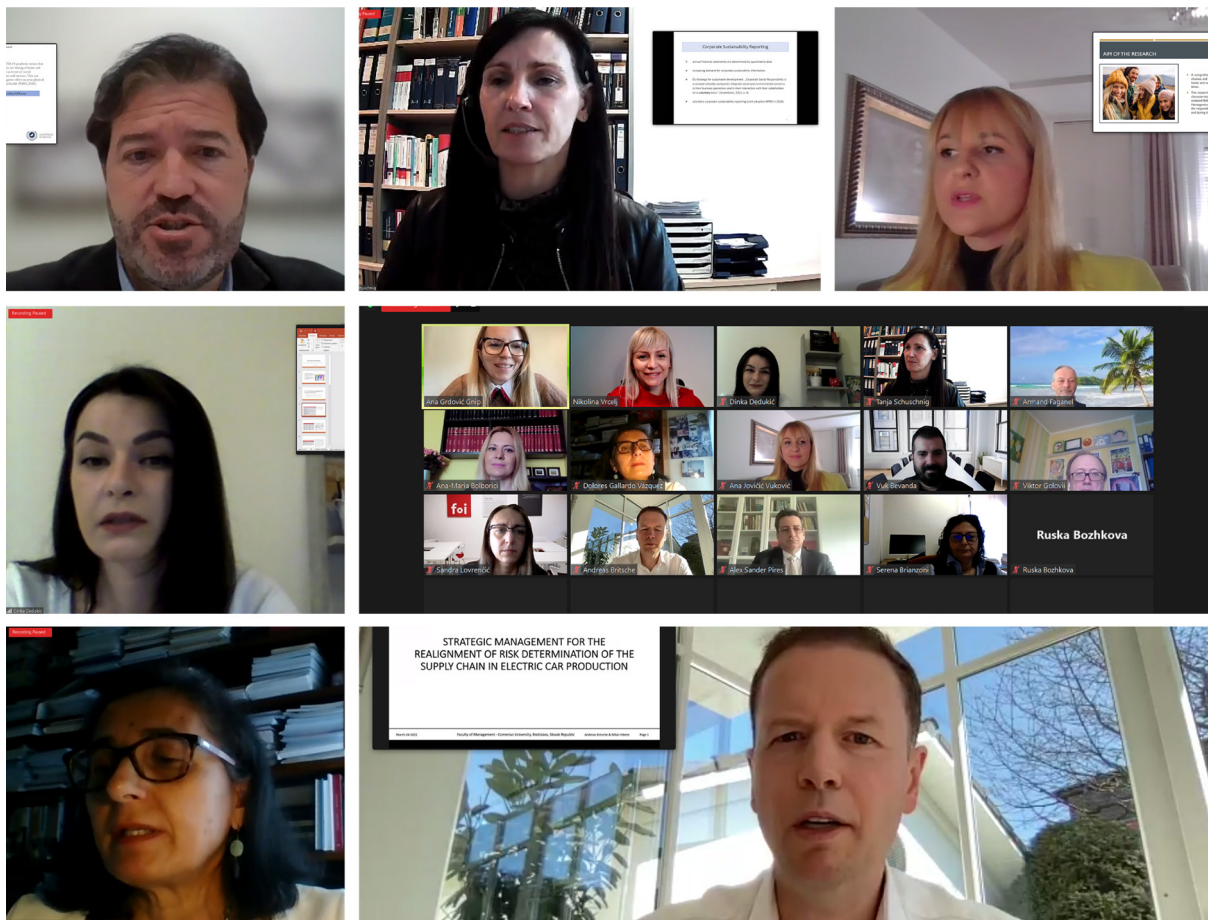
EMAN 2022 keynote speakers were professor Tanja Schuschnig from the University of Klagenfurt, Department for Finance & Accounting, Institute for Financial Management, Austria with the topic: “*Corporate sustainability reporting: current developments and empirical findings from Austria*” and professor Ana Jovičić Vuković from the Novi Sad School of Business, Novi Sad, Serbia with the topic: “*Tourism and COVID-19: case of the Balkan region*”.

Within publications from the EMAN 2022 conference:

- **13 double peer reviewed papers** have been published in the *EMAN 2022 – Economics & Management: How to Cope with Disrupted Times - Selected Papers*,
- **36 double peer reviewed papers** have been published in the *EMAN 2022 – Economics & Management: How to Cope with Disrupted Times - Conference Proceedings* and
- **76 abstracts** have been published in the *EMAN 2022 Book of Abstracts*.

Altogether EMAN 2022 publications have more than **600 pages**. All full papers have DOI numbers and ORCID iD integration.

Participation in the conference took nearly **140 researchers** representing **23 different countries** from different universities, eminent faculties, scientific institutes, colleges, various ministries, local governments, public and private enterprises, multinational companies, associations, etc.





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The Impact of Macroeconomic Indicators and FDI Inflows on the Economic Growth

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Abstract: *The focus of this paper is to test the relevance of chosen macroeconomic indicators and FDI net inflows on the economic growth stimulation in the sample of Emerging European Economies and sub-sample of Visegrad States in the period 1997-2017. This empirical research comprises from analysis of robust panel data modes on the total sample level and in the two analyzed sub-periods (before and after the Global Financial Crisis - GFC) with the use of a dummy variable for the Visegrad States. The results of robust estimations indicate that greater FDI net inflows are a relevant factor of economic growth on the total sample level and in the Visegrad States after the GFC. Based on the empirical findings, the authors suggest that policymakers in the Western Balkans should introduce the necessary promotion measures in order to attract greater FDI inflows and boost the economic development level.*

1. INTRODUCTION

In previous findings, Ercegovac & Beker Pucar (2021) pointed out that the Visegrad States, especially Poland, received the most FDI and Greenfield FDI inflows in the sample of Emerging European Economies (EEEs), with a moderately high positive correlation between FDI and economic growth in Poland and the Czech Republic and a strong positive correlation in Slovakia. On the other hand, Western Balkans received substantially less FDI and Greenfield FDI with a weak correlation FDI – economic growth with the exclusion of Albania that had a strong positive correlation between Greenfield FDI and economic growth. Also, Ercegovac & Beker Pucar (2021a) find that greater Greenfield FDI inflows could be linked with a favorable external balance in the Visegrad group of countries, while Western Balkans have an unbalanced external position that is possibly connected to lower Greenfield FDI inflows. Recent work of Ercegovac & Beker Pucar (2022) indicates that the corona pandemic in the most of analyzed emerging countries had affected the sizeable downfall of Greenfield investments with disturbances in economic growth. Based on the correlation results of a strong and moderately high positive correlation in investigated sub-periods, authors highlight that greater Greenfield FDI inflows are the most significant and stimulating factor of economic development in the analyzed sample of Visegrad and Western Balkan countries, but also that achieved economic growth is a relevant determinant for attracting foreign investors. Mentioned findings of Ercegovac & Beker Pucar (2021, 2021a & 2022) implicate that substantial FDI and Greenfield FDI inflows could produce beneficial effects on the sustainable economic development and external position.

The objective of this panel data analysis is to test the positive impact of FDI inflows together with selected macroeconomic indicators on the economic growth in the selected sample of sixteen ex-transition Emerging European Economies to give some guidance toward economic

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policy creators in emerging economies. The focus of this research is to address the research problem of sustainable economic growth in emerging economies and give a contribution to the literature by observing FDI transmission effects and economic growth models. This research is relevant to the policymakers in emerging economies and especially in the Western Balkan region which received an insufficient level of FDI inflows compared to the Visegrad group of countries.

Minović & Jednak (2021) investigate the Granger causality relationship between economic growth, innovation (R&D expenditure) and FDI for the selected EU members (Bulgaria, Croatia, Hungary, Romania, Slovakia and Slovenia) and EU candidates (North Macedonia, Serbia and Turkey) for the period (2000-2017) with findings of a two-way relationship between economic growth and FDI, economic growth and innovation, and FDI and innovation. Vukmirović et al., (2021) emphasize the importance of FDI for the Serbian economy by analyzing the forecast results that indicate a gradual increase in GDP, FDI, competitive ranks and a decrease in the unemployment rate for the following 5 years. On the other hand, Vasa & Angeloska (2020) perform a correlation analysis covering Serbia in the period (2007-2018) with results of a very weak correlation between FDI inflows and the unemployment rate, a very weak correlation between FDI inflows and increased GDP growth with a strong correlation between GDP growth and industry growth.

In the Western Balkans in the past period, FDI inflows were mostly market seeking and directed in service sectors through privatization and acquisitions. This is in line with Cvetanović, Despotović & Milovanović (2018) that contended that receiving capital inflows in the Western Balkan countries was insufficient and that it is necessary to continue improvements in public institutions and business conditions. The Western Balkan countries need to furtherly improve infrastructure, regulation, government institutions, incentive measures and business environment with the purpose to attract higher volumes of FDI and Greenfield FDI inflows in favorable higher value-added sectors with innovative green technology that will stimulate sustainable development.

After the Introduction section, Section 1 presents the literature review, Section 2 contains information about data and used methodology, while Section 3 discusses the results of the panel data model. Concluding remarks are summarized within the last section.

2. LITERATURE REVIEW

This study investigates the factors of economic growth in Emerging European Economies with the crucial role of FDI inflows. Walkenforst (2004) stresses that multinational companies had a key part in the restructuring and transition of Central and Eastern European economies from socialistic centrally planned regimes to market-oriented economic systems. FDI inflows have numerous positive spillovers on the host economy, like accumulation of necessary capital, foreign currency inflows, new employment, a rise in productivity, better national competitiveness, entrance into Global Value Chains and exports increase, new technology transfer, labor training and overall economic development (see e.g. De Mello, 1999; Noorbakhsh, Paloni & Youssef, 2001; Durham, 2004; Crespo & Fontura, 2007; Denisia, 2010). Darmo, Novak & Lisy (2020) contended that the FDI inflows are related to various positive effects e.g. growing gross domestic product (GDP) and reduced unemployment rate in the host country. Gerschewski (2013) indicates that emerging economies tend to bring more FDI inflows because of potential beneficial

effects such as greater productivity or the transfer of contemporary technology. The empirical research that gives support to FDI's positive transmission effects on the economic growth are Borensztein, De Gregorio & Lee (1998), Li & Liu (2005), Dabla-Norris et al. (2010), Pegkas, 2015; Iamsiraroj & Ulubasoglu, 2015; and Iamsiraroj, 2016. Also, in the relevant literature, there is evidence that Greenfield FDI inflows had a positive impact on the real economy (see e.g. Wang & Wong, 2009; Neto, Brandao & Cerqueira, 2010; Harms & Meon, 2014; Luu, 2016; and Bayar, 2017).

Hanousek, Kočenda & Vozarova (2020) found that FDI inflows can impact the domestic firms through competition and productivity channels and export spillovers, but effects are not always beneficial due to the crowding-out effect on domestic suppliers and intensification of competition level. Geršl, Rubene & Zumer (2007) stated that benefits from FDI spillovers to domestic firms like increased employment and output levels depend on the absorptive capacity of domestic firms. Blomstrom & Kokko (1997) found that positive FDI effects on the economic growth are stronger in countries with high levels of income per capita and that transmission effects differ due to industry characteristics, financial sector development and business conditions in the host country. Colak & Alakbarov (2017) emphasized that FDI spillovers on the economic growth and employment depend on FDI type and investment sector. According to Silajdzic & Mehic (2015), the positive connection between the FDI and economic growth is related to the level of labor knowledge and investors' motivation for higher efficiency. Namely, foreign investors search for locations that are offering high-quality human capital and a skilled workforce (Klimek, 2020). Javorcik (2020) points out that an FDI-friendly host economy is characterized as stable and transparent. It can be summarized that FDI's impact on higher economic growth is conditioned by economic development, human capital, the absorptive capacity of domestic firms, the type of FDI and the investment sector in the host country.

The research of Kosztowniak (2016) backed up the assumption of bi-directional relationship between FDI and GDP in the case of Poland, with the conclusion that GDP had a stronger impact on attracting FDI inflows than vice versa. Dorozynski & Kuna-Marszalek (2016) focus on the Visegrad Group of countries as attractive FDI locations with the conclusion that relevant factors for foreign investors were skilled labor, assistance schemes and well-developed infrastructure.

Stančík (2009) investigated the case of the Czech Republic and found that the EU integration process influenced the sign and magnitude of FDI spillover effects and positive forward spillovers were confirmed mainly in the years following the EU entrance. Geršl & Hlavaček (2007) showed that FDI acquisitions in Czech companies increased the profitability of the domestic companies with the benefits of intra-group financing the corporate growth through loans of the parent company. In the example of Baltic countries, Shkabarín (2015) contended that small open economies accessing the EU might have negative forward FDI spillovers combined with positive backward externalities. Skare & Cvek (2020) indicated that a sizeable amount of FDI in the Republic of Croatia had no significant effect on the country's competitiveness and economic growth, due to FDI sector distribution (mainly services) and lower levels of Greenfield FDI investments. Also, Mencinger (2003) showed evidence of a negative correlation between FDI and economic growth in analyzed transition countries, since FDI was dominant via privatizations and acquisitions without a significant increase in employment and real assets. Brada & Tomšík (2009) researched FDI and reinvested earnings from FDI in the sample of eight transition economies and highlighted a connection with large distortions in their current account deficits. Furtherly, Popescu (2010) added that FDI inflows are related to wage inequalities and growing competition and skill differences.

Zavarská (2022) stated that FDI can have a crucial role in the industrial upgrading and economic development of the Western Balkan countries via FDI inflows in higher value-added sectors and participation in the Global Value Chains through nearshoring. Uvalić & Cvijanović (2018) point out that the macroeconomic situation in the Western Balkans after the GFC has improved, but compared to the Central East European and Baltic countries, Western Balkan countries have still structural weaknesses and forehead more balanced economic development measures are needed. Moran (2014) highlighted that it isn't enough for the host economy just to be open to FDI, it's necessary to have targeting measures that will bring FDI inflows to the chosen sectors and produce higher unit-value exports. Government authorities in the Western Balkan economies should elaborate more efficient country-specific measures with a special focus on the sectoral distribution of FDI to diversify and elevate the production and export base. Estrin & Uvalić (2016) stressed that positive FDI effects on the Western Balkans as host economies depend on infrastructure development, institution quality, political stability, control of corruption, market size and labor education.

3. METHODOLOGY AND DATA

Panel data models are a relevant methodology that is broadly used in empirical studies because of the possibility of simultaneously combining cross-section data with time series. Baltagi (2005) stated that panel data models allow identifying and measuring the effects of investigated problem. There are two groups of panel data models divided by the time dimension and model specification assumptions: micro and macro panel data models (Eberhardt, 2011). This empirical study implements micro panel models that assume a shorter time dimension (often $T < 10$ or fewer years), larger N dimension with more restrictive model specification assumptions compared to macro models i.e. homogeneity of regression parameters, independent errors and stationarity of variables.

3.1 Empirical Model

This study has the objective to provide an adequate contribution to the literature concerning the economic growth models and the role of FDI inflows together with selected macroeconomic indicators in achieving economic progress. The research subject and defined hypotheses are tested with a panel data approach as support for relevant government recommendations towards attracting favorable foreign investors and fastening the catching-up process in emerging economies.

In this paper, authors implement widely used micro panel models: Fixed individual effects (FE), Random individual effects (RE), FE with cluster corrected standard errors, Beck & Kats (1995) Panel Corrected Standard Errors and Driscoll & Kraay (1998) robust standard errors in FE estimation. Beck & Katz (1995) showed a Panel Corrected Standard Errors (PCSE) method that is based on POLS coefficient estimates and provides precise estimation because this method includes large T asymptotic based standard errors, which correct the contemporaneous correlation between the subjects, with good performance in small panels. If residuals are heteroscedastic and potentially autocorrelated, estimators (FE/RE) with cluster standard errors are widely applied. On the total sample (1997-2017) authors use the Driscoll & Kraay robust standard errors estimated by the FE method that is appropriate in larger time dimension panels with potential autocorrelation and heteroscedasticity of standard errors (Hoechle, 2007). This study also implements robust FE/RE estimation with cluster corrected standard errors and PCSE method

on the two subsamples: pre-crisis (1997-2007) and post-crisis (2008-2017) to shorten the time dimension to be adequate for model application and to estimate differences in regression coefficients regarding the GFC and for the Visegrad group of countries. With panel data models with corrected standard errors authors test the following hypotheses:

Hypothesis One: The FDI net inflows are relevant source of financing the economic growth in selected Emerging European Economies.

Hypothesis Two: The selected macroeconomic indicators - inflation rate, government debt, external balance, REER, total factor productivity, labor productivity and tertiary education affect the economic growth in selected Emerging European Economies.

Regression equation for the Fixed individual effects model (FE) is as follows:

$$y_{it} = \beta_{1i} + \sum_{k=2}^K \beta_k x_{kit} + u_{it} \quad (1)$$

where y_{it} is the dependent variable for individual i at time point t , β_{1i} is the heterogeneous free member that variates across individual units, β_k represents constant regression coefficients of independent variables x_{kit} and u_{it} is the standard error. The model includes the individual effects u_{it} i.e. heterogeneity of free members across individual units. The authors implement FE model with the dummy variable for the Visegrad States to estimate individual effects on a dependent variable across cross-section data. Heterogeneity of the analyzed sample of countries implies the estimation of the specified economic growth model with Fixed individual effects. The consistent estimation of β in FE is connected with the assumption of a non-correlation between the components of standard error u_{it} and the regressor x_{it} observed at any point in time. Barros et al. (2020) pointed out that the potential problem of endogeneity is often caused by the omission of important variables, measurement errors and simultaneity. The possible endogeneity problem between variables can be overcome with estimation by the Generalized Method of Moments (GMM).

The dependent variable is economic growth via the annual GDP growth rate (GDPgr). Research variables are chosen to test the hypotheses if FDI, inflation, public debt, trading balance, real exchange rate, productivity indicators and tertiary education, affect economic growth in selected EEEs. The estimated regression equation for FE can be presented as follows⁴:

$$GDPgr_{it} = \beta_{1i} + \beta_1 FDI_{it} + \beta_2 INF_{it} + \beta_3 GD_{it} + \beta_4 EB_{it} + \beta_5 REER_{it} + \beta_6 TFP_{it} + \beta_7 LP_{it} + \beta_8 SET_{it} + u_{it} \quad (2)$$

Given that this study investigates EEEs that went through the macroeconomic stabilization and transition process in the following period (1997-2017), the manuscript includes an estimation of the relationship with macroeconomic indicators like inflation, government debt, trading balance and real effective exchange rate. Also, productivity indicators and tertiary education as a proxy for labor quality are included in the model to test their significance and form a model with a wide range of variables.

⁴ The independent variables in the analyzed economic growth model are: FDI - FDI net inflows in GDP, INF - annual inflation rate, GD - general government debt in GDP, EB - trading balance in GDP, REER - real effective exchange rate, TFP - total factor productivity growth rate, LP - labor productivity growth rate and SET - tertiary school enrolment.

3.2 Data

The research sample includes Western Balkan countries that are converging towards the Europe Union (EU) together with emerging economies that became the EU members in 2004, 2007 and 2013 (Hungary, Poland, Czech Republic, Slovakia, Slovenia, Estonia, Lithuania, Latvia, Bulgaria, Romania and Croatia). The panel data model is estimated in the total sample level and the two sub-periods regarding GFC to shorten the time dimension to be more appropriate for micro panel models and estimate the effects of the structural break. Countries in the selected sample of EEEs ($N=16$) in the period 1997-2017 ($T=21$) differ by development level and convergence pace. Visegrad States (V4) after the entry into the EU (2004) received the significant volumes of FDI and Greenfield FDI inflows following real convergence progress, so the authors intend to test the significance of the FDI in the economic growth model with the use of dummy variable for the V4 subsample in the two mentioned sub-periods.

The data for the dependent variable – annual GDP growth rate was obtained from The World Bank – The World Development Indicators database. The data for the independent variables in the economic growth model was collected from the following Internet databases:

- 1) The World Development Indicators Database:
FDI - percent share of FDI net inflows (inflows-outflows) in GDP;
INF - annual inflation rate (consumer prices);
EB – percent share of external balance on goods and services in GDP;
SET – gross percent of school enrolment tertiary i.e. share of college enrolment in total population of age 18-26;
- 2) The International Monetary Fund Database:
GD – percent share of general government debt in GDP;
- 3) The Bruegel Datasets:
REER - real effective exchange rate (an increase in the index indicates appreciation of the home currency against the basket of currencies of trading partners; index drop represents real depreciation of the national currency concerning currency basket of trading partners; CPI based on 67 trading partners; 2007 is the base year).
- 4) The Conference Board Total Economy Database:
TFP - total factor productivity growth rate (GDP growth decreased for labor quantity contribution, labor quality contribution and total capital services contribution);
LP – labor productivity growth rate per employee (output growth by employed worker);

4. PANEL DATA RESULTS

Specification tests and model estimations are performed with Stata/SE 12.0 software program. The results of the panel model estimations and related specification tests are presented in Table 1. According to the specification tests (Table 1) in the model are present fixed individual effects and random individual effects, but the results of Hausman's (1978) specification test with a p-value under 0.05 indicate that FE estimation is optimal with consistent estimation in both sub-periods. The results of the F test (Table 1) indicate that both sub-periods present significant individual effects in the fixed-effects model. Based on results of modified Wald statistics (Baum, 2001) for the group heteroscedasticity (Table 1) that has p values less than 0.05, it can be pointed out that in both sub-periods, is present heteroscedasticity of standard errors in the model. In Table 1 authors present following autocorrelation tests: Jochmans Portmanteau test and Born-Breitung Bias corrected HR test (Jochmans & Verardi, 2019; Born & Breitung, 2016). Jochmans

Portmanteau test with p values above 0.05 suggests an absence of residual standard error autocorrelation in the pre and post-crisis period. On the other hand, results of the Born-Breitung Bias corrected HR test with a p-value less than 0.05 indicate a presence of standard error autocorrelation type AR1 in analyzed sub-periods. The results of the heteroscedasticity and autocorrelation tests imply heteroscedasticity and potential autocorrelation of standard errors with direction to apply the micro panel models with corrected standard errors like cluster(id)FE, PCSE and Driscoll & Kraay FE.

Table 1. The panel data model of Economic growth

The impact of FDI and chosen macroeconomic indicators on the economic growth										
Model	Pre-crisis (1997-2007)				Post-crisis (2008-2017)				Total sample (1997-2017)	
	cluster(id) FE		PCSE method		cluster(id) FE		PCSE method		Driscoll & Kraay FE	
Variables	coeff.	p - value	coeff.	p - value	coeff.	p - value	coeff.	p - value	coeff.	p - value
FDI	0.1080	0.228	0.0438	0.254	0.0039	0.882	0.0020	0.904	0.0623**	0.018
FDI VS0	0.2396***	0.002	0.1172	0.103	-0.0925	0.357	-0.0455	0.484	-	-
FDI VS1	-0.0399***	0.006	-0.0216	0.403	0.0127***	0.000	0.0193**	0.029	-	-
INF	0.0094***	0.005	0.0100***	0.000	0.2017	0.213	0.2791**	0.045	0.0106***	0.000
GD	0.0137**	0.032	0.0084	0.245	0.0218	0.355	-0.0008	0.954	0.0128*	0.058
EB	-0.0094	0.839	-0.0435	0.351	-0.2008***	0.009	-0.0351	0.149	-0.1237*	0.077
REER	-0.0322	0.376	-0.0214	0.400	-0.0944	0.219	-0.0459	0.163	-0.0401	0.110
TFP	0.7576***	0.000	0.7480***	0.000	1.6083***	0.000	1.3199***	0.000	1.1541***	0.000
LP	0.2088	0.282	0.1152	0.304	-0.6376***	0.002	-0.3548**	0.025	-0.1897	0.348
SET	0.0855**	0.012	0.0570***	0.002	-0.0040	0.862	-0.0092	0.606	0.0501***	0.008
R ² within	0.6584		0.6704		0.7016		0.6338		0.6799	
F test FE/ Wald chi ² test RE	130.990	0.000	198.660	0.000	25.580	0.000	124.360	0.000	112.160	0.000
	p<0.05 FE		p<0.05 RE		p<0.05 FE		p<0.05 RE		p<0.05 FE	
Hausman test	28.340 p=0.0004 p<0.05 Choice of FE				28.970 p=0.0003 p<0.05 Choice of FE				-	
Modified Wald test	chi ² =1699.25 Prob> chi ² =0.000				chi ² =218.36 Prob>chi ² =0.000				-	
Jochmans Portmanteau test	chi ² =16.000 Prob> chi ² =1.000				chi ² =15.000 Prob>chi ² =1.000				-	
Born & Breitung HR test	HR=2.560 p=0.010				HR=3.810 p=0.000				-	
Dependent variable: <i>GDP gr</i> - annual GDP growth rate; Independent variables: <i>FDI</i> - percent share of FDI net inflows (inflows-outflows) in GDP; <i>INF</i> - annual inflation rate; <i>GD</i> - general government debt in GDP; <i>EB</i> - external balance on goods and services in GDP; <i>REER</i> - real effective exchange rate; <i>TFP</i> - total factor productivity growth rate; <i>LP</i> - labor productivity growth rate per employee (output per employed person growth); <i>SET</i> - school enrolment tertiary. Dummy variable for FDI: <i>FDI VS1</i> - Visegrad Group; <i>FDI VS0</i> – sample without Visegrad Group. P-values: * significant at 10%, ** significant at 5%, *** significant at 1%.										

Source: Authors calculation with Stata/SE 12.00 program.

The comparative outlook of robust panel model estimations is presented in Table 1. Before the crisis, FE and RE methods indicate a positive significant link between greater FDI net inflows and GDP growth rate in the sample of EEEs, but the presence of heteroscedasticity and potential autocorrelation indicate considering only robust estimations. FE cluster standard errors and the PCSE method imply a positive FDI transmission effect but are insignificant in pre and post-crisis periods. FDI net inflows contribute to economic growth in EEEs but this impact wasn't estimated as significant by the proposed model in the following sub-periods. According to results of micro panel methods with robust standard errors, before the GFC economic growth is in a positive and significant nexus with inflation, government debt, total factor productivity growth rate and tertiary-educated workforce. This suggests that in EEEs in the pre-crisis period economic

growth coincides with inflation overheating, greater government indebtedness, the accelerated rate of total factor productivity and the rise of higher educated labor. After the GFC, robust results indicate that economic growth rate is in a positive significant link with inflation and total factor productivity, while a negative significant link is evident with trading balance sum and labor productivity growth rate. Analyzing the results, it can be highlighted that in EEEs in the post-crisis period economic growth is significantly related to the rise of total productivity growth rate, moderate inflation overheating, external disbalance and lower labor productivity i.e. cheaper workforce.

The robust estimation with a dummy variable for the Visegrad States showed that in the pre-crisis period FDI net inflows are negatively connected with economic growth, while after the crisis FDI has a positive significant effect on the GDP growth rate in this subsample of countries, significant at 1%. Based on these findings, it can be concluded that after the crisis economies in the Visegrad group with larger volumes of FDI net inflows achieved greater economic progress i.e. Poland. This is in line with expectations and correlation analysis between FDI and GDP growth performed in Ercegovic & Beker Pucar (2021), where Poland had a moderately high positive correlation between FDI and economic growth in the analyzed period.

Estimation with Driscoll & Kraay (D&K) method on the total sample level (1997-2017) gives evidence of a positive and significant nexus between FDI net inflows and GDP growth rate, significant at 5%. The presented results of the D&K method and post-crisis results of the Visegrad group support the assumption that greater FDI net inflows are a relevant factor of economic growth in the EEEs and the Visegrad States after the GFC. According to the robust results of the D&K method, besides FDI relevant factors of economic growth in EEEs are inflation, government debt, external balance, total factor productivity growth rate and labor quality. Inflation, total factor productivity and highly educated labor are relevant variables in the model and positively related to economic growth, significant at 1%.

5. FUTURE RESEARCH DIRECTIONS

Directions for further research might be testing a Granger causality between FDI and GDP growth in EEEs, as well as estimating the proposed economic growth model with other relevant methodologies like Generalized Method of Moments (GMM) or heterogeneous panels models (Augmented Mean Group).

6. CONCLUSION

This research provides empirical evidence supporting the assumption that FDI inflows positively affect economic growth in selected Emerging European Economies (EEEs) and the Visegrad States after the GFC. Presented results contribute to the existing literature on the FDI transmission effects and as such are interesting to a broad range of researchers and government policy-makers. The focus of this panel data research is the direct nexus between FDI and GDP growth as well as the impact of selected macroeconomic indicators like inflation, government debt, external balance, REER, total factor productivity and tertiary educated labor on the economic growth in EEEs. Research showed that besides FDI relevant factors of economic growth in EEEs are inflation, government debt, external balance, total factor productivity growth rate and labor quality. Inflation overheating, government indebtedness, external disbalance, total factor productivity growth and highly educated labor are relevant variables related to economic

growth. The empirical results are obtained via micro panel estimators with corrected standard errors: cluster(id) FE, PCSE and Driscoll & Kraay FE. The comparative study of different panel estimators for selected EEs is performed in the longer period (1997-2017), together with two sub-periods in regard to GFC (1997-2003 and 2008-2017) and with the use of a dummy variable for Visegrad group of countries.

The empirical findings are in purpose of giving useful guidance to the policymakers in emerging economies and the Western Balkans. Economic policy recommendations are directed in adequate measures to promote significant FDI inflows, and improve the total factor productivity level and labor quality in order to boost further real convergence process. Western Balkans should enforce a sustainable growth policy with stronger improvements concerning infrastructure, regulation, institutions, business environment, labor education and incentive measures for investments. Moreover, intense regional cooperation in the area of R&D, energy, transport and agriculture has the potential to furtherly stimulate the economic development of the region and attract FDI in higher-value-added industries. A stable macroeconomic situation, favorable business conditions and promotion of human capital development are the necessary preconditions for attracting FDI and speeding up the catching-up process.

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Capital Flows Volatility and the Macroeconomic Performance – Evidence from Emerging and Developing Economies

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Abstract: *Volatile capital flows pose serious risks to economic growth and financial stability. This paper investigates the link between economic performance and gross capital flows volatility in emerging market and developing economies (EMDE), and specifically, the extent to which macroprudential policy measures can diminish the detrimental effects of capital flows volatility on growth. For that purpose, we start by constructing volatility estimates for gross capital flows and their subcomponents on a sample of 37 EMDEs, following the methodology by Wang (2019). Then we perform panel regression over the period 2000–2018 incorporating the main variables of interest: economic growth, gross capital inflows volatility and macroprudential policy. The results show that the negative effect of gross capital inflows volatility on growth is significantly mitigated by the implementation of macroprudential policy measures. The results are robust against reverse causality and omitted variables bias.*

1. INTRODUCTION

According to neoclassical macroeconomics, international capital flows to support the recipient countries' growth and promote income convergence. The empirical literature provides ambiguous evidence on the benefits of capital flows on economic growth, suggesting that they may be conditional on the achieved level of financial and institutional development (Kalemli-Ozcan et al., 2004; Igan and Tan, 2015). Today, three main arguments are pointed out in favor of financial integration: greater allocative efficiency, better risk sharing, and increased technology transfer (Carney, 2019). On the other hand, academics and policymakers unequivocally recognize risks to economic growth and financial stability posed by external shocks and volatile capital flows. Surges in capital flows bring numerous challenges to the recipient economy, such as asset price bubbles, inefficient allocation of resources and currency appreciation, and depressing export competitiveness (Ghosh et al., 2016; Forbes and Warnock, 2011). In a similar vein, the vulnerability to sudden stops and retrenchment rises, prompting a steep fall in asset prices and currency depreciation, which may further exacerbate inflationary pressures and foreign currency debt repayment. The most recent example is the sharp reversal of portfolio inflows from EMs in the early stages of the COVID-19 pandemic.

Amid the ongoing process of globalization and financial integration, countries' macroeconomic performance is increasingly affected by global financial conditions. The term 'global financial cycle', coined by Rey (2013), represents the elevated cross-country synchronization of asset prices, gross flows and leverage and is mostly attributed to the shocks in the US monetary policy and global risk aversion. The existence of the global financial cycle has one important implication for policymakers EMs – it diminishes the effectiveness of the exchange rate to insulate external shocks to the domestic economy and enable effective monetary policy conduct, morphing the Mundellian trilemma into a dilemma (Miranda-Agrippino and Rey, 2015). The fact

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that exchange rate flexibility has limited capacity to insulate EMs from global financial shocks has fueled recurring debates about whether policymakers should deploy additional policy tools. Recognizing the pronounced role of global ‘push’ factors in the changing international environment, the IMF adjusted its analytical framework by including multilateral aspects of the economic and regulatory policies affecting capital flows. The IMF’s Institutional View (2012) proposes a comprehensive approach, supplementing the existing set of macroeconomic policies with macroprudential and capital flows management measures.

This paper investigates the link between economic performance and capital flow volatility in EMDEs, and specifically, the extent to which macroprudential policy measures can mitigate the detrimental effects of capital flows volatility on growth. For that purpose, we start by constructing volatility estimates for gross capital inflows and their subcomponents, following the methodology by Wang (2019). Then we perform panel regression on a sample of 37 EMDEs over the period 2000–2018 incorporating the main variables of interest: economic growth, gross capital inflows volatility and macroprudential policy.

The remainder of the paper is structured as follows: Section 2 offers a brief literature review. Section 3 provides more details on the gross capital flow volatility estimation and the macroprudential policy index used. Section 4 explains the empirical approach used, whereas section 5 discusses the results and their robustness. Section 6 concludes.

2. LITERATURE REVIEW

This section offers a brief overview of the papers that have already studied the direct response of capital flows to macroprudential policy measures and the effects on GDP growth.

The study by Cerutti and Zhou (2018) investigates the joint impact of macroprudential and capital control measures on cross-border banking flows. They find that tighter MPPs in lender countries reduce direct cross-border banking outflows but are associated with larger outflows via local affiliates, whereas tighter MPPs in borrower countries are associated with larger direct cross-border banking inflows. Frost et al. (2020) compare the effectiveness of macroprudential policies and capital controls in influencing the volume and composition of capital inflows, and the probability of banking and currency crises. Authors find that the activation of foreign exchange (FX)-based MPPs reduces capital inflow volumes by nearly 5% of GDP and is linked to a lower probability of banking crisis and capital flow surges in the following three years.

Neanidis (2018) explores whether banking regulation mitigates the adverse effects of capital flow volatility on economic growth. The author finds that banking supervision promotes economic growth by dampening the negative impact of volatile capital flows. These results hold for aggregate capital flows and their subcomponents, while they are also robust for various indicators of regulatory policies. Boar et al. (2017) investigate specifically the effects of macroprudential policies on long-term economic performance. They find that countries with more active use of macroprudential tools experience stronger and less volatile GDP growth and that these effects are influenced by each economy’s openness and financial development.

The research by Bergant et al. (2020) offers a series of valuable insights into the dampening effects of macroprudential regulation. The authors first show that a more stringent level of regulation significantly reduces the sensitivity of GDP growth in EMs to global financial shocks. In

addition, a broad range of macroprudential measures contributes to enhancing macroeconomic resilience to global financial shocks. They also find that a higher level of macroprudential regulation in one country tends to enhance macroeconomic stability in other countries. Eventually, they find that macroprudential regulation allows for a more countercyclical monetary policy response, involving a decline in policy rates when global financial conditions tighten. Eller et al. (2020) quantify the extent to which macroprudential policies have been able to stabilize capital flows in the CESEE region. For that purpose, they propose a novel regime-switching FAVAR model and construct a novel intensity-adjusted macroprudential policy index. They find that tighter MPPs may be effective in containing domestic private sector credit growth and the volumes of gross capital inflows, but that they do not generally shield CESEE countries from capital flow volatility.

In summary, there is empirical evidence demonstrating the negative link between external shocks and economic growth in EMDEs and the mitigating role of the macroprudential policy.

3. RECENT DEVELOPMENTS IN CAPITAL FLOW VOLATILITY AND MACROPRUDENTIAL POLICY MEASURES

3.1. Gross Capital Inflow Volatility

As a measure of capital flows, we use gross capital inflows rather than net, which is in line with the more recent recommendations in the relevant literature (Avdjiev et al., 2017). The capital flow volatility is estimated following the method developed by Engle and Rangel (2008), which is a volatility measure for macroeconomic variables with a frequency lower than the financial variables. This method overcomes the drawbacks of the most extensively used competing approach, the standard deviation of the capital flows since it allows dynamics. This method is applied to capital flow volatility estimation in the works by Pagliari and Hannan (2017) and by Wang (2019).

The volatility measure is based on the estimation of the standard deviation of the residuals of an AR(1) model for gross capital inflows, on a sample of 37 EMDEs. In line with Wang (2019), we first normalize the quarterly gross capital inflows data by the HP-trend of the nominal GDP, to avoid introducing additional volatility through short-term output fluctuations. We use these data to estimate the residuals of an ARIMA (1,1,0) model.

$$\Delta flow_{it} = c + \beta \Delta flow_{i(t-1)} + v_{it} \quad (1)$$

After confirming the lack of heteroskedasticity, we then calculate the five-quarter moving standard deviation of the estimated residuals.

$$\sigma_{it}^2 = \frac{1}{5} \sum_{j=t-2}^{t+2} (v_{ij})^2 \quad (2)$$

Based on these volatility estimates, we can analyze the developments in the estimated volatility in gross capital inflows. In EM countries, the gross capital inflows volatility spiked during the Global financial crisis (GFC). In the recent period, the volatility is averaging on the pre-crisis level. Nevertheless, the post-crisis period features episodes of pronounced volatility, following developments in the global economy and global financial market. This shows that capital flows volatility remains a key challenge for the policymakers in these economies.

We proceed by further disentangling the volatility of gross capital inflows in EM countries. The structural decomposition of volatility may provide a better understanding of the key drivers of volatility. Figure 1 shows the estimated volatility of the subcomponents of gross capital inflows in EM, according to the ARIMA methodology. It is evident that the category ‘other investment’ is the main driver of the volatility, followed by the portfolio investments. In line with the theory, direct investment remains the most stable component of the gross capital inflows.

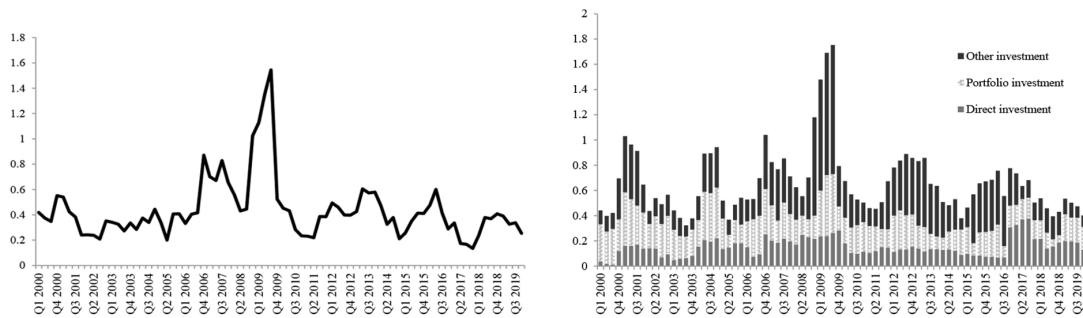


Figure 1. Gross Capital Inflows Volatility to EMs and Structural Decomposition

Source: International Financial Statistics, authors’ calculation.

3.2. Macroprudential Policy Measures

To capture the effect of macroprudential policy measures on mitigating capital flow volatility, we primarily use the integrated Macroprudential Policy (iMaPP) database developed by the IMF. This database reports monthly data, currently for the period from 1990-2018, in over 150 countries, which are grouped into the following six categories: broad-based tools, household sector tools, corporate sector tools, liquidity and FX tools, nonbank sector tools and structural tools. This is to our knowledge the most comprehensive database on macroprudential policy measures, considering the high-frequency data and the broad country coverage.

We construct a composite macroprudential policy index (MPI), which is the unweighted average of the six individual measures within the iMaPP database. Still, we acknowledge its main drawback, i.e. it does not report the change in intensity of the macroprudential policy measures in use. Based on the estimation of MPI, we can monitor the developments in the implementation of macroprudential policy measures in EMs. Figure 2 shows that recently, these measures are used more actively and in a tightening manner, to safeguard financial stability.

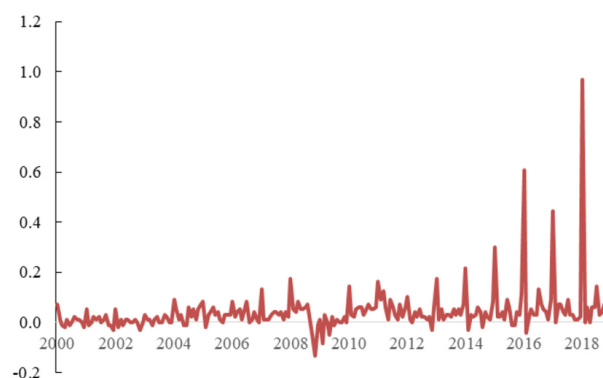


Figure 2. Macroprudential Policy Measures in EMs (net tightening in MPI)

Note: Figure 2 shows the cross-country average of the cumulative net-tightening actions.

Source: iMaPP database, authors’ calculations.

4. EMPIRICAL FRAMEWORK

To investigate the complex relationship between economic growth, capital flows volatility and macroprudential policy measures in EMDEs, we perform a panel data analysis. We build upon the approach by Neanidis (2018), by making several advancements. In particular, we apply a more robust methodology to estimate gross capital flows volatility, use quarterly rather than annual data as a more appropriate frequency to capture volatility and extend the analysis with recent data. Dependent on the characteristics of the panel data used, we run a growth regression model using fixed-effects OLS.

We specify our growth regression model as:

$$Y_{i,t} = \alpha_i + \beta_1 Vol_{i,t} + \beta_2 MaPP_{i,t} + \beta_3 MaPP_{i,t} * Vol_{i,t} + \beta_4 X_{i,t} + \varepsilon_{t,i} \quad (3)$$

where the dependent variable $Y_{(i,t)}$ is quarterly real GDP growth, and i and t represent country and period, respectively. The key variables in the specification are the volatility of gross capital inflows ($Vol_{(i,t)}$) and the level of macroprudential policy measures ($MaPP_{(i,t)}$). The specification also includes the interaction of these two variables, to determine whether the impact of volatility of gross capital inflows on economic growth is affected by the level of macroprudential policy measures. The chosen set of control variables in the regression denoted $X_{(i,t)}$, broadly corresponds to the approach by Bergant et al. (2020). In particular, we include lagged quarterly GDP growth, lagged log of real GDP per capita, output gap and linear trend. Also, we include institutional quality, commodity terms of trade and the volatility index by the Chicago Board Options Exchange (VIX). Finally, α_i is country fixed effect, whereas $\varepsilon_{(t,i)}$ is the error term.

As previously explained, we measure the level of macroprudential policy by constructing a single macroprudential policy index (MaPP) out of the indicators reported in the IMF's iMaPP database. It is worth noting that we analyze the level, instead of the changes in macroprudential policy measures, to limit possible endogeneity in the results. As pointed out in Bergant et al. (2020), while regulation changes are likely triggered by economic developments that complicate identification, the level of regulation when global financial shocks materialize is largely pre-determined being the outcome of easing and tightening decisions over the previous year. Moreover, in the regression, we include the MaPP index by cumulating the macroprudential tightening actions net of loosening actions from 1990-2018 (the last year for which data are available). The volatility of gross capital inflows and their sub-components is estimated as the five-quarter moving standard deviation of the residuals of the ARIMA (1,1,0) model, a methodology that was extensively elaborated in the preceding segment. The variable on institutional quality is derived as an unweighted average of the World Bank's Worldwide Governance Indicators³. The data on GDP are sourced from the IMF's International Financial Statistics (IFS) database. IMF's Commodity Terms of Trade database is a source for commodity terms of trade indices, which proxy the windfall gains and losses of income associated with changes in world prices and are relevant for the large commodity-exporting countries in the sample. Data for the financial development index, which summarizes how developed financial institutions and financial markets are in terms of depth, access and efficiency,

³ The index encompasses six broad dimensions of governance such as voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption.

is from IMF's Financial Development Database. Also, data for VIX is sourced from Chicago Board Options Exchange and is used to capture the effect of global financial market uncertainty. We use the Chinn-Ito index as an indicator of the capital flow measures implemented in a country and the degree of capital account openness. Also, we correct the covariance matrix as suggested by Driscoll and Kraay (1998), to account for serial and cross-sectional correlations. The dataset used in this quarterly panel data regression includes 37 EMDEs and covers the period from 2000Q2-2018Q4, although there are many missing values, especially regarding the independent variables. The chosen period is conditional on the availability of detailed data for gross capital flows and corresponds to the end year of the currently available iMaPP database.

5. RESULTS AND DISCUSSION

The baseline results are presented in Table 1. The top of each column describes the category of gross capital inflows included in each regression. In line with the economic growth literature, the effects of the lagged quarterly GDP growth and the output gap remain highly significant throughout each specification.

Table 1. Baseline regression

Type of gross capital inflows	Dependent variable: Growth rate of real GDP						
	Total (1)	Total (2)	FDI (3)	Portfolio (4)	Portfolio equity (5)	Portfolio debt (6)	Other investment (7)
Lag dependent variable	0.376*** (0.030)	0.376*** (0.032)	0.376*** (0.032)	0.376*** (0.032)	0.384*** (0.031)	0.376*** (0.032)	0.378*** (0.031)
Lag output gap	-1.379*** (0.060)	-1.397*** (0.063)	-1.392*** (0.065)	-1.391*** (0.065)	-1.393*** (0.066)	-1.391*** (0.064)	-1.417*** (0.057)
Lag in real GDP per capita	2.595 (7.584)	6.338 (8.223)	5.332 (8.408)	5.141 (8.520)	4.080 (8.518)	4.883 (8.669)	9.214 (7.967)
Linear trend	0.017 (0.031)	-0.023 (0.031)	-0.024 (0.030)	-0.024 (0.029)	-0.027 (0.030)	-0.022 (0.030)	-0.030 (0.029)
Volatility of gross capital flows	-0.002 (0.020)	-0.090* (0.046)	-0.014 (0.037)	0.025 (0.141)	0.888* (0.510)	-0.027 (0.163)	-0.586*** (0.171)
Institutions	0.512 (0.690)	0.705 (-0.726)	0.877 (0.715)	0.673 (0.755)	0.744 (0.844)	0.736 (0.774)	0.289 (0.788)
Commodity terms of trade	-0.049 (0.037)	-0.044 (0.034)	-0.033 (0.035)	-0.032 (0.039)	-0.058 (0.041)	-0.058 (0.047)	-0.058 (0.036)
Ln VIX	1.900 (1.271)	1.466 (1.264)	1.338 (1.308)	1.323 (1.325)	1.225 (1.337)	1.326 (1.329)	1.633 (1.211)
Macroprudential policy measures		0.532 (0.382)	0.755* (0.418)	0.865** (0.432)	1.169** (0.466)	0.790* (0.416)	-0.140 (0.403)
Macroprudential policy measures * volatility of gross capital inflows		0.030*** (0.010)	0.010 (0.009)	-0.011 (0.061)	-0.262 (0.171)	0.016 (0.069)	0.226*** (0.065)
Constant	3.335 (12.931)	10.181 (13.149)	7.355 (13.362)	6.788 (13.646)	7.760 (14.017)	9.091 (13.980)	17.342 (13.648)
Observations	1,920	1,807	1,807	1,807	1,705	1,773	1,807
Number of groups	29	29	29	29	27	28	29
Within R-squared	0.591	0.591	0.59	0.5897	0.593	0.590	0.597

Notes: Driscoll-Kraay standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; sample: 2000q2-2018q4.

Source: Own research

Still, our main variables of interest are the gross capital inflows volatility and the level of macroprudential policy measures. Baseline results indicate that economic growth is adversely affected by the volatility of total gross capital inflows. This effect remains negative across the majority of gross capital inflows subcomponents, being especially significant for other investment inflows – the category which demonstrates the highest volatility. The coefficients on the level of macroprudential policy measures are predominantly positive and significant, indicating that macroprudential policy produces a direct and favorable impact on economic performance. Turning our attention to the interaction term, the results show significant positive effects for total gross capital inflows and other investment inflows, suggesting that macroprudential policy measures significantly mitigate the detrimental effect of capital inflows volatility on economic growth. The control variables are broadly in line with the economic theory and the previous studies' findings (Neanidis 2018; Boar et al. 2017; Bergant et al. 2020).

Table 2. Robustness tests for reverse causality

	Dependent variable: Growth rate of real GDP	
	MaPP: One-quarter lag of MaPP	MaPP: Four-quarter lags of MaPP
	(1)	(2)
Lag dependent variable	0.380*** (0.031)	0.374*** (0.030)
Lag output gap	-1.407*** (0.058)	-1.396*** (0.061)
Lag in real GDP per capita	5.875 (7.999)	5.013 (8.328)
Linear trend	-0.027 (0.029)	0.001 (0.030)
Volatility of gross capital flows	-0.084* (0.046)	-0.099** (0.048)
Institutions	0.754 (0.737)	0.869 (0.911)
Commodity terms of trade	-0.041 (0.033)	-0.053 (0.044)
Ln VIX	1.437 (1.271)	1.881 (1.290)
Macroprudential policy measures (MaPP)	0.648** (0.307)	0.382 (0.303)
MaPP * volatility of gross capital inflows	0.027** (0.011)	0.032*** (0.011)
Constant	9.255 (12.819)	7.429 (15.218)
Observations	1,836	1,863
Number of groups	29	29
Within R-squared	0.599	0.594

Notes: Driscoll-Kraay standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; sample: 2000q2-2018q4.

Source: Own research

Further robustness tests are necessary to confirm the validity of the baseline findings. One important issue that needs to be addressed in studies of this kind is the possible presence of reverse causality. In our research, reverse causality may arise in case the level of macroprudential regulation reacts to changes in GDP growth. We tackle this potential issue by incorporating the level of macroprudential measures (as opposed to their change) in the baseline regression because it is a more persistent and less volatile category. Moreover, as the level of macroprudential

regulation is derived by cumulating the past macroprudential actions, it is largely predetermined to the GDP fluctuations (Bergant et al. (2020)). Nevertheless, we perform robustness tests for reverse causality by lagging the level of macroprudential policy measures for one quarter and four quarters. The results are largely consistent with the baseline, with the volatility of gross capital inflows having a significant and negative effect on economic performance, whereas the coefficient of the interaction between macroprudential policy and volatility remains positive and highly statistically significant.

Another potential issue that we need to test for is whether our baseline results suffer from omitted variables bias. The dampening effects attributed to macroprudential regulation could be driven by country characteristics or policy actions that are correlated with macroprudential regulation and have been omitted from the analysis. To address these concerns, the regression specification is augmented with interaction terms between the volatility of gross capital inflows and other factors that may affect resilience. In this regression, we incorporate the influence of institutional quality, financial development and the introduction of capital flow measures. Throughout these specifications, the mitigating effect of macroprudential policy on the volatility of gross capital flows remains positive and highly significant.

Table 3. Robustness tests for omitted variables

	Dependent variable: Growth rate of real GDP		
	X = institutions	X = financial development	X = capital flow measures
	(1)	(2)	(3)
Lag dependent variable	0.376*** (0.032)	0.407*** (0.033)	0.376*** (0.032)
Lag output gap	-1.400*** (0.062)	-1.446*** (0.062)	-1.391*** (0.063)
Lag in real GDP per capita	6.956 (8.227)	10.436 (6.672)	5.509 (8.135)
Linear trend	-0.025 (0.031)	-0.048 (0.034)	-0.019 (0.030)
Volatility of gross capital flows	-0.127** (0.000)	-0.246 (0.000)	0.000 (0.000)
Institutions	0.255 (0.833)	0.934 (0.789)	0.899 (0.715)
Commodity terms of trade	-0.046 (0.034)	-0.050 (0.034)	-0.044 (0.034)
Ln VIX	1.476 (1.261)	1.509 (1.154)	1.416 (1.259)
Macroprudential policy measures	0.517 (0.374)	0.497 (0.375)	0.437 (0.419)
Macroprudential policy measures * volatility of gross capital inflows	0.034*** (0.012)	0.047*** (0.016)	0.030*** (0.010)
X		7.668 (8.027)	0.346 (0.868)
X * volatility of gross capital inflows	0.063 (0.041)	0.231 (0.226)	0.003 (0.046)
Constant	11.556 (13.217)	15.264 (9.616)	9.000 (13.341)
Observations	1,807	1,737	1,760
Number of groups	29	28	28
Within R-squared	0.591	0.612	0.590

Notes: Driscoll-Kraay standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; sample: 2000q2-2018q4.

Source: Own research

6. CONCLUSION

This paper provides the groundwork for an elaborate investigation of the interconnectedness between economic growth, gross capital flows volatility and macroprudential policy measures. The main research question is to what extent macroprudential policy measures can mitigate the detrimental effects of capital flows volatility on economic performance. This research adds to a growing body of literature examining this particular topic in recent years.

We start by constructing volatility estimates for gross capital flows and their subcomponents in a set of 37 EMDEs, following the methodology by Wang (2019). The estimates show that the post-crisis period features episodes of pronounced volatility in gross capital flow, following developments in the global economy and global financial markets. Hence, capital flows volatility remains a key challenge for policymakers in EMDEs. Then we perform fixed-effects OLS panel regression over the period 2000-2018, incorporating the main variables of interest: economic growth, gross capital inflows volatility and macroprudential policy, and controlling for the effects of financial development, institutional quality, VIX, commodity terms of trade and capital account openness. We also interact macroprudential measures with capital flows volatility.

The baseline results indicate that economic growth is negatively affected by capital flow volatility. About the interaction term, the results show significant positive effects, suggesting that macroprudential policy measures significantly alleviate the detrimental effect of capital flows volatility on economic growth. Our baseline results remain robust after testing for reverse causality and omitted variable bias.

To conclude, these findings suggest that regulatory policies, such as macroprudential policy measures, can significantly contribute to mitigating systemic risks, especially in countries exposed to large and volatile capital flows.

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I. APPENDIX

1. Country sample

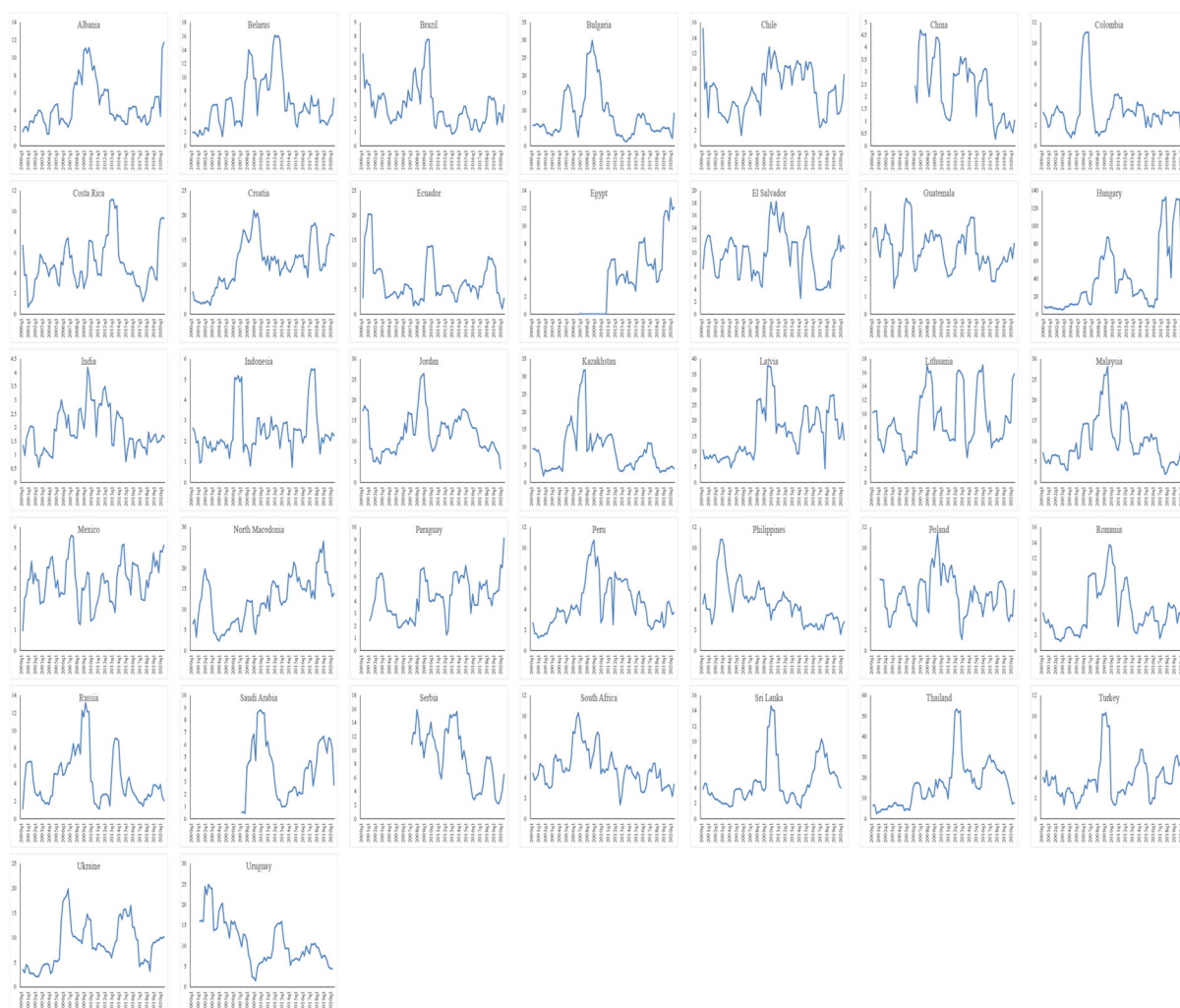
Albania	India	Russia
Bulgaria	Jordan	Saudi Arabia
Belarus	Kazakhstan	El Salvador
Brazil	Sri Lanka	Serbia
Chile	Lithuania	Thailand
China	Latvia	Turkey
Colombia	Mexico	Ukraine
Costa Rica	North Macedonia	Uruguay
Ecuador	Malaysia	South Africa
Egypt	Peru	
Guatemala	Philippines	
Croatia	Poland	
Hungary	Paraguay	
Indonesia	Romania	

2. Variables and data sources

Variable	Period	Source
Gross capital flows	2000-2020	IMF, IFS
Real GDP	2000-2020	IMF, IFS
Real GDP per capita	2000-2020	IMF, WEO
Nominal GDP	2000-2020	IMF, IFS
Macroprudential regulation	2000-2018	iMaPP dataset, Alam et al (2019)
Institutional quality	2000-2019	World Bank, WGI
Commodity terms of trade	2000-2019	IMF, Commodity Terms of Trade Database
VIX	2000-2021	Chicago Board Options Exchange
Financial development	2000-2019	IMF, Financial Development Database
Capital flow measures	2000-2018	Chinn-Ito Index Dataset

II. APPENDIX

Gross Capital Inflows Volatility in Emerging and Developing Economies



Note: These figures present the estimations of gross capital inflow volatilities in emerging economies. Capital inflows are scaled by GDP trend, and capital flow volatility is estimated by the method introduced in Section 3. Figures on gross capital inflows volatilities by separate instruments are available upon request.



Support and Importance of Integration in Disruptive Times – Comparative Analysis of Serbia and Neighboring Countries during COVID-19 Pandemic

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Integration;
COVID-19 crisis;
GDP growth rate;
Foreign trade



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Abstract: Nowadays, in a highly globalized world, the level of economic integration has reached enormous proportions and there is almost no country that is not a part of some economic agreement. The purpose of this paper is to determine if countries that are members of the European Union have been less affected by the COVID-19 crisis and if EU membership helped their economies recover faster compared to those which are not in the EU. In order to conduct such an analysis six countries of the region have been chosen, three of them as EU members and the remaining three as EU membership candidates. Economic activity and foreign trade of Serbia and selected surrounding countries will be analyzed through indicators such as gross domestic product, and import and export trends during the four years, from 2018 to 2022. Furthermore, the research will encompass implemented support programs and measures for overcoming the consequences of the coronavirus pandemic.

1. INTRODUCTION

Since the middle of the 20th century, the urge for economic integration has been growing. From free trade agreements to European Union (EU), different kinds of economic cooperation have been made. Governments realized that many economic, social and environmental goals can be achieved more efficiently by joining forces, and defining and implementing mutual strategies and measures. Over the last decades, globalization has reached enormous proportions. Economic interdependence significantly increased as countries began to remove barriers and became more open to free trade of goods and services, movement of people, capital transactions and exchange of information and technology. Therefore, a huge number of free trade areas, customs unions and common markets have been established, whereas European Union presents the highest level of economic and political integration. How high were the intensity and the extent of integration processes that occurred in the 20th century, is perhaps described the best by Haberler (1964, p.1) who claimed that it was the “age of integration” since “every conceivable, or inconceivable, a combination of countries has been proposed, more or less seriously, as a candidate for integration, other planets and outer space being almost the only areas that do not yet figure in any of the many plans and proposals”.

2. EU COOPERATION AND SOLIDARITY THROUGH THE CRISIS

Countries in Europe started reporting COVID-19 cases at the end of January and by the spring of 2020, the disease had already escalated. Europe, especially some western countries like Italy and Spain, was among the worst affected regions. What followed the world had never witnessed before. Lockdowns, closure of borders, suspension of all non-essential activities and restricted movement completely changed everyday life, almost shut down international trade, transport and

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travelling. Economic activity across the world plummeted. Production dropped sharply as it was constrained to essential goods only for quite some time, many parts of the services sector were completely disabled, people were left unemployed or working fewer hours, whereas foreign exchange was significantly decelerated and decreased. It was a huge challenge for the whole world to react fast and cooperatively in order to protect health systems, economies and social peace. Although the EU eventually established mechanisms to respond to the crisis, it was not a simple task. European Union reflects the highest level of economic and political integration, comprised of 27 countries. Besides the internal market, EU members share the same values and aims related to social progress, security, environment protection, cultural diversity, technological development and other issues important for further growth and improvement. However, being a part of the EU also means that many measures, strategies or policy changes have to be discussed among and approved by all members. And in a group of 27 entities, it is not always an easy process. Different views and goals among the EU members are not a surprise since demographic and economic disparities across the Union are noticeable. Even in emergencies, the interests and approaches to the crisis can differ significantly among member states, which slows down the decision-making process and prolongs solutions. In such cases, it all depends on the readiness and the ability of member states to put the benefits of the integration as a whole above its own. Over the years, integration mechanisms of the EU have become more flexible and responsive, while the common policy instruments have reached high levels of efficiency, although still not sufficient (Todorović & Marković, 2020).

Even though the political and economic coordination between member states is well established, it is not easy to overcome adversities since social, economic, political and demographic disparities across the EU cannot be disregarded. The global financial crisis in 2008 caused severe economic consequences, but the intensity and the time of the recession which hit European economies varied significantly. COVID-19 pandemic reopened some questions about cross-national solidarity and „the foundational controversy over who owes what to whom” during difficult times, making member states deeply divided on how to respond to this crisis (Ferrera, Miró & Ronchi, 2021). Despite that the virus has had the same impact on people’s health around Europe, the impact on the economy and overall society differed considerably. Regions and countries with economies which heavily rely on exports, which are deeply involved in international supply chains, where a significant part of economic activity is concentrated in services that require a physical presence of the client and economies based on small and medium-sized enterprises were the hardest hit. Furthermore, the extent of support each member state is able to implement varies a lot, as well as the potential for fast recovery. Thus, the risk of widening disparities across the EU has become higher. In order to improve the EU’s competitiveness and maintain its position as one of the top global players, even and collective recovery has been necessary. After the initial disagreements which lasted for the first few months following the outbreak of coronavirus, leaders of the EU managed to find a compromise and shift from confrontation to reconciliation. The efforts resulted in the Next Generation EU plan, a historic 750 billion euros recovery instrument, included in the new long-term EU budget. It emphasized that “solidarity, cohesion and convergence must drive Europe’s recovery”, and that “no person, no region, no Member State should be left behind” (EC, 2020).

3. ECONOMIC ACTIVITY AND FOREIGN TRADE OF THE OBSERVED REGION BEFORE AND AFTER THE EMERGENCE OF PANDEMIC

From the group of countries explored in this research, Hungary has been the oldest EU member, since 2004, and it is the country with the highest gross domestic product (GDP) per capita in the region. Bulgaria joined the EU in 2007, whereas Croatian accession to the Union occurred in

2013, making it the youngest EU member. Since none of them have adopted the euro as its official and primary currency yet, they are not part of the monetary union (euro area). Serbia, Montenegro and Albania are among the countries which are recognized as candidates for EU membership with signed Stabilisation and Association Agreements. In order to examine the impact of the COVID-19 crisis on the economy of observed countries, GDP growth rates will be analyzed for the period before and after the coronavirus outbreak. Presented data shows dynamics of GDP quarterly, expressing the change compared to the same quarter of the previous year.

Table 1. GDP growth rate for selected countries 2018 – 2021.

GDP growth rate (%)*						
Year/quarter	<i>Hungary</i>	<i>Croatia</i>	<i>Bulgaria</i>	<i>Serbia</i>	<i>Albania</i>	<i>Montenegro</i>
2018 Q1	5.5	1.8	3.0	4.9	4.4	4.8
Q2	5.2	4.1	3.1	4.9	4.3	5.2
Q3	5.7	2.7	3.2	4.1	4.5	5.3
Q4	5.3	2.9	3.4	3.4	3.1	4.9
2019 Q1	5.2	4.8	4.2	2.6	2.2	3.2
Q2	4.7	3.6	3.8	2.9	2.3	3.6
Q3	4.4	2.7	3.3	4.8	3.8	5.2
Q4	3.9	3.1	3.1	6.2	-0.1	3.7
2020 Q1	1.6	1.0	-1.0	5.2	-2.5	2.5
Q2	-13.2	-14.1	-7.7	-6.4	-10.2	-20.5
Q3	-4.4	-10.7	-4.6	-1.4	-3.5	-27.1
Q4	-3.5	-7.3	-2.9	-1.1	2.9	-7.7
2021 Q1	-1.3	-0.4	-1.4	1.5	5.5	-6.5
Q2	17.7	16.9	7.1	13.7	17.9	19.0
Q3	6.5	15.3	4.6	7.6	7.0	25.8
Q4	7.1	9.9	NA	7.0	NA	NA

* compared to the same quarter of the previous year; NA-data not available

Source: Hungarian Central Statistical Office; Croatian Bureau of Statistics; Republic of Bulgaria National Statistical Institute; Statistical Office of the Republic of Serbia; Institute of Statistics, Albania; Statistical Office of Montenegro.

Analyzing the presented data, it could be noticed that 2020 was the year with the biggest fall in overall economic activity in all observed countries (Table 1). After two years of constant growth, the beginning of 2020 was marked by an economic slowdown in the whole area. Until the second quarter, the coronavirus disease had already spread throughout Europe and consequences of restrictive measures arose. The second quarter of 2020 was the time when the whole world economy was hit the hardest by the pandemic and the observed region was no exception. Official national statistics of selected countries show that each of them experienced a significant decline in GDP, compared to the same period of the previous year. The most dramatic fall was registered in Montenegro (20.5%), whereas Serbia had the smallest drop in GDP (6.4%). Hungary, Croatia and Albania all recorded a decrease above 10%, (13.2%, 14.5% and 10.2% respectively) while Bulgaria managed to maintain its economy at a 7.7% fall. The same trend continued during the whole year. All observed economies suffered huge losses in industry performance in the second quarter of 2020, especially in manufacturing. Although the production of pharmaceutical products mostly increased, it could not compensate for the huge decline in other manufacturing categories like motor vehicles. The construction sector also started to slow down. However, the services sector was the most affected. The highest drop, compared to the same period of the previous year, was recorded in accommodation and food service activities, arts and entertainment, transportation and storage. Financial and insurance activities, along

with information and communication, public administration and defense, education and health were sectors that registered an increase or the smallest decline in most countries during this period. Despite the fact that in the third-quarter economic activity slightly increased, it was still significantly lower compared to the same period of 2019. Manufacture started to rise in some branches, but it was still behind 2019 levels, as well as the rest of the industry sector and agriculture, whereas construction had an even bigger drop than in the second quarter in most observed countries. In the service sector, the highest decrease in the third quarter was still in accommodation and food service activities, arts and entertainment, transportation and storage. Positive trends were mainly continued in information and communication and financial and insurance activities which moderated the GDP decline. In the last quarter of 2020, Albania was the only country in the region that recorded a positive growth rate, thanks to highly increased construction activity, financial and insurance services, real estate activity and information and communication services. The remaining states kept negative trends. According to the Eurostat data, Montenegro was the country with the lowest annual real GDP growth rate in Europe in 2020, registering a decline of 15.3%. Croatia was below the EU average (-5.9%) as well, with an 8% drop in GDP. Hungary and Bulgaria managed their economies at levels above the EU average, dealing with a 5% and 4.2% fall respectively, whereas Serbia was in the top five, having a 1% decline in GDP. Not until the beginning of 2021 did the economies of the region start to recover. Hungary, Croatia, Bulgaria and Montenegro were still maintaining negative growth rates, whereas Serbia and Albania registered positive economic trends. Mitigation of pandemic measures, widespread vaccination and adaptation to the “new reality” led to improved economic conditions in 2021. The second quarter of 2021 was the period when all the observed countries registered the highest GDP growth rates, but it should be kept in mind that such high numbers were actually the result of very low base values in the corresponding period of the previous year. The same applies to the third quarter when positive trends continued.

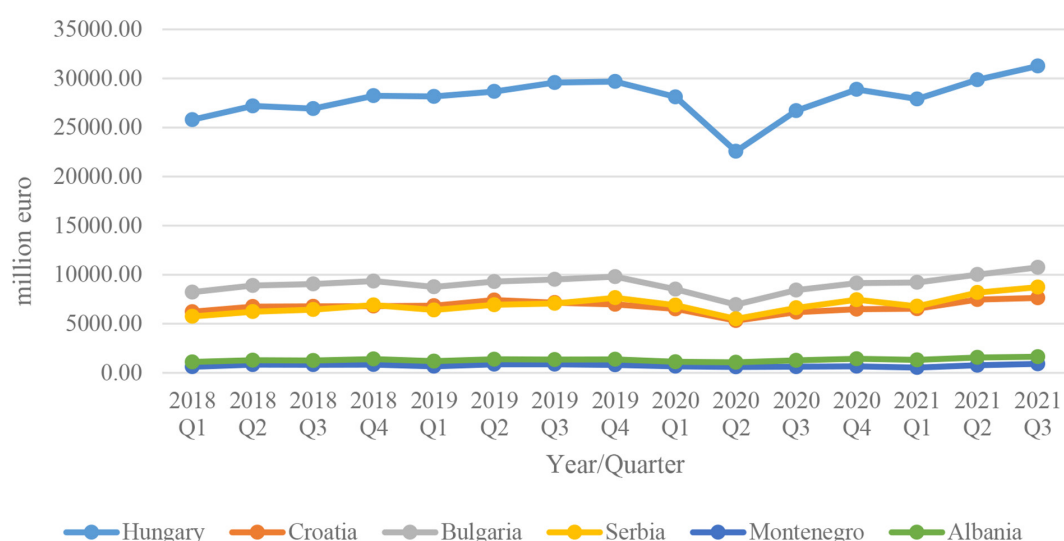


Figure 1. Imports of goods and services in million euros 2018-2021 (current prices)

Source: Eurostat; authors' work

Foreign trade has been among the most jeopardized segments of the economy during the pandemic, in particular during the first wave of contagion since restrictive measures and supply chain disruptions seriously affected international trade. Due to the limited availability of data for the observed period, different calculation methodologies and currencies, the unadjusted data of Eurostat will be used as the only database containing the data which can be compared for selected

countries. As could be seen in Figure 1, all states had an almost steady rise in their imports in the last two years before the COVID-19 pandemic. In the first quarter of 2020, that tendency changed and imports in all countries of the region started to decrease. As the pandemic escalated and restrictive measures were imposed, international exchange was at risk, which resulted in a decline in imports in all mentioned countries during the second quarter. Hungary experienced the sharpest fall. Bulgaria faced a significant decrease as well, Serbia and Croatia followed, while Albania and Montenegro had the slightest imports drop. However, the negative trend did not last for long. Since the third quarter imports began to rise, exceeding the value from the first quarter at the end of the year in all countries except Bulgaria. The rise continued throughout the observed period, with a small decrease in the first quarter of 2021 in some countries.

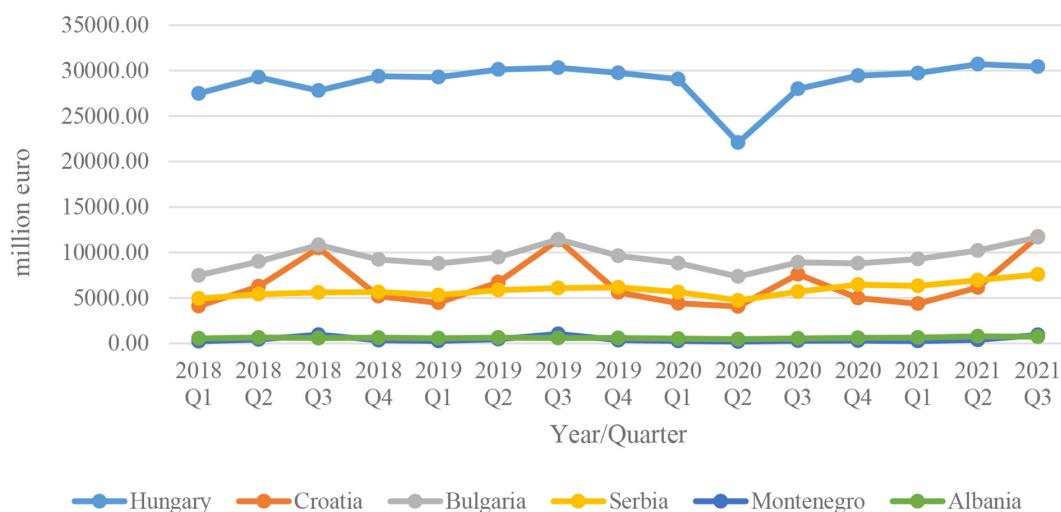


Figure 2. Exports of goods and services in million euros 2018-2021 (current prices)

Source: Eurostat; authors' work

Based on the export data presented in Figure 2, primarily it can be noticed that during 2018 and 2019, Hungary, Croatia and Bulgaria had a steady growth in export, while Serbia, Albania and Montenegro achieved modest growth in exports of goods and services. During the third quarter of 2018, Hungary recorded a slight decrease in exports, whereas Croatia and Bulgaria reflected a significant increase. Hungary's export-oriented economy was heavily damaged by the COVID-19 crisis which caused a slowdown in the exchange of goods and services, especially in the second quarter of 2020. Reduced foreign demand, as well as logistical challenges in the realization of global trade and overall uncertainty, significantly impacted the Croatian export in the first and the second quarter of 2020 and the first quarter of 2021. Bulgaria also recorded a decrease in export values in the first and the second quarter of 2020. Actually, there was a negative trend in exported consumption goods and major differences in the dynamics of the export level in 2020, compared to the previous year. A heavy recession during the first wave of coronavirus and lockdown in Serbia negatively affected exports in the first two quarters of 2020 and the impact has been larger on manufacturing than service companies. Serbia has prohibited the export of some medicine and medical products and agricultural products (World Bank Group, 2020). Due to the barriers to the movement of people and tourism sector losses, the analysis of Albanian exports of goods and services indicates a huge decline in services export during the second quarter of 2020. Montenegro also suffered serious supply shocks from the COVID-19 outbreak which resulted in a slowdown in exports. Practically, in every sector of the economy, negative growth rates have been observed. The service sector, which contributes the most to the Montenegrin economy, was hit the worst by the pandemic. Since the

current crisis was driven by pandemic and epidemiological constraints, not by internal concerns, the economic rebound in the second half of 2020 was rather swift, starting immediately after countries mitigated the restrictions.

Despite the fact of being members, the external exchange of Hungary, Croatia and Bulgaria with the rest of the EU was highly affected in 2020. According to the Hungarian Central Statistical Office data, external trade of goods with the EU countries had been rising through the years until 2020, when both imports and exports declined. However, the fall was stopped in 2021 already, with imports and exports even surpassing the pre-pandemic values. On the other hand, the value of goods imports and exports to non-EU countries did not register any decrease during the COVID-19 crisis, since the upward trend has continued during the last two years. External trade of services with both groups of countries, EU and non-EU, recorded a fall in 2020 and an increase in 2021, although not enough to reach the pre-pandemic levels. Data provided by the Croatian Bureau of Statistics (CBS, 2021) shows that Croatian external trade with the EU countries was also down in 2020. On the other hand, imports from certain EFTA countries, countries in the region, countries in Asia and countries of Oceania recorded a growth, in some cases even multiplied a few times, as well as exports to some EFTA countries, OPEC countries, non-EU European countries and countries in America. In 2021 the value of foreign trade was significantly higher since both imports and exports registered an increase in almost all groups of countries (CBS, 2022). As stated in the official database of the National Statistical Institute of the Republic of Bulgaria, external trade with the EU countries, as well as with non-EU countries, decreased in 2020. The value of exports from non-EU members dropped more than from the EU partners, while the fall in the value of imports was bigger in the group of EU members than the others. Despite the decline in 2020, the value of foreign trade in 2021 was already improved significantly. Both exports and imports with the EU partners and with the non-EU countries were considerably increased, reaching even higher levels than in 2019, before the COVID-19 crisis.

Serbian statistical data for 2020 (SORS, 2021) show that the value of Serbian exports to the EU, after an increase in 2019, was down, whereas exports to EFTA and other industrial countries continue to rise. Exports to developing countries also recorded a slight decrease. The imports trend was different. Imports value from the EU countries declined in 2019 compared to the previous year, but in 2020 it grew, exceeding the 2018 level. Imports from EFTA countries recorded an upward trend in previous years, while the value of imports from other industrial countries and developing countries raised in 2019, before going down in 2020. After the initial period of shock caused by the pandemic, the external trade of Serbia in 2021 recovered. The value of imports and exports with the EU, as well as with all the other regions and economic zones, except Northern Africa and OPEC countries, increased (SORS, 2022). According to the Statistical Office of Montenegro (MONSTAT, 2021), the value of exports to the EU had already been decreasing, and in 2020 that downward trend continued, while imports value dropped in 2020 after an incline in 2019. Trade between Montenegro and other CEFTA member countries also declined in 2020, after growth in previous years. Interestingly, the pandemic did not influence the exports to America, Asia and Africa since it continued its growth in 2020, whereas imports from Asia and Africa went down, but the value of imports from America raised after a decline in 2019. External trade of Montenegro in 2021 recorded a positive trend, with rising exports and imports from all continents (MONSTAT, 2022). Asia was the only region in which the value of exports significantly declined in 2021 compared to the previous years. Statistics on the international trade of Albania suggest that the value of exports to European countries and the majority of the EU was in decline since 2019 and it continued in 2020 as well. The same applies to the

export value to America and Asia, whereas export to African countries recorded a considerable increase. Export to Australia and Oceania raised as well despite the pandemics. Imports from Europe and the majority of EU countries were also down in 2020, as from all the other regions except Australia and Oceania. In 2021 both imports and exports between Albania and the EU, and with other major partner countries increased (ISTAT, 2021).

4. MECHANISMS OF RESPONSE TO COVID-19 CRISIS

Coronavirus and widespread lockdowns have resulted in an unparalleled amount of economic uncertainty, comparable to or perhaps exceeding that experienced during the Great Recession of 2007-2009. The COVID-19 pandemic has triggered the worst economic crisis in our lives. The economy has shrunk, and job losses have increased. To a greater or lesser extent, the COVID-19 crisis has impacted every country in the world and globalization has become one of the decisive factors in the disease's spread (Sheresheva, 2020). Authorities were forced to impose measures to prevent the spread of the disease and it caused a significant slowdown in national economies and the global economy (Hayakawa, K. & Mukunoki, H., 2021). In all the analyzed countries, the epidemic did not have an equal impact on all sectors. Border closures, restrictions on people's mobility and gathering, and the prohibition on the operation of catering facilities all had a substantial impact on the tourism and hospitality industries.

The global crisis induced by the COVID-19 pandemic has far-reaching consequences that will be felt in the following years, across all economic sectors and social strata in *Hungary* (Nicola et al., 2020). As a result of COVID-19 restrictions, people began to self-quarantine, switching to remote working or enrolling in learning programs. Digital achievements have been revalued, and the relevance of broadband internet access in numerous domains such as shopping and managing finances has increased (Kovács et al., 2020). The Hungarian government launched a variety of programs to mitigate the effects of the economic crisis caused by the pandemic. Due to the COVID-19 crisis, the measures of the Hungarian government were aimed at: 1) healthcare sector (HUF 245 billion, 0.6 percent of GDP); 2) liquidity financing loans in a total amount of HUF 300 million; 3) job creation and job protection (HUF 450 billion); 4) support for tourism, agriculture, construction, transport, logistics (HUF 150 million); 5) investments in enhancing export competitiveness (EUR 800,000 grant) (IMF, 2021).

The COVID-19 crisis brought unprecedented situations and significant disruptions to all aspects of life in *Bulgaria* as well. The Bulgarian government has imposed limitations on people and businesses in order to stop and minimize the spread of the coronavirus. To aid the struggling economy and preserve employment, the government has launched a comprehensive package of measures. Bulgarian authorities have aided households and businesses financially by raising the capital of the Bulgarian Development Bank, providing portfolio guarantees for company loans, and guaranteeing no-interest consumer loans (BGN 700 million, 0.6 percent of GDP). Furthermore, the state authority has introduced the possibility of deferral of payments to sole traders and tax returns for corporate income taxes and personal income taxes (OECD, 2021). Bulgaria has enacted a payment act, which included financing 60% of salary, social security and healthcare insurance for all employees engaged in human health services, retail, transportation companies, private education, trade fair organizers, hotels, restaurants, bars, cinema, tourism operators, and financing 60% of salary and the employer's social security and healthcare insurance (OECD, 2021). One of the additional measures was a monthly pension supplement of BGN 50 (about EUR 25) for pensioners.

Faced with broad economic instability as a result of the COVID-19 pandemic, *Croatia*, like other countries, launched a variety of legislative measures to help the ailing economy, maintain jobs, restrict the spread of the disease and reduce the healthcare system's shock. In order to support the liquidity of financial institutions, the Croatian National Bank adjusted its regulatory framework and monitoring activities, lowering the total amount of mandatory reserve by HRK 10.45 billion (EUR 1.3 billion) (OECD, 2020). For the maintenance of liquidity, the government has ensured the structural repo facility and regular weekly repos (HRK 3.8 billion) (IMF, 2021). Croatian government outlined certain actions in coping with the effects of the pandemic: 1) Measures to preserve jobs in affected sectors and to support the tourism industry; 2) Authorized tax payment delays; 3) Procurement of sanitary equipment such as disinfection equipment, soap, masks, etc. European Commission has approved a number of subsidized loan programs to the Croatian Bank for Reconstruction and Development (HBOR), as well as an HRK 1.53 billion state aid package for tourism and sports firms.

Without a doubt, the presence of COVID-19, as well as the implementation of all state-level efforts to limit the virus's transmission, have had a substantial impact on the health system of *Serbia*. Improving the prompt detection of new potential cases and hotspots was crucial. Serbia has significantly increased its testing, whereas its vaccine capacity was the highest in the region, outperforming both OECD and EU averages (OECD, 2021). For economic recovery, Serbia spent EUR 73 million and purchased and transported medical equipment for EUR 15 million. Serbia has hired 2500 health personnel (doctors and nurses) and increased wages in the public healthcare sector by 10% in response to the COVID-19 pandemic (RSD 13 billion). A one-time payment of RSD 10,000 was also made to public healthcare staff (about 0.02 percent of GDP). To mitigate the negative impact of the crisis caused by COVID-19, the government of Serbia has introduced three sets of tax policy, direct payments and measures for maintaining the liquidity of economic entities (OECD, 2021). The fiscal stimulus package had a total value of EUR 6.0 billion (12.7% of GDP), consisting of EUR 4.0 billion in direct financial support and expenditures and EUR 2.0 billion in loan guarantees schemes and grants for the maintenance of liquidity of small and medium-sized enterprises (OECD, 2021). In addition, 160 000 holiday vouchers were distributed to the tourism sector and direct aid to the hospital-ity sector, totaling RSD 1.4 billion. To control and avoid further severe spreading of coronavirus, the European Union (EUR 100 million loans), World Bank (EUR 200 million loans), and Council of Europe Development Bank (EUR 200 million financial support) gave further assistance to the economy of Serbia.

The pandemic and its consequences provided a huge challenge for *Albania* as well, not only in terms of the healthcare system's timely response but also in terms of society's socio-economic segment. Albanian Ministry of Finance and Economy prepared a recovery and response plan to assist businesses (particularly small firms), damaged by the pandemic. The authorities have instituted a range of financial stimulus for the people and businesses that included (OECD, 2021): 1) Support for small businesses and the unemployed in the amount of EUR 52 million (welfare benefits, sick pay, cash transfer, housing relief); 2) Sovereign financial guarantee for companies who are having trouble paying their employees, in the total value of EUR 80 million; 3) State guarantee for tourism, garment industry and manufacturing business for EUR 138 million and 4) Ensuring minimum salary for public transport workers (EUR 1 million). In the context of health measures, the Albanian government has enacted additional initiatives (OECD, 2021): 1) Purchasing medical materials and equipment for medical staff amounting to EUR 20 million; 2) Providing EUR 16 million for humanitarian operations

and creation of a financial anti-COVID-19 fund and a reserve fund for any unforeseen emergency of EUR 8 million; 3) Increasing salaries for healthcare workers and social assistance payments (0.8% of GDP). International Monetary Fund, European Union and other donors have approved emergency funding for the Albanian government in order to help it respond to the crisis (OECD, 2021).

COVID-19 presented challenges and great strain on *Montenegro's* health system, adequate social protection and economic progress (UNSDG, 2020). To support the health system and slow down the spread of the coronavirus, Central Bank supported the government of Montenegro to adopt a moratorium on loan repayment for citizens who lost their jobs. To support the economy and citizens, authorities approved a package of measures and allocated funds for general economic support, tourism, hospitality, agriculture and fisheries in the amount of EUR 163 million. Regarding disease control and health safety issues in Montenegro, the EU allocated an additional EUR 9.5 million for investment in infrastructure, equipment and human capacity of the health sector (OECD, 2021).

5. CONCLUSION

COVID-19 pandemic caused unprecedented health, social and economic consequences that completely changed the world. It also proved that mutual support and cooperation between countries is the only way to a successful recovery. The integration provides higher security for its member in the period of crisis, by protecting the joint interests and giving help to those who need it. This research indicates that the EU membership did not have a significant influence on the economic activity during the first two years of the pandemic since GDP trends were more or less similar across the region, regardless of EU membership. Present differences were more related to the specific features of each economy since some sectors were more affected by the pandemic than others. Foreign trade analysis of the observed countries suggests that despite the EU membership, the external exchange of Hungary, Croatia and Bulgaria with the rest of the EU was highly affected in 2020, whereas with other countries and regions it recorded more positive movements. External trade of Serbia, Albania and Montenegro varied across the partner countries and regions, not showing that being outside the EU has influenced significantly their foreign exchange during COVID-19.

To mitigate the crisis's detrimental effects on the health system and economy, all the countries have implemented budgetary measures and other support programs. Different world organizations, such as the European Commission, Council of Europe Development Bank, International Monetary Fund and World Bank have approved financial aid packages to observed EU and non-EU countries, to combat coronavirus consequences and promote socio-economic recovery. In comparison to Hungary, Croatia and Bulgaria, it's important to highlight that Serbia, Albania and Montenegro are not EU members yet, therefore, these countries have had less availability and access to EU funding for their medium-term recovery from the pandemic. Based on all of the above, it can be assumed that EU member states had a greater approach to funding sources, but that did not lead to a faster recovery from this crisis caused by COVID-19.

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Dynamic Efficiency Assessment of the European Banking Industry: A Literature Review

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Abstract: *This paper aims to survey, identify and present the relevant studies and their findings regarding the efficiency of banking systems in Europe with the application of the Data Envelopment Analysis (DEA) window technique approach. Notwithstanding, another goal is to provide a background on the DEA methodology and present the window technique approach and highlight its strengths and limitations.*

This article implements an extensive literature review of studies that employ the WDEA (window DEA) methodology in the efficiency evaluation of European banking. The conducted literature review has surveyed the Scopus, Web of Science (SSCI and SCI papers) and CROSBİ (Croatian Scientific Bibliography) databases with „Data Envelopment Analysis“, „Window“ and „Bank“ as keywords for the search, which resulted in a total of 89 hits (41 in Scopus, 47 on WoS and 1 on CROSBİ). Thereafter, a manual survey of these studies has been conducted, which eventually resulted in 12 papers regarding the efficiency of European banking. This study identifies all the relevant previous work regarding the efficiency of European banking with the application of WDEA (DEA-window technique) as well as a presentation of their used models, the selected variables and their findings.

This literature review indicates that the surveyed studies have been published in the period between 2007 and 2020 and have included the time frame from 1995 to 2017. The longest study includes 13 years, whereas the shortest includes 3 analysed years.

The findings primarily show the applicability of WDEA in the literature.

1. INTRODUCTION

Banks are vital intermediaries in the financial system, and especially important in countries with less developed financial systems. As Fotova Čiković & Cvetkoska (2017) stated, banks represent a “backbone of the country’s economy” and a crucial influencer of the financial stability and therefore, the banking sector has to “function at its optimum level”. Therefore, an analysis of banking efficiency is an important topic from both a microeconomic and a macroeconomic perspective. From a microeconomic perspective, „the efficiency of banks is important because of the increase in competition from foreign banks and the improvement of institutional regulation and supervision, whereas from a macroeconomic perspective, the efficiency of the banking system influences the cost of financial intermediation and the stability of the entire financial system” (Paleckova, 2017).

Efficiency is defined as „a performance indicator of a profit or non-profit organisation and refers to achieving the highest possible results (outputs) with the use of minimum resources (inputs)” (Cvetkoska & Savić, 2017). Bank efficiency has been commonly and consistently measured. In the literature, there are three approaches for measuring efficiency, and these are the ratio indicators, the parametric approaches (the factor analysis, regression analysis and stochastic frontier

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approach) and the non-parametric approaches (which include the Data Envelopment Analysis (DEA) and the Free Disposal Hull (FDH) (Micajkova & Poposka, 2013; Vincova, 2005; Soysal-Kurt, 2017).

Notwithstanding, “there have been two competing paradigms on efficiency analysis for private and public organizations, one of which is the data envelopment analysis (DEA) which is based on a mathematical programming approach, and the other is the estimation of stochastic frontier functions (SFF) which is based on the econometric regression theory” (Wang, 2003).

In this paper, all the relevant window DEA applications have been surveyed, identified, analysed and presented. The main goal of the study is to survey, identify and present the relevant studies and their findings regarding the efficiency of banking systems in Europe with the application of the Data Envelopment Analysis (DEA) window technique approach. Notwithstanding, another goal is to provide a theoretical background on the DEA methodology and present the window technique approach and highlight its strengths and limitations, which are given in Section 2.

The remainder of this paper is structured as follows. The following section provides a theoretical background on the efficiency of the European banking system and the window DEA technique. The third section presents and elaborates on the research methodology and the review process. Section four reveals the results, i.e. the identified and surveyed relevant papers regarding the efficiency measurement of European banks and/or banking systems with the application of WDEA (window DEA) methodology and the last, fifth section opens a discussion and concludes the paper with a summary of the key findings.

2. THEORETICAL BACKGROUND

2.1. Efficiency of the European Banking Sector

The application of the DEA methodology in banking could be in order to address one of the following problems: “a) analysis of banks operating within one country, b) analysis of bank branches in one bank, c) analysis of banks in two or more countries, d) efficiency of bank mergers and e) banking branch development strategies” (Cvetkoska & Fotova Čiković, 2020; Paradi et al., 2004).

The efficiency of banking has been one of the most common DEA applications worldwide. Namely, Gattoufi et al. (2008) analysed 136 banks in 16 different countries in the Middle East and North Africa between 2003 and 2006. The results indicate an improvement in the ranking of the largest number of banks that passed through mergers and acquisitions during 2005 and 2006. Thus, with a few exceptions, the positive influence of mergers and acquisitions on the performance of banks has been determined.

Kaur and Kaur (2010) analysed unbalanced panel data for 52 banks from 1990 to 2008 in India and the results of their study show that throughout the analysed period the average efficiency of public sector banks was 73.4%, while for private banks 76.3%.

Sufian, Zulkhibri and Charon (2007) analyse the efficiency of commercial banks in Singapore in the period 1998-2004 and focus on the impact of mergers and acquisitions in banking on

banking efficiency. The results indicate that during the pre-merger process, banks were able to produce the same amount of outputs with only 93.82% of the amount of used inputs, and would reduce the inputs by 6.18% to produce the same amount per merger. In the period after the merger, however, the banks in Singapore recorded average overall efficiency of 98.77%.

The efficiency of the European banking sector has been widely assessed with the use of the leading non-parametric methodology DEA. This should not come as a surprise, considering that DEA represents the most renowned and implemented non-parametric methodology which has been widely used in the measurement of efficiency in many industries, but mostly in “agriculture, banking, supply chain, transportation, education and public policy” (Emrouznejad & Yang, 2018).

Hartman & Storbeck (1996) use the DEA window analysis technique to investigate the development of the loan operation efficiency of 12 Swedish banks over 9 years. They have selected this research period due to “gradual relaxation of regulations in Swedish banking, which meant new challenges and opportunities”. Moreover, their study “has demonstrated the increasing inefficiencies throughout the bank sector, which can be explained predominantly by the increasing credit losses”.

Rakocevic & Dragasevic (2009) have employed the AHP method to assess the efficiency of the banking sector in Montenegro and to show “the multicriterial methods for ranking and comparing banks”.

Micajkova & Poposka (2013) have focused on a sample of 15 commercial banks in Macedonia in the period 2008-2011. The results of the CCR model show significant growth in the efficiency of the Macedonian banks in the period from 2008-2010 and a decrease in efficiency in 2011. The average efficiency in 2008 was 0.596, the average efficiency in 2010 increased to 0.779, while in 2011 it decreased to 0.697. Sparkasse Bank is the most efficient bank with a score of 0.92, and the Central Cooperative Bank is the most inefficient with an average score of 0.295. When using the BCC model, the number of efficient banks as well as the average total efficiency for the sector since the CCR model shows that the main source of inefficiency is inefficient volumes.

Andries & Ursu (2016) explore the efficiency of 783 commercial banks from the EU during the period 2004–2010. Their findings show that the global financial crisis had “a significant and positive impact on both the cost and profit inefficiencies of the commercial banks from the EU and that this impact is higher on Eurozone banks”. Moreover, the profit efficiency has been less impacted by the large public banks.

Cvetkoska et al. (2021) have investigated the relative efficiency of three European developing countries (North Macedonia, Croatia and Serbia) in the period from 2015 to 2019. Their findings indicate that Macedonian banks noted the highest efficiency in the observed period (91.1%), followed by the Croatian (90.9%) and the Serbian (81.9%) banks.

2.2. Window Data Envelopment Analysis (WDEA)

The Data Envelopment Analysis has been developed and introduced by Charnes, Cooper & Rhodes (1978), but the idea of measuring efficiency has been laid out by Farrell (1957), who developed the concept of “best-practice frontiers and came up with the first measurement scheme and efficiency concept” (De Borger et al., 2002).

Data Envelopment Analysis (DEA) is one of the most applied mathematical linear programming approaches for assessing the relative efficiency of homogeneous DMUs (Decision-Making Units). Decision-Making Units (DMUs) are “any type of entities that use certain input variables to produce various forms of output variables” (Rakocevic & Dragasevic, 2009). Thus, DMUs can be banks, countries, hospitals, universities, restaurants, etc. (Tsaples & Papathanasiou, 2020).

The window DEA technique has been first introduced by Klopp (1985), as a possibility to incorporate the time dimension in the efficiency analysis, which would enable following the efficiency alterations of the decision-making units (DMUs) over time (Cvetkoska & Savić, 2017). Some scholars claim that the window DEA technique has been proposed by Charnes et al. (1985) “in their efforts to assess relative efficiency in cross-sectional and time-varying data” (Flokou et al., 2017). However, “DEA window analysis is based on a dynamic perspective, regarding the same DMU in the different period as entirely different DMUs” (Jia & Yuan, 2017).

Flokou et al. (2017) define the window DEA methodology as a “compromise between contemporaneous and inter-temporal analyses where DEA is applied successively on overlapping periods of constant width (called a window)”. The window analysis technique works “on the principle of moving averages” (Paleckova, 2017).

The specificity of the window analysis, in comparison with the DEA BCC and CCR models, is in the “analysis of panel data” and it is addressing “the performance of a DMU over time by treating it as a different entity in each period”. The panel data can better capture the volatility of efficiency over time (Tuškan & Stojanović, 2016). According to Fried et al. (2008), the objective of the window analysis is to “alleviate volatility in efficiency estimates” and its purpose is “to track efficiency trends through successive overlapping windows”.

The DEA methodology has its strengths over parametric methodologies. Namely, it is appropriate for small samples, it does not require pre-specified functional form on the data. However, the DEA has also some limitations, such as the assumption that the data is error-free and the sensitivity to outliers (Gaganis & Pasiouras, 2009). Fotova Čiković & Lozić (2022) state a few other limitations, such as the ignorance of the “effect of exogenous variables on the calculation and operation, the notion that results are potentially sensitive to the selection of input and output variables, not offering any possibilities or ways for efficiency improvement”. Even so, they highlight all the other strengths of DEA: “the simultaneous analysis of multiple inputs and outputs, the comparison of each inefficient unit with its “peer group” and the non-requirement of previous knowledge of the explicit functional form linking input and output variables nor a priori determination of the weights for those variables”.

Moreover, the window DEA technique involves more observations than the DEA, which is considered a major strength. The DEA window analysis technique, together with the Malmquist Index analysis technique has more advantages than the DEA CCR and BCC models, “due to the analysis of panel data” and it can “better capture the variations of efficiency over time and use them as the more appropriate tool for efficiency measurement”, compared to the CCR and BCC DEA models (Tuškan & Stojanović, 2016). However, Cooper et al. (2007) state that the fact that the first and the last year in the analysis „are not tested as frequently as the other analysed years” is its main disadvantage and this could be overcome with the use of “a bootstrap in DEA to obtain efficiency scores of DMUs in the sample” (Simar & Wilson, 2000).

3. RESEARCH METHODOLOGY

The used methodology for this study is the extensive literature review, and it has been undertaken to summarize relevant past findings regarding the efficiency of European banks and banking systems with the application of the window Data Envelopment Analysis (WDEA).

This research and extensive literature review started with a survey of the two most relevant global scientific databases, namely the Scopus and the Web of Science database and the regional/national Croatian Scientific Bibliography (CROSBİ). The following keywords have been used: „Data Envelopment Analysis“ AND „Bank“ AND „Window“. The research process and the steps taken are shown in Figure 1. In the first step, the most relevant scientific databases for this research have been identified. In the second step, the survey and collection of documents (i.e. papers) have been initiated without limiting the time of publication or the scientific area of research, which was then followed by elimination of the duplicate documents and elimination of the grey literature, which has led to the identification of 12 relevant empirical studies that employ the dynamic WDEA in European banking. In the next step, a thorough qualitative analysis of the surveyed papers, their models and their findings will follow as a result of the extensive literature review. A presentation and a qualitative analysis of the selected studies, their used models, data and, most importantly, their findings, are presented in the next section.

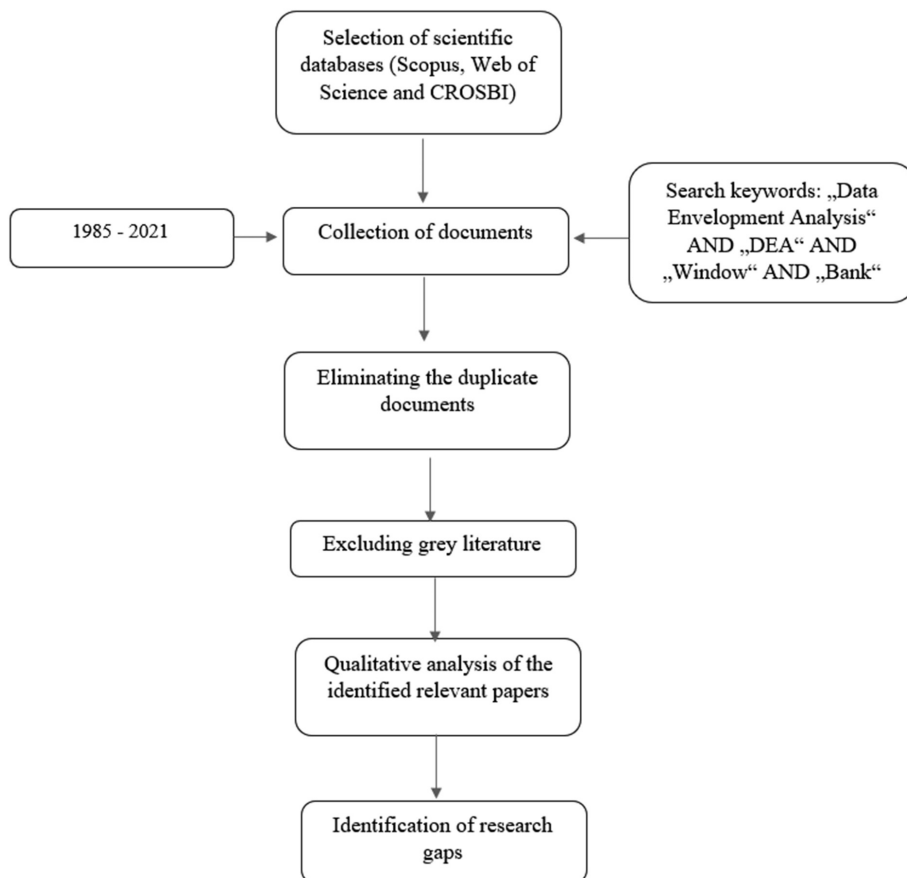


Figure 1. The selection process of the papers for the literature review

Source: Author

4. RESULTS: THE APPLICATIONS OF WINDOW DEA IN EFFICIENCY EVALUATION IN EUROPEAN BANKING

The conducted in-depth literature review has surveyed the Scopus, Web of Science (SSCI and SCI papers) and CROSBİ (Croatian Scientific Bibliography) databases using the keywords „Data Envelopment Analysis“ AND “Window” AND “Bank”, searching for empirical studies that explore and measure the efficiency of banking in Europe.

The results from the literature review resulted in a total of 89 hits (41 in Scopus, 47 on WoS and 1 on CROSBİ), which eventually resulted in analysis of a total of 12 papers regarding the efficiency of European banking with the application of the window DEA. In this study, all the relevant published empirical studies employing the window DEA technique regarding the efficiency of European banking have been identified, presented and qualitatively analysed. Moreover, their used variables and DEA models have been presented together with their findings.

A short overview of the applications of window DEA in European banking is presented in Table 1, and a thorough qualitative analysis of their results and used models are presented thereafter.

Table 1. Application of WDEA in European banking efficiency evaluation

Author/s and year of publication	Paper	Time frame	Country
Kisielewska, Guzowska, Nellis & Zarzecki (2007)	<i>Polish banking industry efficiency: A DEA window analysis approach</i>	1995–2003	Poland
Gaganis & Pasiouras (2009)	<i>Efficiency in the Greek Banking Industry: A Comparison of Foreign and Domestic Banks</i>	1999–2004	Greece
Savić, Radosavljević & Ilievski (2012)	<i>DEA Window Analysis Approach for Measuring the Efficiency of Serbian Banks Based on Panel Data</i>	2005–2011	Serbia
Zimkova (2014)	<i>Window analysis of technical efficiency: Case of the Slovak banking system</i>	2000–2012	Slovakia
Repkova (2014)	<i>Efficiency of the Czech banking sector employing the DEA window analysis approach</i>	2003–2012	Czech Republic
Tuškan & Stojanović (2016)	<i>Measurement of cost efficiency in the European banking industry</i>	2008–2012	28 European banking systems
Paleckova (2017)	<i>Application of window Malmquist index for examination of efficiency change of Czech commercial banks</i>	2004–2013	Czech Republic
Fotova Čiković & Cvetkoska (2017)	<i>Efficiency of the Macedonian banking sector: A non-parametric approach</i>	2008–2015	North Macedonia
Degl’Innocenti, Kourtzidis, Sevic & Tzeremes (2017)	<i>Investigating bank efficiency in transition economies: A window-based weight assurance region approach</i>	2004–2015	9 new EU members in Central and Eastern Europe
Cvetkoska & Savić (2017)	<i>Efficiency of bank branches: empirical evidence from a two-phase research approach</i>	2009–2011	North Macedonia
Drab & Kocisova (2019)	<i>Efficiency of the banks: the case of the Visegrad countries</i>	2005–2016	Visegrad countries: Czech Republic, Slovakia, Poland and Hungary
Cvetkoska & Fotova Čiković (2020)	<i>Assessing the relative efficiency of commercial banks in the Republic of North Macedonia: DEA window analysis</i>	2007–2017	North Macedonia

Source: Author

Kisielewska, Guzowska, Nellis & Zarzecki (2007) have implemented the window DEA technique to investigate the efficiency and productivity of the largest ten Polish commercial banks in the period from 1995-2003, using intertemporal and locally intertemporal data. Furthermore, they explore the productivity changes within the sector with the Malmquist Index approach. In their study, the chosen sample of the 10 largest banks represents roughly 80 % of the banking sector's total assets. They have applied the DEA window analysis approach "in order to accommodate a relatively small sample size with a large number of performance variables". For this study, they developed six performance DEA models with different input and output variables. The obtained results show that the average cost efficiency estimates within each particular model, i.e. depending on the model applied, average efficiency across the sample of banks rose and fell between 1995 and 2003. "The minimum average estimates are obtained with model 1A (57 per cent) and maximum with model 3 (90 per cent)". The authors conclude that the largest banks in Poland have noted "an upward trend in the average level of efficiency" during the analysed period.

Gaganis & Pasiouras (2009) have focused on a sample of 18 foreign and 21 domestic banks operating in Greece in the period from 1999 to 2004 in order to measure the influence of bank ownership on efficiency. In their study, they employ an input-oriented data envelopment analysis (DEA) BCC model window technique with a profit-oriented approach and a Tobit regression model. The variables used for the DEA model are as follows: staff expenses and other administrative expenses as inputs and net interest income and net commission income plus other operating income as outputs. The obtained results show that the "average pure technical efficiency during the whole observed period was 0.7325, whereas the scale efficiency varied between 0.5772 and 0.8703 with an average equal to 0.6830". Interestingly, they could not prove that domestic banks are more efficient than foreign-owned banks in Greece.

Savić, Radosavljević & Ilievski (2012) have measured the efficiency of commercial banks in Serbia for the period from 2005 to 2011. In their empirical study, they have developed two DEA models with an intermediation approach: a profit efficiency model and an operating efficiency model. In the first model, they selected two inputs (Interest expenses and Non-interest expenses) and two outputs (Interest income and Non-interest income), whereas, in the second model, they employ Number of employees, Fixed assets and intangible investments, Capital and Deposits as inputs and Granted loans and deposits and Non-interest income as outputs. The findings from the profit DEA model show that only two banks are relative efficient while „all other banks show some kind of inefficiency" and 11 out of 28 banks note an efficiency result between 60% and 70%. The results from the operating DEA model indicate that almost all of the banks in the sample experience dynamic changes in efficiency throughout the years. However, in this model, there are no banks with efficiency lower than 50%, while four banks are relative efficient in the whole period (Agroindustrijska komercijalna banka, Banka Postanska stedionica, Volksbank, ProCredit Bank). Thus, most of the banks in the sample have a range of efficiency between 60% and 70%, regardless of whether it is a profit or operating efficiency of the banks. The authors conclude the paper with the notion that the Serbian banking sector experiences "annual constant increase in efficiency".

Zimkova (2014) aims to measure the technical efficiency of 10 Slovak commercial banks in the period 2000 – 2012. The input-oriented BCC slacks-based measure model of data envelopment analysis (SBM) has been employed. The selected inputs for the window DEA model were Deposits and Fixed assets, whereas Earning assets (Loans and commercial papers) were selected as outputs within a 4 years length of the window. The obtained results indicate that the largest Slovak bank by asset size, Slovenská sporiteľňa, was found technically efficient in a total of 5 years, and the most

efficient from the analysed sample. According to the window DEA analysis, technically most efficient banks are Slovenská sporiteľňa and Tatra banka.

Repkova (2014) has examined the efficiency of the Czech banking sector employing the input-oriented window DEA technique for the period 2003–2012, implementing the SBM (slack based model – non-radial) model. The sample consists of 11 commercial banks. In this study, the intermediation approach has been adopted with labour and deposits as inputs and loans and net interest income as outputs for the DEA model. The obtained results show that the average efficiency results from the CCR model show an efficiency varying from 70–78 %, whereas the efficiency results from the BCC model vary between 84 and 89 %. The difference between the efficiency results between the CCR and the BCC model are as a result of the elimination of the “part of the inefficiency that is caused by a lack of size of production units” in the BCC model. The large banks (Československá obchodní banka, Česká spořitelna and Komerční banka) noted the lowest efficiency scores in the Czech banking sector, and the reasons behind its inefficiency are “the excess of deposits in the balance sheet and inappropriate size of operation”.

Tuškan & Stojanović (2016) have implemented two different approaches to the efficiency evaluation of banking systems: namely, the financial indicators and the Data Envelopment Analysis (DEA) methodology. They have employed both the CCR and BCC output-oriented DEA models and the output-oriented window analysis technique for the 28 European banking systems. The observed period is 2008–2012. Interest expenses and total operating expenses have been used as input variables, whereas interest income and total operating income as output variables. The results from the DEA window analysis indicate the lowest efficiency in 2008 (0.659), due to the “onset of the financial crisis in that year” and the highest in 2011 (0.732).

Paleckova (2017) has applied the Window Malmquist index approach (which is a combination of the window DEA and the Malmquist index analysis) to assess the efficiency of the Czech banking system in a sample of 16 commercial banks operating in the period 2004–2013. The two basic input-oriented DEA models (CCR and BCC) have been simultaneously used in this study. This study is the first empirical study implementing the DEA Window Malmquist index approach for the Czech banking sector. The intermediation approach has been adopted for this study with two input variables (labour and deposits) and two output variables (loans and net interest income). The findings from this study reveal that in the CCR model “most banks reached a Window Malmquist index of above 1.00”, which means that most banks increased their efficiency in the period 2004–2013. The findings in the BCC DEA model show positive efficiency changes but on a smaller scale. Interestingly, this study showed new insights regarding the efficiency of large banks. Namely, the findings indicate that the largest banks have an inadequate size and noted “the lowest values in scale efficiency”. Thus, this empirical study concludes that “large banks are the least efficient banks in the Czech banking industry”, as in Repkova (2014).

Fotova Čiković & Cvetkoska (2017) have analysed the efficiency of the banking sector in North Macedonia in the period from 2008 to 2015. In their output-oriented DEA model, they have employed total deposits, interest costs and operating (non-interest) costs as inputs and total loans, interest revenue and non-interest revenue as outputs. The results from their empirical study reveal that the average relative efficiency of the banking sector as a whole is 88.77%. Interestingly, they found no bank in their sample that has been relatively efficient in each of the observed years as well as any of the windows. Ultimately, their findings are in accordance with many previous studies in banking and prove that large banks are most efficient in the North Macedonian banking system.

Degl'Innocenti, Kourtzidis, Sevic & Tzeremes (2017) have investigated the efficiency of 116 banks for 9 new EU members (namely, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania) in the region of Central and Eastern European (CEE) in the period 2004-2015. They have applied the Weight Assurance Region (WAR) model and selected deposits as an intermediate variable in the two-stage data envelopment analysis model. Their window DEA represents an expansion of the WAR model, with a main goal “to include the dimension of time into analysis”. The inputs used in the first stage are total assets and personnel expenses, while deposits function as the output. In the second stage of the research, deposits represent inputs, whereas loans and securities are the outputs.

Their findings indicate that the bank inefficiency in CEE countries “is mainly driven by the profitability stage rather than the value-added activity stage”. More specifically, they found Czech, Hungarian and Polish banks from the top-20 banks' group to be most efficient. On the other hand, Romania notes low-efficiency results over most of the observed period.

Cvetkoska & Savić (2017) have focused solely on one Macedonian commercial bank (namely Komercijalna banka A.D. Skopje) and have investigated the efficiency of the bank branches for three years (from 2009 to 2011) in two phases. In the first phase of the research, the DEA window analysis was used as a tool for “monitoring the trend of the relative efficiency of each branch under consideration”. In their study, the output-oriented BCC DEA window analysis model with 4 inputs (personnel, equipment, business premises, and material expenses) and 16 outputs (lending to citizens, corporate lending, domestic payment operations – total transactions, domestic payment operations – officers, domestic payment operations – average per employee, bank cards, ATM transactions, POS terminals and imprinters transactions, denar saving passbooks, foreign currency saving passbooks and current accounts, deposits structure, realised inflows from legal entities, realised outflows from legal entities, total F/X purchase, inflows from individuals, and outgoing payments from individuals) has been implemented. This research is one-of-a-kind since it focuses on one bank and its branches and it offers great managerial implications, i.e. the results provide valuable information for the bank's management since they identify and point out the efficient and inefficient branches.

Drab & Kocisova (2019) have measured the technical efficiency of domestic commercial banks in the Visegrad countries (V4, which include Czech Republic, Hungary, Poland and Slovakia) with the application of an input-oriented BCC and CCR Window DEA with an intermediation approach and thus, estimate the change efficiency in the banking sector. The observed period is from 2005 to 2016. In their window DEA model, they have used three sub-periods (windows), as follows: 2005-2008, 2009-2012 and 2013-2016. The obtained results from the empirical research indicate that the efficiency of the banking sector in the Visegrad countries “increased during the analysed period except for the 2009-2011 period”, due to a slowdown as a consequence of the financial crisis and “subsequent changes in the regulatory requirements or banks' loan assessment behaviour”. Moreover, the findings show that the Hungarian banking sector is most efficient (with an average efficiency score of 78.83%), Czech is second best (with a technical efficiency score 68.63%), and Slovak and Polish banking sectors have been ranked third and fourth with efficiency scores of 60.52% and 58.32%, respectively.

Cvetkoska & Fotova Čiković (2020) have focused their research on the North Macedonian banking sector, and have empirically measured its profit efficiency with the application of the window DEA technique on a sample of 14 commercial banks in the period from 2007 to 2017. Their

output-oriented BCC window model uses interest and non-interest expenses as inputs and interest and non-interest revenues as outputs and the length of the window is 6 years. Their findings indicate that there were obvious consequences of the Global Financial Crisis, which has left banks inefficient in the first few years shortly after its occurrence. The large banks are the most efficient in their sample, as in Fotova Čiković & Cvetkoska (2017). The overall results show that the banking sector in North Macedonia noted the highest efficiency results in the year 2007 (84.04%) and the lowest in 2011 (65.25%).

5. DISCUSSION AND CONCLUSION

According to the obtained results from the extensive literature review, nine of the total twelve surveyed papers focus on a single banking market (i.e. national banking sector), whereas three studies are cross-country studies and include 28 European banking systems, 9 new EU members in Central and Eastern Europe and the Visegrad countries: Czech Republic, Slovakia, Poland and Hungary (in Tuškan & Stojanović, 2016; Degl'Innocenti, Kourtzidis, Sevic & Tzeremes, 2017 and Drab & Kocisova, 2019, respectively). Three of the surveyed papers concern the banking system in North Macedonia (in all of which, one of the authors is Cvetkoska), and two are focused solely on the banking sector in the Czech Republic. The findings from this literature review indicate that the surveyed studies have been published in the period between 2007 and 2020 and have included the time frame from 1995 to 2017, i.e. most of the surveyed papers (in particular, 9 out of 12) analyse the period after 2003. The shortest study is 3 consecutive years: 2009-2011 (Cvetkoska & Savić, 2017), whereas the longest is 13 years – 2000-2012 (Zimkova, 2014).

The group of large banks is proven to be most efficient in the papers of Fotova Čiković & Cvetkoska (2017) and Cvetkoska & Fotova Čiković (2020). However, Repkova (2014) and Paleckova (2017) showed that large banks are the least efficient banks in the Czech banking system.

In the last step of the research approach, an identification of the research gap has been set. Thus, it can be concluded that papers and empirical studies in the SEE region are quite modest, papers and empirical studies of banking with WDEA in Northern and Western Europe are practically non-existent and the window DEA technique has been rather neglected by researchers.

Window DEA provides a dynamic perspective of the relative efficiency of decision-making units and thus, should be implemented more often by researchers of the banking industry as well as any other industry.

The DEA methodology has many advantages over parametric methodologies, and the window DEA has even more strengths due to the dynamic perspective and the entrance of the time dimension. And even though there have been many rebuttals (that have been addressed in Section 2), many scholars agree that “DEA's advantages outweigh by far its limitations” (Škuflić et al., 2013; Stolp, 1990; Fotova Čiković & Lozić, 2022).

The scientific contribution of this article is threefold: first, it provides an in-depth extensive literature review on studies regarding the banking efficiency in Europe with the implementation of window DEA and focuses on 12 relevant studies; second, it presents the window DEA technique, its strengths and limitations; and finally, this article should be considered a stepping stone for future work and employment of WDEA in banking, and in any other industry for that matter.

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Capital Market Efficiency in Asia: An Empirical Analysis

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Abstract: This paper aims to test efficiency, in its weak form, in the capital markets of the Philippines (PSEi), South Korea (KOSPI), Indonesia (JKSE), Thailand (SET), Malaysia (KLCI), China (SSEC) and Hong Kong (HSI) over the period from January 2, 2017, to February 17, 2022. The return series shows signs of deviation from the normality hypothesis, given the skewness and kurtosis coefficients. The results, therefore, support the conclusion that the random walk hypothesis is not supported by the indices, the values of the variance ratios are in all cases less than unity, implying that the returns are autocorrelated over time and there is mean reversion in all indices. The results obtained allow for the rejection of the random walk hypothesis and the informational efficiency hypothesis of financial markets. These findings also open room for market regulators to pursue measures to ensure better information in these regional markets.

1. INTRODUCTION

Most authors argue that a stock market is efficient when the competence among the different participants in it is the same, followed by the principle of maximum benefit, which leads to a situation of balance, where the market prices of any security are a good estimate of the theoretical or intrinsic price. In another way, the prices of securities that are traded in an efficient financial market reflect all available information and adjust fully and quickly to new information. In addition to the assumption that the information available in the market is free (Dias et al., 2020; Dias et al., 2021; Dias et al., 2020, 2022; Dias, Heliodoro, Alexandre, Santos, and Vasco, 2021; Dias and Santos, 2020; Vasco et al., 2021).

One of the fundamental concepts of financial theory concerns the efficiency of markets, where the prices of financial assets provide the appropriate signals for the purchase of resources. The market efficiency hypothesis starts from the premise that an investor cannot obtain an extraordinary risk-adjusted return. However, some empirical studies have proven the opposite, that an investor can earn a return above the market average (Dias et al., 2021; Dias, Heliodoro, Alexandre, Santos, and Vasco, 2021; Santos et al., 2021; Dias et al., 2021, 2022).

Financial instability is a very important factor for society since a financial crisis or a stock market crash can directly or indirectly affect the level of the economic well-being of a country's inhabitants. If a given stock market is strongly linked to the stock market of another country, the

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financial stability of the former depends, in part, on the financial stability of the latter. Thus, the occurrence of integration between markets can have significant implications for international risk diversification (Silva et al., 2020; Dias et al., 2022; Zebende et al., 2022).

Considering the events that occurred in 2020, the Covid-19 pandemic crisis and the oil price war between Russia and Saudi Arabia, it becomes pertinent to study the market efficiency, in its weak form, and test the predictability in the capital markets of the Philippines (PSEi), South Korea (KOSPI), Indonesia (JKSE), Thailand (SET), Malaysia (KLCI), China (SSEC) and Hong Kong (HSI), in the period from January 2nd, 2017 to February 17th, 2022. The results suggest that the random walk hypothesis is rejected in all markets. The values of the variance ratios are, in all cases, less than unity, which implies that the returns are autocorrelated over time, and there is mean reversion in all indices.

In terms of structure, this paper is organized into 5 sections. Section 2 presents a Literature Review of articles on the efficient market hypothesis in international financial markets. Section 3 describes the methodology and data. Section 4 contains the results. Section 5 concludes.

2. LITERATURE REVIEW

The first notion of market efficiency was presented by Gibson (1889), the author considered that the value that stocks acquired when they became public in the market, was considered the best value about themselves because they reflected the most complete information. Later the French mathematician Bachelier (1900), sharing the same idea of market efficiency, found that the behaviour of asset prices fluctuates randomly and unpredictably, which means, they are independent of previous fluctuations, thus formulating the random walk hypothesis. Bachelier's work (1900) was a contribution to what would become one of the most famous theories in finance, the market efficiency hypothesis. Years later academics like Cowles (1933), Cowles (1944), Working (1949) reinforced the random walk hypothesis, explaining that investors could not influence future returns based on historical prices, so they could not cope with an apparently "perfect" market to obtain the long-awaited extraordinary profits.

Later, other studies by Roberts (1959), Osborne, (1959), Granger and Morgenstern (1963) reinforced the random walk hypothesis, describing the behaviour of asset prices as a stochastic process in which the future forecasts of securities are not affected by their historical prices.

The subject of the efficient market hypothesis (EMH) has motivated several studies to analyse the implications of the efficient markets hypothesis, according to which the current price of assets reflects all available information at a given time, and the price adjusts rapidly as new and unanticipated information comes into the market (Fama and French, 1988).

Heliodoro, Dias, and Alexandre (2020), Takyi and Bentum-Ennin (2020), tested the random walk hypothesis in several international markets to gauge whether markets are efficient, in their weak form. Heliodoro, Dias, and Alexandre (2020) analysed the capital markets of Argentina, Brazil, Chile, Colombia, Mexico, and Peru and the U.S. over the period 2015 to 2020. To understand whether the 2020 global pandemic caused contagion in these regional markets, the authors show that the pandemic showed lower than expected levels of contagion, which may be of interest to investors looking for opportunities in these markets, as these results may indicate efficient diversification strategies. Takyi and Bentum-Ennin (2020) evaluated the functioning of

African capital markets in the period October 2019 to June 2020, the authors concluded that the 2020 global pandemic had negative effects on efficiency in its weak form.

In more recent studies, Zebende et al. (2022), and Dias et al. (2022) measured the efficiency of several financial markets, to check whether returns followed a random walk process, that is, whether there was evidence that returns were autocorrelated over time. Zebende et al. (2022) used intraday data to measure market efficiency, in its weak form, in G20 capital markets. For this purpose, the entire analysis was divided into two different time scales: Period I, with a time scale of less than five days and Period II, with a time scale of more than ten days. In the pandemic times of Covid-19, our results show that considering the DFA method, for maturities less than 5 days, stock exchanges tend to be efficient, while for maturities longer than 10 days, stock exchanges tend to be inefficient. However, with the DCCA method for cross-correlation analysis, the results for open/closed indexes show different types of behaviour for each stock market index separately. Authors Dias et al. (2022), on the other hand, tested the efficient market hypothesis, in its weak form, in the capital markets of Botswana, Egypt, Kenya, Morocco, Nigeria, South Africa, Japan, the UK, and the US over the period from September 2, 2019, to September 2, 2020. The authors show that returns are autocorrelated over time, and so, the random walk hypothesis is rejected in all analysed markets, with no differences between mature and emerging markets.

To resume, this paper aims to contribute to providing information to investors and regulators in Asian capital markets, where individual and institutional investors seek diversification benefits, as well as to help promote the implementation of policies that contribute to the efficiency of international markets.

3. METHODOLOGY

3.1. Data

The analysed data are the prices index of the capital markets of the Philippines (PSEi), South Korea (KOSPI), Indonesia (JKSE), Thailand (SET), Malaysia (KLCI), China (SSEC) and Hong Kong (HSI) for the period from January 2nd, 2017, to February 17th, 2022. The quotes are daily and were obtained from the Thomson Reuters platform.

Table 1. The name of countries and their indices used in this paper.

Country	Index
Philippine Stock Exchange Index	PSEi
Korea Composite Stock Price Index	KOSPI
Jakarta Composite Index	JKSE
Stock Exchange of Thailand	SET
FTSE Bursa Malaysia	KLCI
Shanghai Stock Exchange	SSEC
Hang Seng	HSI

Source: Own elaboration.

3.2. Methodology

The research will develop over several stages. In the first stage, we will elaborate graphs, in returns, to estimate the evolution of Asian capital markets. The sample will be characterized using descriptive statistics, to verify if the data follow a normal distribution. To assess whether the

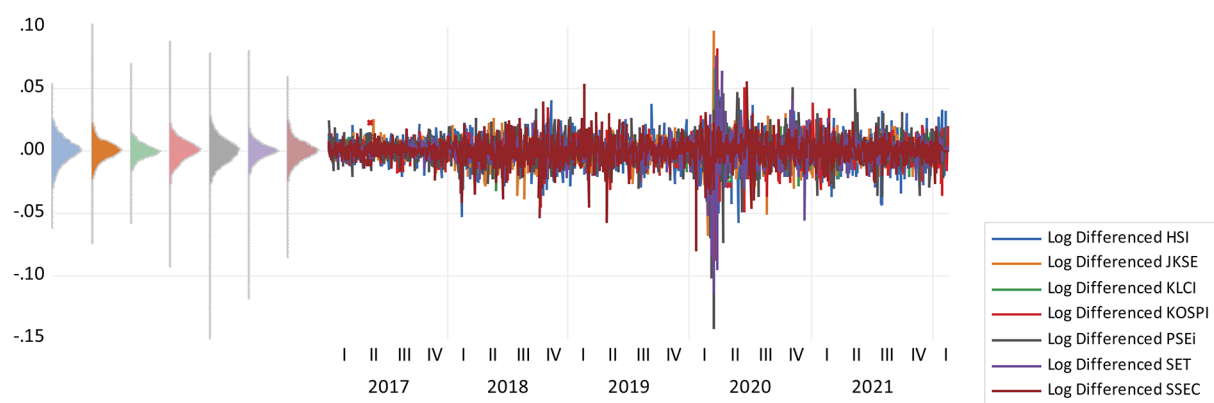
time series follows white noise (mean = 0; constant variance), the panel unit root tests of Levin et al. (2002), Im et al. (2003) will be used. To answer the research question, we will resort to the variance ratio method proposed by Lo and Mackinlay (1988), to assess the autocorrelation between the return series. This is classified as a parametric test. The efficient market hypothesis, in its weak form, states that it is not possible to predict future prices based on historical prices. Rosenthal (1983) argues that if a market is efficient in its weak form, then there should be no linear dependence between lagged returns in either the statistical sense (absence of autocorrelation) or the economic sense (absence of positive returns after transaction costs are considered). The model of Lo and Mackinlay (1988) defines P_t as the price of an asset at t and X_t as the natural logarithm of P_t , the random walk hypothesis is given by:

$$X_t = \mu + X_{(t-1)} + \epsilon_t \quad (1)$$

Where μ is an arbitrary motion parameter and ϵ_t is the random error term, the authors point out that an important characteristic of the random walk process is that the variance of the increments grows linearly according to the observation interval. That is, the variance of $X_t - X_{(t-2)}$ is twice the variance of $X_t - X_{(t-1)}$. Thus, the validity of a random walk model can be tested by comparing variance estimators of the returns at different frequencies. For example, the variance of the weekly return series must be five times larger than the variance of the daily returns. The model consists of testing whether the ratio of the variance for different intervals weighted by their duration is equal to one.

4. RESULTS

Figure 1 shows the evolution, and return, of the 7 stock markets in Asia under analysis. All series show a relatively high dispersion around the mean, as well as relatively synchronized behaviour between the data series. Through graphical analysis, it is possible to observe the existence of sharp structural breaks due to the significant drop in stock prices, which led to a bearish period in the markets under analysis. This evidence was also found by the authors, Dias, Teixeira, Machova, et al. (2020), Dias and Pereira (2021), Dias, Heliodoro, Alexandre, Santos, and Farinha (2021).



Notes: DataStream: January 2, 2017, 1260 data point.

Figure 1. Evolution, return, of the 7 Asian capital markets for the period January 2nd, 2017 to February 17th, 2022.

Source: Own elaboration.

Table 2 shows key descriptive statistics for the capital markets of the Philippines (PSEi), South Korea (KOSPI), Indonesia (JKSE), Thailand (SET), Malaysia (KLCI), China (SSEC), and Hong

Kong (HSI) for the period from January 2nd, 2017, to February 17th, 2022. The analysed markets show positive average returns, while the stock market index PSEi shows the sharpest standard deviation (0.013028). The stock market of Thailand (SET) has the most significant skewness (-2.166928) and Kurtosis (32.57937). Additionally, the skewness and kurtosis coefficients are statistically different from those of a normal distribution, which are presented by the Jarque and Bera test (1980) where the hypothesis that the data follow a normal distribution is rejected at the 1% significance level.

Table 2. Descriptive statistics, return, of the 7 Asian capital markets for the period January 2, 2017, to February 17, 2022.

	HSI	JKSE	KLCI	KOSPI	PSEi	SET	SSEC
Mean	9.31E-05	0.000226	1.98E-05	0.000241	7.13E-05	8.56E-05	8.56E-05
Median	0.000780	0.000634	7.52E-05	0.000733	0.000174	0.000477	0.000443
Maximum	0.049250	0.097042	0.066263	0.082513	0.071717	0.076531	0.055542
Minimum	-0.057202	-0.068051	-0.054047	-0.087670	-0.143224	-0.114282	-0.080392
Std. Dev.	0.011766	0.010267	0.007491	0.011070	0.013028	0.010171	0.010549
Skewness	-0.385551	-0.081607	-0.270251	-0.277017	-1.541857	-2.166928	-0.625278
Kurtosis	5.072136	13.92446	13.11306	12.25060	20.95262	32.57937	9.065647
Jarque-Bera	256.6383	6266.954	5384.717	4508.727	17419.80	46920.36	2013.688
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	0.117280	0.284239	0.024982	0.303307	0.089777	0.107886	0.107811
Sum Sq. Dev.	0.174291	0.132707	0.070656	0.154286	0.213696	0.130241	0.140096
Observations	1260	1260	1260	1260	1260	1260	1260

Notes: ***, **, *. represent significance at 1%, 5% and 10%, respectively.

Source: Own elaboration.

Since we are in the presence of time series, we should study the stationary nature of time series concerning Asian capital markets, namely the stock markets of the Philippines (PSEi), South Korea (KOSPI), Indonesia (JKSE), Thailand (SET), Malaysia (KLCI), China (SSEC), and Hong Kong (HSI). For that, the panel unit root tests of Levin et al. (2002), Im et al. (2003) were used, and to validate the tests Dickey and Fuller (1981), Phillips and Perron (1988) with Fisher transformation. The intersection of the tests shows the stationarity of the time series in the first differences, that is, we are facing white noise (mean = 0; constant variance) (see table 3).

In table 4 are presented the results of the variance ratio methodology proposed by Lo and MacKinlay (1988), to evaluate the autocorrelation between the return series. In all cases, the statistics were calculated for lags of 2 to 16 days, with 1-day intervals, for the stock markets of the Philippines (PSEi), South Korea (KOSPI), Indonesia (JKSE), Thailand (SET), Malaysia (KLCI), China (SSEC), and Hong Kong (HSI). The results show that the random walk hypothesis is rejected for all stock market indices. Returns are found to be autocorrelated over time, and mean reversion exists, as the values of the variance ratios are lower than unity. Given these assumptions, markets tend to react abruptly to information due to the uncertainty and pessimism experienced in the global economy stemming from the 2020 global pandemic. Additionally, the hypothesis of the informational efficiency of the analysed stock markets may be questioned. These findings were verified, by the authors' studies (Dias, Pardal, Santos, and Vasco, 2021; Dias et al., 2021, 2021, 2022; Dias, Heliodoro, Alexandre, Santos, et al., 2021b; Santos et al., 2021; Zebende et al., 2022), which show the presence of autocorrelation, i.e., the existence of long memories in international stock markets.

Table 3. Panel unit root test applied to the 7 Asian capital markets over the period from January 2nd, 2017 to February 17th, 2022.

Group unit root test: Summary				
Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-76.5090	0.0000	7	8794
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-62.6404	0.0000	7	8794
ADF - Fisher Chi-square	994.674	0.0000	7	8794
PP - Fisher Chi-square	671.177	0.0000	7	8813

Note: ** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality. Automatic lag length selection based on SIC: 0 to 10. Newey-West automatic bandwidth selection and Bartlett kernel.

Source: Own elaboration.

Table 4. Tests of the Variance Ratios of Lo and Mackinlay, regarding the 7 Asian capital markets over the period January 2nd, 2017, to February 17th, 2022.

Null Hypothesis: HSI is a random walk				
Joint Tests		Value	df	Probability
Max z (at period 2)		17.67887	1259	0.0000
Wald (Chi-Square)		313.1722	4	0.0000
Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	0.501757	0.028183	-17.67887	0.0000
4	0.276609	0.052726	-13.71994	0.0000
8	0.160117	0.083366	-10.07459	0.0000
16	0.095320	0.124053	-7.292679	0.0000
Null Hypothesis: JKSE is a random walk				
Joint Tests		Value	df	Probability
Max z (at period 2)		15.56637	1259	0.0000
Wald (Chi-Square)		245.3904	4	0.0000
Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	0.561293	0.028183	-15.56637	0.0000
4	0.296241	0.052726	-13.34759	0.0000
8	0.193906	0.083366	-9.669293	0.0000
16	0.143998	0.124053	-6.900278	0.0000
Null Hypothesis: KLCI is a random walk				
Joint Tests		Value	df	Probability
Max z (at period 2)		17.84048	1259	0.0000
Wald (Chi-Square)		319.7124	4	0.0000
Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	0.497202	0.028183	-17.84048	0.0000
4	0.282994	0.052726	-13.59883	0.0000
8	0.189128	0.083366	-9.726607	0.0000
16	0.136900	0.124053	-6.957499	0.0000
Null Hypothesis: KOSPI is a random walk				
Joint Tests		Value	df	Probability
Max z (at period 2)		17.87709	1259	0.0000
Wald (Chi-Square)		322.1111	4	0.0000

Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	0.496170	0.028183	-17.87709	0.0000
4	0.293773	0.052726	-13.39439	0.0000
8	0.194319	0.083366	-9.664335	0.0000
16	0.147918	0.124053	-6.868685	0.0000
Null Hypothesis: PSEi is a random walk				
Joint Tests		Value	df	Probability
Max z (at period 2)		16.88164	1259	0.0000
Wald (Chi-Square)		285.3437	4	0.0000
Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	0.524225	0.028183	-16.88164	0.0000
4	0.273427	0.052726	-13.78029	0.0000
8	0.161931	0.083366	-10.05283	0.0000
16	0.119180	0.124053	-7.100338	0.0000
Null Hypothesis: SET is a random walk				
Joint Tests		Value	df	Probability
Max z (at period 2)		15.28017	1259	0.0000
Wald (Chi-Square)		236.2273	4	0.0000
Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	0.569359	0.028183	-15.28017	0.0000
4	0.308406	0.052726	-13.11686	0.0000
8	0.196823	0.083366	-9.634294	0.0000
16	0.126590	0.124053	-7.040606	0.0000
Null Hypothesis: SSEC is a random walk				
Joint Tests		Value	df	Probability
Max z (at period 2)		17.37548	1259	0.0000
Wald (Chi-Square)		303.4415	4	0.0000
Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	0.510307	0.028183	-17.37548	0.0000
4	0.297852	0.052726	-13.31703	0.0000
8	0.170067	0.083366	-9.955239	0.0000
16	0.098738	0.124053	-7.265123	0.0000

Note: Standard error estimates assume no heteroskedasticity. Test probabilities computed using permutation bootstrap: reps=1000.

Source: Own elaboration.

5. CONCLUSION

The general conclusion to be retained and supported by the results obtained, through the tests performed with mathematical and econometric models show that the random walk hypothesis is rejected in Asian capital markets, namely in the stock indices of the Philippines (PSEi), South Korea (KOSPI), Indonesia (JKSE), Thailand (SET), Malaysia (KLCI), China (SSEC) and Hong Kong (HSI), in the period from January 2, 2017, to February 17, 2022. The results suggest that markets exhibit persistence in their returns, which means, the time data exhibit serial autocorrelation, which shows that if investors use trading strategies with the necessary lags, they can obtain returns above the market average.

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The COVID-19 Pandemic, Government Response, and Serbian Stock Market: Evidence from ARDL Cointegration Model

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Abstract: *The existence of a real possibility that the current health crisis could lead to an economic crisis has prompted governments worldwide to make great efforts to sustain their markets. This paper explores the impact of COVID-19 and Serbian government anti-Covid activities on the domestic stock market using the Autoregressive Distributed Lag (ARDL) Cointegration model. In its research, the paper considers the impact of the number of newly infected and the number of deaths from coronavirus daily, as well as measures taken by governments to combat viruses on the representative Belgrade stock exchange index BELEX15. The results showed a significant long-term negative impact on the number of deaths per day and international travel control on the BELEX15 index. In terms of reducing the negative consequences of the crisis caused by the global pandemic, these results could be a good guideline for effective management of government measures.*

1. INTRODUCTION

The SARS-CoV-2 virus, or the COVID-19, surprised the whole world, causing a significant measure of fear and uncertainty, primarily due to rapid contamination and high mortality rates. At the same time, there have been significant disruptions in the international market and relations between national economies. The coronavirus was initially considered a Chinese problem, then a problem of Southeast Asia, but a combination of various factors, natural, political, and regulatory, led to the rapid global spread of the epidemic, which is why it was recognized as a pandemic by the World Health Organization (WHO), on 11 March 2020. At the very beginning, coronavirus was treated as a public health problem, but, over time, its impact on overall life, and thus on the economy and capital markets, became more and more pronounced. A significant number of economic experts and international institutions monitor and predict the impact of the pandemic on the global economy, which is now known as the common term “global recession” (Karajović et al., 2021).

This global recession differs from all previous ones, primarily due to the inclusion of multiple uncertain socio-economic connections. Such relation is largely a result of concerns about the spread of the virus but also about government interventions in terms of limiting contact between people. All this has led to a reduction in the inflow of money into companies and an increase in the number of unemployed (Gravelle and Marples, 2021). Governments have taken unprecedented measures to protect the health of the population and businesses. For example, European countries have provided significant funds to support struggling companies and postpone interest-free and late tax payments, temporarily reduced taxes, implemented measures for the most vulnerable sectors, such as paid leave due to unemployment, etc. The introduction of the state of emergency on March 15, 2020, due to the pandemic of the COVID-19 virus, the extensive curfew, the closing of borders, and the ban on social contacts have caused restrictions or complete work suspension in

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many economic entities in Serbia. Some sectors, such as catering, tourism, air transport, and other services, completely stopped working almost overnight to avoid the circulation of citizens and reduce the spread of the virus. State support for the economy began with the decision of the National Bank of Serbia (NBS) in mid-March to decrease the reference interest rate to 1.75 percent, followed by another additional reduction to 1.5 percent in April. In March, the NBS decided on a three-month moratorium on loan repayments for both the economy and citizens to mitigate obligations to banks during the expected duration of the epidemic. Following these initial measures, the Serbian government has provided a series of individual actions as part of an economic package to lessen the effects of the COVID-19 crisis (Đaković, 2020).

The latest pandemic is also affecting stock markets. According to Azimli (2020), for example, the COVID-19 pandemic affects the stock market in two ways. First, the high level of economic policy uncertainty resulting from the pandemic spread and the unknown future of the virus led to low expectations of cash flow, leading to a depreciation of the stock market. Second, stopping the industrial, tourism, transport, and other sectors directly affect stock indices by depressing related stocks.

Minding the topic, the subject of this paper is the relationship between the COVID-19 pandemic and government response and the Serbian stock market by implementing the ARDL cointegration model. This paper deals with the impact of the number of coronavirus infections and deaths per day, as well as the effect of Restrictions on internal movement (RIM) and International travel controls (ITC) during the COVID-19 pandemic on the representative index of the Belgrade Stock Exchange - BELEX15 (B15). The paper consists of five parts. After the introductory discussion, the second part gives a brief overview of the relevant literature and previous research. The third part contains the research methodology, with hypotheses, research data, and econometric methods. The results of hypothesis testing are presented in part four. The final part holds the conclusions of the conducted research with recommendations for future researchers.

2. LITERATURE REVIEW

The coronavirus caused massive instability in world stock markets, with the sharpest daily decline in stock market indices in history (Fernandes, 2020; Vasiiu, 2020; Hatmanu and Cautisanu, 2021). Based on the results of many studies, coronavirus, in terms of new cases and the number of deaths from its consequences, has a negative impact on stock markets (Gherghina et al., 2020; Al-Awadhi et al., 2020; Hatmanu and Cautisanu, 2021).

Zaren and Hizarci (2020) analyze the possible effects of the COVID-19 on stock markets, using stock indices daily data. The cointegration test using COVID-19 daily infections and deaths was used to question possible outcomes on the stock markets. The SSE, KOSPI, and IBEX35 indices have a cointegration relationship with the number of infections, while FTSE MIB, CAC40, DAX30 indices don't.

Wardani and Lahuddin (2021) analyze COVID-19 in response to the Indonesian stock market applying the ARDL cointegration method. In this study, the authors examine the relationship between the natural logarithm of the daily trading volume of the Indonesia Stock Exchange and the natural logarithm of daily COVID-19 confirmed cases both in the short run and the long run. The findings show that in the short-run, Indonesia's stock market is only influenced by its lag, but not in the long run.

The impact of social distancing policies on the stock market, which governments have taken to curb the spread of the pandemic, has been studied by Ozili and Arun (2020). The research results showed that the number of isolation days and international travels had a negative impact on the stock market, while restrictions on internal movement had a positive one.

Eleftheriou and Patsoulis (2020) analyze the impact and effects of government measures due to the COVID-19 pandemic on 45 stock market indices worldwide. Authors find evidence of negative direct and indirect (spillover) effects for the initial period of containment measures (lockdown).

Zaremba et al. (2020) explore the policy responses to the COVID-19 pandemic in 67 countries. Authors demonstrate that non-pharmaceutical interventions significantly increase equity market volatility. Furthermore, two types of actions usually applied chronologically, particularly early—information campaigns and public event cancellations—are the major contributors to the growth of volatility.

Baber and Tripathi (2021) look at the effect of lock-in and social distancing policies in light of stock prices, business activity indices, and exchange rates in India. Confirmed cases of COVID-19 and confirmed deaths associated with the disease are used as independent variables. The obtained results reveal a significant negative impact of social distancing policies on economic activity and business, the stock market, and the exchange rate. The authors conclude that the economic stimulus of the Government of India could not have a positive effect on the stock market.

Zoungrana et al. (2021) examined the effect that government measures against coronavirus had at the company level and in the industry, finance, and distribution sectors. The obtained results show that, at the company level, social distancing and government measures had a positive impact on the market, while restrictions movements and isolation measures led to a decline in the value of shares. At the sector level, according to the survey results, restrictions on movement had a significant negative impact on the returns of companies from all three sectors, while isolation measures affected the industrial and financial sectors more than the distribution sector.

3. RESEARCH METHODOLOGY

3.1. Research Hypothesis

Based on the review of the literature, and to meet the objectives of the research presented in the introductory part, the following research hypotheses were set:

Hypothesis One: The B15 index has been affected by the number of new cases due to the coronavirus.

Hypothesis Two: The B15 index has been affected by the number of new deaths due to the coronavirus.

Hypothesis Three: The B15 index is significantly affected by measures adopted by the national authorities.

Hypothesis Four: The B15 index has been negatively affected by restrictions on domestic movements and international travel control.

3.2. Data Set and Description

The analysis used the number of daily infections and deaths in the Republic of Serbia, starting with the appearance of the first case of coronavirus, from March 6, 2020, to March 7, 2022, which is a total of 504 trading days. The B15 index was used to determine the impact of the coronavirus on the Serbian stock market. The variables used in the study as stock market variables (B15), COVID-19 variables (number of COVID-19 infections and deaths per day), and variables related to measures taken by the authorities against the infection (Restrictions on internal movement - RIM, and International Travel control - ITC), as well as data sources, are shown in *Table 1*.

Table 1. Research variables description

Abbreviation	Description	Source
B15	Representative index of the Belgrade Stock Exchange.	Belgrade Stock Exchange
NDC	The number of new cases of coronavirus per day.	Ministry of Health of the Republic of Serbia
NDD	The number of new coronavirus deaths per day.	Ministry of Health of the Republic of Serbia
RIM	Restrictions on internal movement during the COVID-19 pandemic. Ordinal variable (0 - No measures; 1 - Recommend movement restriction; 2 - Restrict movement).	Our World in Data
ITC	International travel controls during the COVID-19 pandemic. Ordinal variable (0 - No measures; 1 - Screening; 2 - Quarantine from high-risk regions; 3 - Ban on high-risk regions; 4 - Total border closure).	Our World in Data

Movements of selected variables from 6 March 2020 to 7 March 2022, which is 504 trading days, are shown in Figure 1. Namely, for the evolution of the local capital market, but global markets also, 2020 was atypical, bearing in mind that the COVID-19 pandemic led to one of the most severe health crises in recent human history (Hatmanu and Cautisanu, 2021). The first signs of a pandemic in the Serbian capital market appeared in mid-March. The period of decline, which followed the trend in the European and international markets, was fueled by the coronavirus-caused panic. The value of the B15 index declines after the appearance of the first case of coronavirus (mid-March), then there is a change in trend and growth so that after the initial shock caused by the COVID -19 pandemic, similar to other stock exchanges, the Serbian capital market slowly recovers from the shock. The pandemic variables in the Republic of Serbia have shown a growth trend, with the number of newly infected growing in four waves, reaching the highest values in January 2022, and the number of deaths in six waves gaining peak values in March 2021. The pandemic variables in the Republic of Serbia have shown a growth trend, with the number of new cases growing in four waves, reaching the highest values in January 2022, and the number of deaths in six waves hitting peak values in March 2021. Governments undertook a wide range of combating COVID-19, and some of these measures are Restrictions on internal movement (RIM) and International travel controls (ITC). When it comes to RIM, the Restrict movement was valid in Serbia from the beginning of March to the middle of May. After that, the periods with the recommended movement restriction and no measures changed. In regards to ITC in Serbia, in the period from March to mid-May 2020, measures included a travel ban in all regions or complete closure of the border, while in late May and early April 2021, as well as between October and December 2021, all people coming from a high-risk region were quarantined.

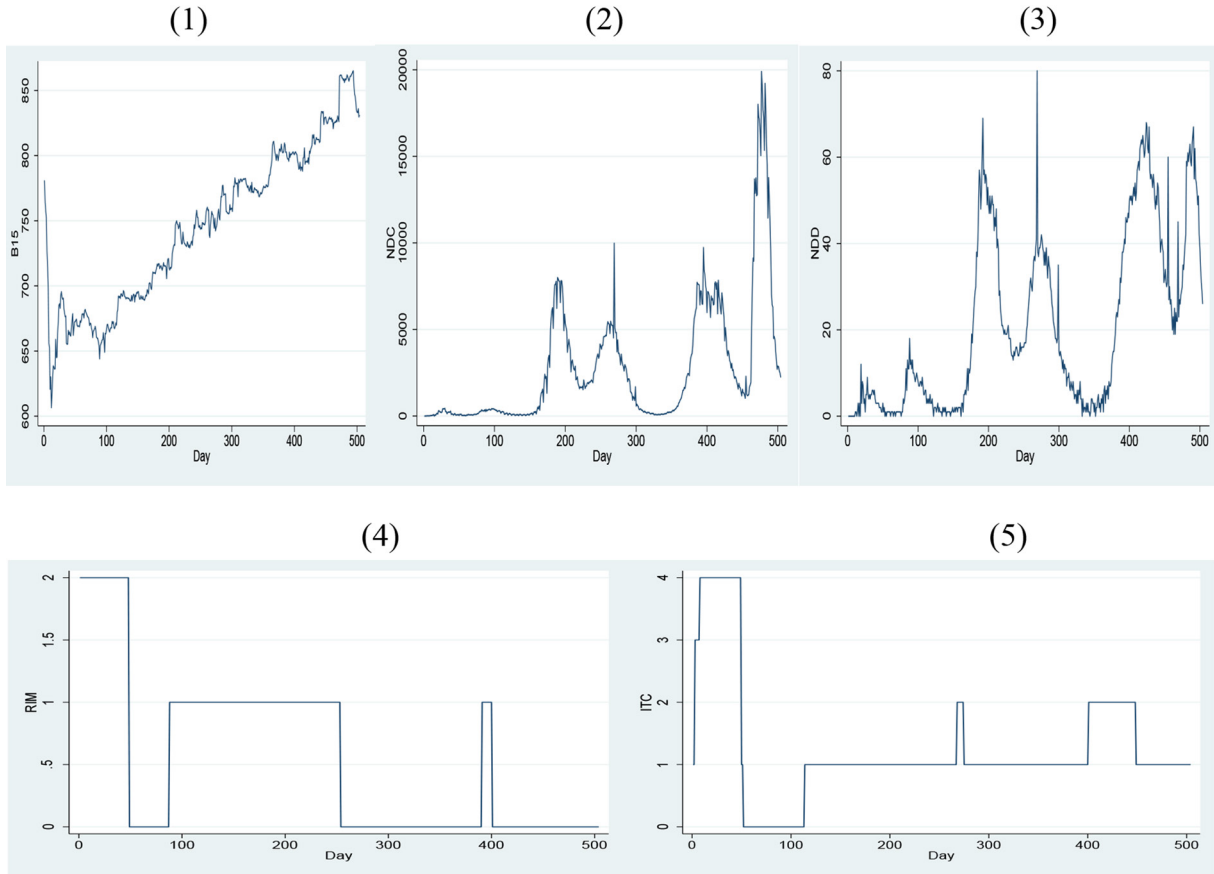


Figure 1. The value of the B15 index at the daily level (1), the number of newly coronavirus infected per day (2), the number of deaths from the consequences of the coronavirus per day (3), Restrictions on internal movement during the COVID-19 pandemic (4) and International travel controls during the COVID-19 pandemic (5)

Source: Authors

3.3. Research Methods

The equation of the influence of COVID-19 variables and variables related to measures taken by the authorities to control the infection on the representative index of the Belgrade Stock Exchange B15 is estimated using the ARDL modeling approach according to Pesaran and Shin (1999), and Pesaran, Shin, and Smith (2001). The ultimate advantage of this approach is its applicability in cases when the variables are $I(0)$ or $I(1)$, which avoids the problem of determining the order of integration of time series that commonly occurs in standard cointegration analyses. In this research, the ARDL methodology involves two steps. The first step begins with conducting tests to probe the existence of cointegration. In the second step, after cointegration is confirmed, the long-term relationship and the associated error correction model are estimated. The ARDL model is a least-squares regression model that contains dependent and explanatory variables (Ganić, 2021, p. 96). It is usually denoted as $ARDL(p, q_1, \dots, q_k)$, where p is the number of lags of the dependent variable, q_1 is the number of lags of the first explanatory variable, q_k is the number of lags of the k -th explanatory variable. The ARDL Bound test, in this work, is given as:

$$\Delta Y_t = \sum_{i=1}^{p-1} \beta_i \Delta Y_{t-i} + \sum_{j=1}^k \sum_{l_j=0}^{q_j-1} \delta_{j,l_j} \Delta X_{j,t-l_j} + \gamma Y_{t-1} + \sum_{j=1}^k \phi_j X_{j,t-1} + u_t \quad (1)$$

Where is:

Y_t – the dependent variable (B15),
 $X_{(j,t)}$ – independent variables (NDC, NDD, RIM, ITC),
 k – number of independent variables,
 Δ – the first difference operator,
 u_t – error term, β_i , and
 $\delta_{(j,lj)}$ – coefficients that indicate short-run relationships,
 γ and Φ_j – coefficients that indicate long-run relationships,
 p and q_j – optimal lags.

The Bounds test examines the null hypothesis about the non-existence of a long-run relationship between the considered variants based on Fisher's statistics. The calculated F-statistic is compared with the critical limit values found in Pesaran, Shin, & Smith (2001). Two sets of asymptotic critical values are available: the first set assuming that all variables are in model I(1), and the second set assuming that all variables are in model I(0). If the calculated value of the F-statistic is higher than the upper limit, the null hypothesis of no long-term relationship can be rejected, whether the variables are I(0), I(1), or fractionally integrated. If the calculated value is lower than the lower bound, the null hypothesis of no long-term relationship can be accepted, whether the variables are I(0), I(1), or fractionally integrated. Finally, if the calculated value is between these two bounds, a single conclusion cannot be made, but it depends on whether the variables are I(0) or I(1), so tests for the unit root existence are necessary.

If the results of the cointegration test indicate long-term relationships between the variables under consideration, the error correction model (ECM) is applied, which can be represented by the following equation:

$$\Delta Y_t = \sum_{i=1}^{p-1} \beta_i \Delta Y_{t-1} + \sum_{j=1}^k \sum_{l_j=0}^{q_j-1} \delta_{j,lj} \Delta X_{j,t-l_j} + \theta ECT_{t-1} + u_t \quad (2)$$

Where θ is the coefficient of error correction term (ECT), which must be statistically significant, negative, and subunit, showing the rate at which the dependent variable, after the shock produced in the system, restores equilibrium.

The stability of the model coefficient and the residual component was verified to confirm the previously estimated model, while the robustness of the results obtained in the ARDL model was verified using VAR Granger causality.

4. EMPIRICAL RESULTS AND DISCUSSION

Before testing critical values, it is necessary to examine the properties of variables, that is, the degree of their integration. It is of essence to determine whether the variables are integrated of order $n = 0, 1, 2$ to avoid apparent regression, meaning evident results (Benazić and Mašić, 2016). In the presence of variable I(2), the calculated F-statistic is not valid because the critical value test is based on the assumption that the variables are I(0) or I(1). For this purpose, the extended Dickey-Fuller – ADF (Dickey and Fuller, 1979) and Phillips Perron - PP (Phillips and Perron, 1988) tests can be used. The results of unit-root tests are shown in Table 2. The test results indicate that variables of order I(1) are integrated, that is, they are stationary in the first difference, and for that reason, the ARDL Bounds cointegration approach can be applied.

The first step of the ARDL approach begins with critical values testing to determine the existence of cointegration, a long-term connection. The maximum number of lags in the ARDL model is four and is designed based on the AIC criteria. The chosen model is ARDL (2, 1, 2, 0, 2). The results of long-term relationship testing are given in Table 3. The obtained value of F-statistics is higher than the critical value of I (0) and I (1) regressors, so the null hypothesis about the non-existence of a level relationship is rejected.

The long-run relationship, i.e., the selected long-run ARDL (2, 1, 2, 0, 2) equation of the B15 index value is shown in Table 4. It is clear that the increase in International travel controls during the COVID-19 pandemic caused a decrease in the value of the representative index of the Belgrade Stock Exchange B15 at a statistically significant level and, also, the ADJ coefficient of the B15 index value in the first lag is negative at a statistically significant level and indicates a high rate of convergence towards long-term equilibrium. In the short run, it is evident that the positive changes in the current and first lag of International travel controls during the COVID-19 pandemic (ITC), as well as the positive changes in the first lag of the number of new coronavirus deaths (NDD) are statistically significant and have positive effects on change the value of the index B15 (B15).

Diagnostic and model stability tests indicate that the proposed model has been adequately evaluated, and conclusions based on such a model are acceptable (Table 5 and Figure 2).

Table 2. Unit root test results

Variable and test	Level			First difference			Order of integration
	Φ	Constant	Trend	Φ	Constant	Trend	
ADF test							
B15	-8.46***	8.38***	8.62***	-21.67***	-0.95	1.39	I(1)
NDC	-2.68***	-0.01	1.24	-27.36***	0.43	-0.41	I(1)
NDD	-3.25***	0.29	1.79	-33.94***	0.52	-0.38	I(1)
RIM	-3.15***	2.09**	-1.80	-22.38***	-0.84	0.57	I(1)
ITC	-2.35**	1.60	-0.58	-22.34***	0.17	-0.20	I(1)
PP test							
B15	64.21***	8.38***	8.62***	0.86	-0.95	1.39	I(1)
NDC	86.54***	-0.01	1.24	-4.56***	0.43	-0.41	I(1)
NDD	73.44***	0.29**	1.79	-9.62***	0.52	-0.38	I(1)
RIM	81.54***	2.09	-1.80	-0.04	-0.84	0.57	I(1)
ITC	-0.58***	1.60	-0.58	-0.00	0.17	-0.20	I(1)

Note: *, **, and *** - the statistical significance at the 10%, 5%, and 1% level, respectively.

Source: Authors

Table 3. Testing the long-term relationship between variables in the ARDL model

Model	ARDL	F-Statistic
B15\NDC, NDD, RIM, ITC	(2, 1, 2, 0, 2)	35.488
Significance	Critical values	
	I(0)	I(1)
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Authors

Table 4. ARDL error correction model (2, 1, 2, 0, 2)

D.B15		Coefficient	Std. Err.	t
ADJ	D.B15			
	L1.	-0.7952459	0.0606964	-13.10***
LR	NDC	0.0008438	0.0006506	1.30
	NDD	-0.0870685	0.1647486	-0.53
	RIM	-3.527265	2.468095	-1.43
	ITC	-6.99486	2.636204	-2.65***
SR	B15			
	LD.	-0.1838255	0.0435894	-4.22***
	NDC			
	D1.	-0.0001997	0.000335	-0.60
	NDD			
	D1.	0.1000999	0.1009543	0.99
	LD.	0.1225523	0.0568297	2.16**
	ITC			
	D1	3.964907	1.763985	2.25**
	LD.	3.755436	1.250628	3.00***
	Constant	0.1084512	0.2436009	0.45
R^2		0.5258		
$Adj R^2$		0.5152		

Note: *, **, and *** - the statistical significance at the 10%, 5%, and 1% level, respectively.

Source: Authors

Table 5. Diagnostic tests

Serial correlation	
Breusch-Godfrey LM test	$\chi^2 = 0.423$; Prob > $\chi^2 = 0.5156$
Functional form	
Ramsey RESET test	F(3, 495) = 1.23; Prob > F = 0.2989
Heteroskedasticity	
Breusch-Pagan/Cook-Weisberg test	F(4, 498) = 1.92; Prob > F = 0.0938
ARCH test	$\chi^2 (1) = 2.266$; Prob > $\chi^2 = 0.0817$

Source: Authors

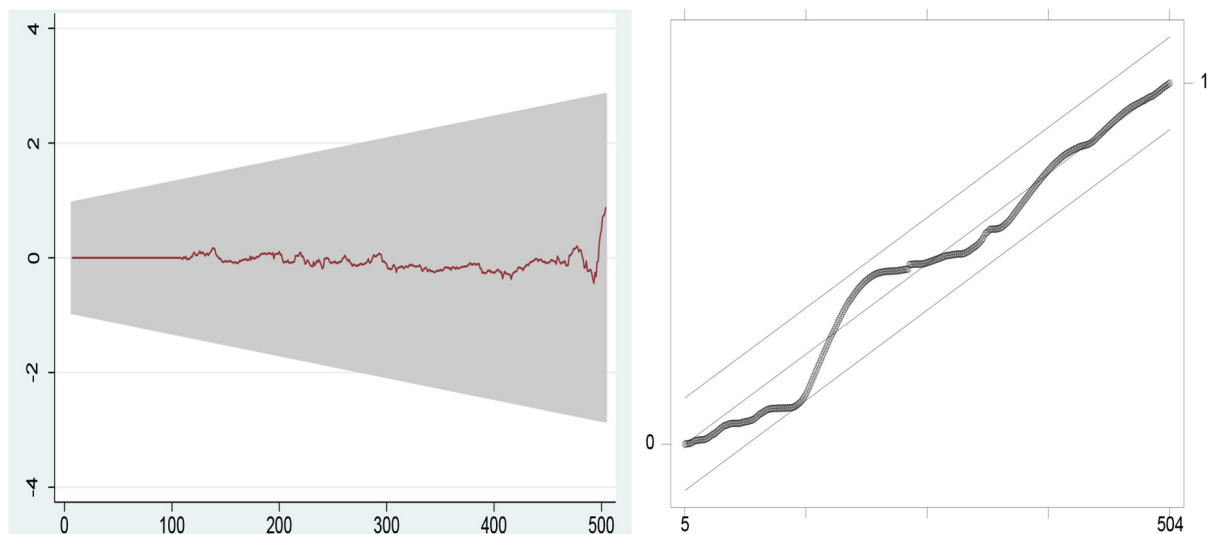


Figure 2. CUSUM and CUSUM of squared plots

Source: Authors

The VAR Granger causality model was used to verify the robustness of the results from the validated model. The results of the VAR Granger causality test (Table 6) also indicate two causal links, suggesting that changes in International travel controls during the COVID-19 pandemic, as well as changes in the number of new coronavirus deaths, cause changes in the values of the B15 index.

Table 6. Granger causality test results

H_0	χ^2	p
NDD does not cause B15	7.1191	0.028
ITC does not cause B15	11.111	0.004

Source: Authors

5. CONCLUSION

The COVID-19 pandemic is one of the latest, but also the most significant phenomena, which has seriously affected stock markets. In that sense, this paper focuses on determining the relationship between the pandemic and the Serbian stock market (measured by the B15 index) in the period from the first case of coronavirus in Serbia, March 6, 2020, to March 7, 2022, which is a total of 504 trading days. We used two categories of variables: 1) pandemic variables (number of new cases and new deaths due to coronavirus per day), and 2) variables that reflect measures taken by the authorities to control the infection (restrictions on internal movement, international travel controls).

The results of the conducted empirical analysis indicate a statistically significant and negative long-term relationship between the number of deaths from the consequences of the coronavirus on the daily level of the B15 index. The obtained results are in accordance with the results of studies by other authors (Hatmanu and Cautisanu, 2021; Gherghina et al., 2020; Al-Awadhi et al., 2020). Also, according to the obtained results, international travel control is statistically significantly and negatively related to the B15 index in the long run. The results of previous studies point to similar conclusions (Chowdhury et al., 2021; Zoungana et al., 2021; Hatmanu and Cautisanu, 2021).

This paper provides a better insight into the impact of the current pandemic on the Serbian stock market in two years. The results could be a guideline to national authorities to effectively manage the measures adopted to fight the pandemic. The work also has certain limitations. First of all, it is focused only on the analysis of the Serbian context. In addition, the paper did not take into account economic variables such as, for example, inflation, monetary policy, fiscal policy, etc. In this regard, to obtain as accurate results as possible, future research could include these variables and additional pandemic variables, such as the number of tested and vaccinated, and use different methodological approaches, such as panel regression analysis, by including several countries.

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Measuring Company Performance Using the Integrated Indicator

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Abstract: *When assessing the company's financial position and performance, we most often use financial indicators such as net income, rate of return on assets, rate of return on equity, cash flow and the like. However, dynamic business conditions have brought the need to use an integrated (composite) indicator, especially for a comparative long-term analysis of several companies. The composite indicator consists of individual indicators (variables) and allows for a comprehensive assessment of performance in order to get a full picture of the company's business that all stakeholders can understand. The application of this indicator is possible at the national and international levels. Therefore, this paper aims to point out how performance measurement using a composite indicator facilitates the assessment of business operations, but also investors' decision-making.*

1. INTRODUCTION

The rapid expansion of production and trade, the general trend of world market globalization, growing competition, technological and software development have conditioned the intensification of flows of goods, services and capital. In such conditions, managers need timely and accurate information as well as tools to identify opportunities for business improvement. Managers do not have a large number of tools at their disposal to examine multiple variables, which will at the same time facilitate decision-making regarding changing business strategy. However, the application of composite indicators will provide information on performance flows and performance evaluation over time. Also, their application can provide information on the environment in which companies operate.

The research subject includes 12 service companies selected with the highest revenue in 2020. Data in the period from 2018 to 2020 is observed. Secondary data is used and the selected variables (operating income, net income, total assets, equity and return on assets), using multivariate analysis, i.e. composite indicators, create a new variable (Total Performance Indicator) that allows us to rank companies and more easily assess their financial position and performance. This paper aims to form a composite indicator using multivariate analysis to examine the extent to which composite indices are suitable for measuring performance.

In that sense, the paper is divided into three parts. The first part provides an overview of the literature. The second part of the paper deals with the methodology of factor analysis, research design and description of indicators that are the starting point for data processing in the statistical program (*Statistical Package for the Social Sciences* – SPSS). Finally, the results and analyses are presented.

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2. REVIEW OF LITERATURE

The service sector is growing in importance and has an increasing share in the national economy. The basic task of service companies is to provide differentiated services of high quality at an appropriate price with minimal costs. The service sector is becoming the dominant sector offering products/services in line with consumer needs. Faced with competition, managers need to bring company services closer to customers in order to achieve success (Blešić et al., 2011). Continuous monitoring of the achieved performance enables companies to focus their strategy on the goals set.

Performance measurement as an integral part of management accounting has been widespread since the 1990s among the scientific and professional community as well as numerous practitioners (Haktanir, 2005; Atkinson, 2006). Success in achieving the company's goals will depend on the way performance is measured, but also on the time at which the measurement is made. Of course, the process of measuring performance is constant and continuous, but for an adequate assessment of the company's performance, it is necessary to evaluate and review the achieved performance at least once a year. There are several studies evaluating the evolution of performance measurement and performance management systems (Bititci et al., 2012; Choong, 2014). The concept of performance measurement is very important for a company's business strategy, competitive position and long-term economic sustainability (Pnevmatikou-di & Stavrinoudis, 2016). Measures such as earnings per share, return on investment (RoI), and rate of return on capital employed (RoCE) can be used to measure performance (Ezzemel, 1992). Neely et al., (2005) point out that the level of performance that a company achieves is the result of the efficiency and effectiveness of the actions it takes. A performance measurement system is defined as a set of metrics used to quantify actions. In this regard, popular indicators of efficiency and effectiveness are the rate of return on investment and market share.

Performance measurement systems can help companies evaluate, control, learn, and improve their business (Behn, 2003). Neely (2005) highlights five phases to explain the evolution of performance measurement literature. He calls the first phase the *problem identification* that characterizes the 1980s. At this stage, dissatisfaction with the use of traditional measures is observed and expressed (Chakravarthy, 1986). The 1990s bring the second phase of *potential solutions* to address dissatisfaction. In this period, Kaplan & Norton (1992) propose a balanced scorecard with four perspectives: the financial perspective, the consumer perspective, the internal processes perspective, and the learning and growth perspective. BSC (Balanced Scorecard – BSC) has become a practical approach used in measuring performance (Neely, 2005). In the third phase, methods for applying a *performance measurement system* in the late 1990s are sought. The fourth phase focuses on *empirical research on company capabilities and their performance measurement*. The focus is on researching the ability to measure the impact of performance measurement on customers (Evans, 2004). The final phase is the *theoretical verification of the set of performance measurement frameworks* that causes new problems (Choong, 2014; Malina et al., 2007).

For performance measurement in service organizations such as banks, retail, and insurance organizations there are various approaches (Sainaghi, 2010). However, there is a noticeable lack of performance management studies in the hospitality and tourism industry (Sainaghi et al., 2017) which has unique characteristics such as service complexity, capital investment, sensitive production processes where customers are involved in the production process, the importance of work location, environmental sensitivity and the like.

In recent years, when making decisions about the company performance, the method of multivariate analysis, i.e. composite indices, has been used. Composite indices represent the aggregation of basic indicators into one indicator and are used in different sectors. Although there are different ways of measuring performance, a large number of authors emphasize the creation of a composite indicator as a tool for performance evaluation. Composite indices are used in the health sector, social services, education and other sectors (Freudenberg, 2003). They enable the use of a single result that includes a range of performance indicators.

There are many dilemmas to consider before using composite indicators. They relate primarily to whether composite indices can accurately reflect company performance and whether the way they are created affects their instability and unreliability. In addition, you need to know to what extent they can be affected by uncertain conditions. Regardless of these dilemmas, what is certain is that the use of composite indicators offers a full assessment of performance and presents a broader picture of the company's business that the public can understand.

3. SAMPLE DESIGN AND RESEARCH METHODOLOGY

The use of composite indicators as a tool for multivariate analysis is becoming popular because the observation of a certain problem can be included in one indicator. There is a large number of definitions that describe multivariate analysis, so we opt for the following: *multivariate analysis is a set of statistical methods that simultaneously analyze multidimensional measurements obtained for each observation unit from the set of objects we examine* (Kovačić, 1994).

Composite indicators allow the measurement of multidimensional concepts that cannot be viewed based on a single indicator (Nardo et al., 2008). Due to the ability to evaluate the company's performance, the popularity of composite indicators is growing. They enable monitoring of performance over time, enable ranking of companies and facilitate the interpretation of the results obtained. When defining the sample for the application of the composite indicator methodology, we first look at the list of companies with the highest revenue in 2020, published by the Business Registers Agency. The sample consists of 12 companies from the service sector (six companies from the trade sector: *Delhaize Serbia*, *Nelt Co.*, *Mercator-s*, *Lidl*, *Phoenix Pharma* and *Mercata Vt.*), while the second group consists of six companies from the hospitality industry: *Mona Hotel*, *Hotelsko TT Palisad*, *Mountain Resort Kopaonik*, *Hotel Putnik Kopaonik*, *Tonati* and *Solaris Resort Vrnjačka Banja*). The composite indicator is designed and tested using real data. Secondary data taken from companies' financial statements are used. The basic set of selected variables (operating income, net income, total assets, equity and return on assets) and the method of their measurement are shown in Table 1.

Table 1. Variables selected to create a composite indicator

Variables	Measurement	Acronym
Operating income	Highlighted in income statement	OI
Net income	Highlighted in income statement	NI
Total assets	Highlighted in balance sheet	TA
Equity	Highlighted in balance sheet	K
Return on assets	Operating Income/Total assets	ROA

Source: Authors

Table 2 shows the ranking of companies by individual original values of selected variables (operating income, net income, total assets, equity and return on assets). In the period from 2018

to 2019, out of the five observed variables, Delhaize is in the first place, while Solaris is in the last place in four of the five observed variables. Solaris has the first position based on ROA in 2019 (10.34). The ranking of other companies according to the values of their variables is given in Table 2.

The quality of the composite indicator depends on the methodology used in its creation, but it also depends on the quality of the data used in the analysis. By combining individual indicators into one indicator, the model forms a composite indicator. The composite indicator aims to measure multidimensional concepts that cannot be covered by a single indicator. The advantages of using a composite indicator include the following (OECD, 2008): summarizing complex, multidimensional areas in order to support decision-makers; it is easier to interpret one composite indicator than a larger number of individual ones; may indicate the progress of the test unit over time; reduces the empirical set of indicators without losing the necessary information; enables communication with the public and promotes accountability and enables users to efficiently compare complex dimensions.

However, composite indicators can create a misconception about the observed phenomenon if they are not adequately formulated or interpreted (Nardo et al., 2005). The subjective choice of constructing composite indicators is also mentioned as a disadvantage (for example, the choice of data aggregation, the choice of weights, etc.), which can lead to erroneous conclusions regarding the performance of companies or countries (Munda & Nardo, 2003).

Creating composite indicators is a very complex process and involves specific steps that need to be followed. The phases of creation offer different alternatives that determine the quality and accuracy of the obtained results. Creating a composite index involves the following steps (OECD, 2008):

- Formulation of a theoretical framework;
- Data selection;
- Treatment of missing data;
- Multivariate data analysis;
- Data normalization;
- Weighting;
- Aggregation;
- Sensitivity analysis;
- Examination of correlation with other indicators and
- Result interpretation.

The above steps need to be harmonized, and the choice of method within these steps depends on the data available. Before creating a composite indicator, descriptive statistics of the defined sample should be considered. This is important because differences in the values of indicators in terms of units of measurement require data normalization. As there are different units of measurement in the sample, the normalization is performed using min - max transformation, which enables the transformation of values to an identical range of values. Normalized values range from 1 to 7 based on the World Economic Forum methodology. In this way, we raise the comparative ability of the indicator.

For positive indicators, i.e. to increase the value of variables that positively affect performance, the following formula 1 is applied during transformation (WEF, 2016, p. 241). We subtract the

Table 2. Ranking of companies according to individual variables from 2018 to 2020

Company	Year	Operating income	Rank	Net income	Rank	Total assets	Rank	Equity	Rank	ROA	Rank
Delhaize Serbia, Beograd	2018	100.054.412,00	2	2.665.532,00	1	84.120.570,00	1	43.381.505,00	1	82,94%	1
	2019	104.316.102,00	1	5.175.014,00	1	86.236.774,00	1	43.381.506,00	1	9,02%	2
	2020	110.942.458,00	1	3.930.919,00	1	72.196.168,00	1	28.094.597,00	2	9,07%	1
Lidl, Nova Pazova	2018	113.310.885,00	1	(5.506.033,00)	12	32.919.883,00	3	38.424.488,00	2	(15,47%)	12
	2019	37.849.263,00	5	(1.986.593,00)	11	41.475.819,00	3	40.786.204,00	2	(2,30%)	12
	2020	57.013.057,00	4	1.138.121,00	2	53.999.296,00	3	40.786.204,00	1	4,70%	4
Mercator-s, Novi Sad	2018	83.078.502,00	3	(1.662.330,00)	11	54.070.144,00	2	15.950.663,00	3	(1,45%)	10
	2019	77.514.350,00	3	(2.157.800,00)	12	65.807.174,00	2	10.743.906,00	3	1,64%	8
	2020	79.215.605,00	2	(5.478.054,00)	12	55.477.309,00	2	4.871.515,00	3	2,92%	3
Nelt Co.	2018	78.271.156,00	4	536.442,00	3	25.794.613,00	4	534.631,00	6	2,14%	7
	2019	78.195.986,00	2	601.208,00	2	26.476.799,00	4	534.631,00	6	2,82%	6
	2020	77.060.501,00	3	783.179,00	4	26.798.700,00	4	534.631,00	6	3,71%	2
Phoenix Pharma	2018	43.981.793,00	5	146.139,00	5	20.893.429,00	5	1.403.220,00	5	1,76%	8
	2019	52.173.571,00	4	568.707,00	3	22.563.122,00	5	1.403.220,00	5	2,14%	7
	2020	55.900.338,00	5	1.004.396,00	3	25.082.084,00	5	1.403.220,00	5	2,66%	5
Mercata Vt.	2018	29.297.909,00	6	255.577,00	4	6.653.464,00	6	16.256,00	11	6,96%	4
	2019	23.969.592,00	6	336.613,00	4	6.426.845,00	6	16.256,00	10	6,16%	4
	2020	55.398.515,00	6	650.391,00	4	9.604.554,00	6	27.492,00	11	7,64%	6
Mountain Resort Kopaonik	2018	973.467,00	7	612.302,00	2	5.501.334,00	7	2.160.783,00	4	2,98%	5
	2019	796.653,00	7	279.166,00	5	4.928.769,00	7	2.160.783,00	4	(1,75%)	11
	2020	663.930,00	7	55.659,00	6	4.960.227,00	7	2.160.783,00	4	0,70%	9
Solaris Resort Vrnjačka Banja	2018	178.099,00	10	5.675,00	8	28.153,00	12	8.667,00	12	22,88%	2
	2019	167.006,00	10	3.922,00	10	54.697,00	12	12.589,00	11	10,34%	1
	2020	111.477,00	12	6.533,00	9	56.501,00	12	6.056,00	12	(11,30%)	12
Mona Hotel	2018	484.357,00	8	70.901,00	6	90.394,00	11	353.765,00	7	9,39%	3
	2019	481.148,00	8	18.897,50	6	991.488,00	10	353.765,00	7	7,85%	3
	2020	272.458,00	9	(46.207,00)	10	1.051.011,00	10	353.765,00	7	(3,82%)	7
Hotelsko TT Palisad	2018	405.932,00	9	7.878,00	7	1.879.629,00	8	209.136,00	8	2,18%	6
	2019	405.931,00	9	8.112,00	9	1.867.765,00	8	209.136,00	8	0,97%	10
	2020	242.905,00	10	155,00	8	1.834.667,00	8	209.136,00	9	(3,36%)	8
Hotel Putnik Kopaonik	2018	18.595,00	11	(6.923,00)	10	692.059,00	10	162.502,00	9	(0,46%)	9
	2019	148.596,00	11	15.912,00	7	755.306,00	11	162.502,00	9	3,45%	5
	2020	162.414,00	11	28.508,00	7	787.425,00	11	162.502,00	10	5,04%	10
Tonati, Beograd	2018	0	12	562,00	9	979.626,00	9	20.000,00	10	(1,83%)	11
	2019	125.212,00	12	10.628,00	8	1.750.602,00	9	11.000,00	12	1,20%	9
	2020	276.389,00	8	(121.639,00)	11	1.689.559,00	9	297.015,00	8	(5,97%)	11

Source: Authors' calculation adapted from Business Registers Agency, 2020.

minimum value and divide it by the range between the minimum and maximum value. Formula 2 will be applied to indicators where a higher value leads to a weaker result or a decrease in the development indicator.

$$TI_{ji} = 6 * \frac{I_{ji} - I_j^{min}}{I_j^{max} - I_j^{min}} + 1 \quad (1)$$

$$TI_{ji} = -6 * \frac{I_{ji} - I_j^{min}}{I_j^{max} - I_j^{min}} + 7 \quad (2)$$

where:

TI_{ji} – transformed value of j-th indicators in the indicator;

I_{ji} – value of the j-th indicator in the i-th company;

I_j^{min} – minimum value of the j-th indicator in companies;

I_j^{max} – maximum value of the j-th indicator in companies.

As the increase of selected variables has a positive effect on the performance of companies, we applied formula 1 for data transformation.

4. RESULTS AND DISCUSSION

Correlation analysis allows for determining the degree of agreement between indicators. It determines the strength and direction of the linear correlation between two variables (Pallant, 2009, p.129). Small values of partial correlation indicate the existence of real factors among the data. Based on the values in the correlation matrix (Table 3), it can be noticed that the highest degree of direct quantitative agreement is between operating income and operating assets (0.872), then between total assets and equity (0.794), while in the third place is the ratio of equity and total assets (0.642). The lowest degree of agreement is between net income and operating income.

Table 3. Correlation matrix

		ROA	Operating income	Equity	Total assets	Net income
Correlation	ROA	1.000				
	Operating income	0.235	1.000			
	Equity	0.324	0.642	1.000		
	Total assets	0.391	0.872	0.794	1.000	
	Net income	0.399	0.036	0.121	0.162	1.000

Source: Authors' calculation using SPSS

The Kaiser-Meyer-Olkin measure and the Bartlett test are used to determine the justification for the application of factor analysis. The value of the Kaiser-Meyer-Olkin measure should be greater than 0.6 (Haier et al., 2010), which in this case is (0.646). If the value is not higher, then the correlation matrix is not appropriate for factor analysis, while the Bartlett test measures the adequacy of sampling for each variable in the model, as well as for the whole model. The condition is that the realized level of significance is less than 0.05 because it indicates that the correlation matrix of data has significant correlations between indicators (Pallant, 2009, p.138). The realized level of significance of the test is 0.000, which is less than 0.05 and justifies the use of factor analysis.

Finally, a component matrix is obtained in which it is important that the sum of the weights is equal to 1. The value shown in Table 5 is pre-processed by obtaining a sum for each indicator

and then dividing the value of the individual weight by that sum to receive a weight that can be further used to create a composite indicator.

Table 4. KMO and Bartlett test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.646
Bartlett's Test of Sphericity	Approx. Chi-Square	93.488
	Df	10
	Sig.	0.000

Source: Authors' calculation using SPSS

Table 5. Weights

Indicator	Total Performance Indicator
Operating Income	0.245
Net Income	0.082
Total assets	0.272
Equity	0.245
ROA	0.156

Source: Authors' calculation using SPSS

After weighting, the weighted values of the indicators are aggregated to obtain the value of the composite indicator. Based on the weight, it is possible to define a formula for calculating the Total Performance Indicator:

$$TPI = 0.245 \times OI + 0.082 \times NI + 0.272 \times TA + 0.245 \times E + 0.156 \times ROA$$

Where:

TPI – Total Performance Indicator.

The obtained indicator will be applied to selected companies in the period from 2018 to 2020. The Total Performance Indicator enables the determination of the rank of individual companies in the observed period (Table 6).

Table 6. Values of total performance indicator in the period from 2018 to 2020

Company	2018	Ranking	2019	Ranking	2020	Ranking
Delhaize Serbia, Beograd	6.67	1	6.18	1	5.43	1
Lidl, Nova Pazova	4.40	2	3.94	2	4.64	2
Mercator-s, Novi Sad	3.95	3	3.93	3	3.42	3
Nelt Co.	2.97	4	2.99	4	3.00	4
Phoenix Pharma	2.44	5	2.60	5	2.72	5
Mercata Vt.	1.98	6	1.91	6	2.40	6
Mountain Resort Kopaonik	1.65	7	1.57	7	1.57	7
Solaris Resort Vrnjačka Banja	1.62	8	1.50	9	1.29	12
Mona Hotel	1.51	9	1.51	8	1.40	10
Hotelsko TT Palisad	1.47	10	1.46	10	1.41	9
Hotel Putnik Kopaonik	1.41	11	1.45	11	1.47	8
Tonati, Beograd	1.40	12	1.45	12	1.38	11

Source: Authors' calculation using SPSS

Different methods can be used when aggregating weighted indicator values. The method of linear aggregation is used in the paper, because all individual indicators are expressed in the same units of measurement, respecting mathematical properties (Nardo et al., 2008). During the normalization of the indicators, a transformation model is applied, which reduces the values of the

indicators to a scale from 1 to 7, so it is to be expected that the values of the composite indicator are in that range. Based on Table 6, it can be noticed that the maximum value of the indicator for 2018 is 6.67 (Delhaize), and the minimum value is 1.40 (Tonati). The maximum value of the indicator in 2019 is recorded at Delhaize (6.18), and the minimum value of the indicator is maintained at the Hotel Tonati (1.44). In 2020, Delhaize has the highest value again (5.42), and Solaris Resort has the lowest value (1.29). So, in the observed period, the first seven companies do not change their ranking. The change of ranking is recorded at Hotel Mona (2018 - 9, 2019 - 8, 2020 - 9). Solaris Resort takes the eighth position in 2018, the ninth in 2019, while in 2020 it is in the twelfth position. Hotel Putnik records an improvement in the list of observed companies, so in 2020 it is in the eighth position, and 2018 in the eleventh.

Comparing the obtained ranking of companies in Table 2 and Table 6, it can be noticed that Delhaize and Solaris occupy the same position. In fact, the first five companies have the same ranking based on the analysis of individual values and the values of the obtained composite indicator. However, it is much easier, simpler and faster to make a decision based on an aggregate indicator.

The proposed composite indicator summarizes corporate performance. The main positive advantage compared to a set of individual indicators is that the model summarizes corporate sustainability and allows for a quick and clear comparison. Also, the composite indicator model facilitates detailed analysis and easier visualization of all performance indicators along with their benchmarks. It is possible to make comparisons over time, rank and benchmark companies. In this way, partial and hidden information is eliminated. It is possible to simultaneously assess the total performance, including the difference in performance between companies in one view, all of which facilitates the interpretation of results without losing information due to the reduction in the number of indicators (Hudrliková, 2013). A composite performance indicator is a comprehensive approach, as it also contains an essential element of corporate sustainability, i.e. corporate governance (Zhou et al., 2012).

There are two perspectives on composite indicators (Sharpe, 2004): *proponents of composite indicators* who think aggregation of individual indicators is important because it allows for a better, easier and simpler view of a multidimensional phenomenon and *opponents of composite indicators* who point out that a set of individual indicators is sufficient for studies of a certain phenomenon and that they should not be combined due to the presence of subjectivity in the weighting of indicators.

In any case, based on the above, we can see that composite indicator can be a very useful tool for decision making. There is no generally accepted methodology for creating a composite indicator, but the methodology is very flexible and adapts to specific situations in practice (Saisana & Tarantola, 2002).

5. CONCLUSION

Continuous market research is a basic prerequisite for creating new services and achieving consumer satisfaction and competitive advantage in the market. Therefore, the service sector must frequently evaluate performance and change goal setting. One way of evaluation is the use of composite indicators. Composite indicators are useful for assessing various phenomena that cannot be covered by a single indicator. However, as indicators are aggregated to calculate the value of the composite indicator, it can also be used to assess economic performance.

The objective of the paper has been to form a composite indicator using multivariate analysis to examine the extent to which composite indices are appropriate for measuring performance. The obtained results justify the use of composite indicators for easier assessment of companies' business and decision-making. The obtained ranking using individual variables for measuring performance (operating income, total assets, equity and return on assets) and the obtained composite indicator indicate that companies occupy the same ranking. In the sample of 12 companies from the service sector in the period from 2018 to 2020, Delhaize and Tonati occupy the same position (first and last). The maximum value of the composite indicator for 2018 is 6.67 (Delhaize), and the minimum value is 1.40 (Tonati). The maximum value of the indicator in 2019 is again recorded at Delhaize (6.18), and the minimum value of the observed companies is maintained at Tonati (1.44). In 2020, Delhaize has the highest value again (5.42), and Solaris Resort has the lowest value (1.29). So, in the observed period, the first five companies do not change their ranking. The change of ranking is recorded at Hotel Mona (2018 - 9, 2019-8, 2020-9). Solaris Resort takes the eighth position in 2018, the ninth in 2019, while in 2020 it is in the twelfth position. Hotel Putnik records an improvement in the list of observed companies, so in 2020 it is in the eighth position, and 2018 in the eleventh. In fact, the first five companies (Delhaize Serbia, Belgrade, Lidl, Nova Pazova, Mercator-s, Novi Sad, Nelt Co., Phoenix Pharma) have the same ranking based on the analysis of individual values and the values of the obtained composite indicator. Based on aggregate indicators decisions are made easier, simpler and faster.

As composite indicators focus on important business issues of companies and offer a full picture of the assessment of business and financial position of companies, it is likely that they will continue to be used in various fields. A careful approach needs to be established when selecting indicators that can be used to measure performance in the service sector and create a composite indicator.

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Corporate Well-Being Programme as a Tool to Cope with Reduced Engagement and Resilience in COVID-19 Times

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Abstract: *The coronavirus pandemic is having a dramatic impact on employees around the world, damaging their physical and psychosocial well-being, and triggering disengagement and affecting their resilience. This research aims to test, through a case study, the effects of a corporate wellness programme on engagement and resilience in COVID-19 times. A quantitative methodology has been used through self-administered questionnaires and two instruments; the reduced International Physical Activity Questionnaire (IPAQ), to measure the level of physical activity, and the Healthy and Resilient Organization (HERO) questionnaire to measure engagement and resilience. The results reveal that a corporate well-being programme, adapted to COVID-19 times, offers a better relationship between physical activity levels and engagement and resilience, compared with other pre-pandemic programmes, proving its efficiency. In a conclusion, this case study may be helpful to convince organizations of the importance of adapting their corporate well-being programmes in pandemic times, to maintain and even improve the engagement and resilience of their workforce.*

1. INTRODUCTION

For the first time in history, the World is suffering two pandemics at the same time; the COVID-19 pandemic, declared by the World Health Organization (WHO) on March 11, 2020 (WHO, 2020), and the one declared, also by the same organization in 2012 due to physical inactivity and sedentary lifestyle (Kohl et al., 2012). COVID-19 has worsened physical inactivity levels (Diniz et al., 2020) with home confinement having a negative effect on physical activity and daily sitting time increased from 5 to 8 hours per day (Ammar et al., 2021) when physical activity has proven to be the best natural medicine to prevent the consequences of confinement and teleworking and stress (Chen et al., 2020). Furthermore, since 2020, and also in 2021, employees in most countries were still required or encouraged to work from home (De Klerk et al., 2021).

The impacts of COVID-19 on workplaces and workers worldwide have been dramatic and, given the uncertainties of the pandemic, organizations need to actively support the health and well-being of employees (Kniffin et al., 2021). During the last years, more companies are implementing corporate well-being programmes to take care of their workers' health and hence, the company's health, as the employee's well-being is an essential element that contributes to the long-term success of a company, becoming, therefore, a strategic element in corporate human resource management (Sparling, 2010).

Physical inactivity and increased sedentary lifestyles triggered by Covid-19 and teleworking are having negative consequences on the physical and mental health of employees; therefore, it is essential for companies that wish to look after the health of their employees to adapt their wellness programmes to the new situation as soon as possible (Núñez-Sánchez et al., 2021).

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Furthermore, Acuña et al. (2021) found that the COVID-19 pandemic is triggering stress and reducing engagement while Wang et al. (2020), underlined the importance to improve mental health and psychological resilience during this period.

Therefore, this research aims to test, through a real case study, the effects of a corporate well-being programme on engagement and resilience in COVID-19 times.

2. LITERATURE REVIEW

Based on scientific evidence, maintaining a regular exercise routine is a key strategy for physical and mental health during a forced rest period like the current coronavirus emergency (Maugeri et al., 2020). Physical activity has a positive impact on psychosocial variables in employees (Bezner et al., 2018), on the perception of health status and general health (Kim et al., 2019), and it is positively related to happier workers (Cohn et al., 2009). These physically active workers are more engaged (Gómez-Chacón et al., 2021), healthier and more resilient (Gerber et al., 2014). Employees are suffering physical inactivity consequences and also having a dramatic impact on their mental health, therefore it is of great importance to improve mental health and psychological resilience (Wang et al. 2020)

These two positive resources, engagement and resilience are part of the healthy employees' strengths such as self-efficacy, hope, optimism and resilience (Luthans & Youssef, 2004) and engagement (Salanova, 2012). This concept of a Healthy Employee is part of the Healthy and Resilient Organization, created by Salanova et al. (2012). The different strengths of the healthy employee are related to employees being more satisfied with their jobs and more engaged and better performance (Bakker & Demerouti, 2017), employees with more proactive behaviors and creative ideas (Gawke et al., 2017).

First, engagement can be defined following Schaufeli et al. (2002) as a satisfactory cognitive-affective state in relation to the work performed in their company. Employee engagement, according to the last Gallup study (2021) remains dismally low (only 20%), in other words, 80% of an organization's employees are not engaged at work, therefore the organization's resilience during a crisis will be at high risk, and leaders won't be able to consistently reach their goals, as employees' disengagement creates a drag on productivity, innovation and organizational change.

Second, resilience can be defined, from the perspective of positive organizational psychology, as a stable trajectory of healthy functioning after a highly adverse event (Bonanno et al., 2011). These two concepts, engagement and resilience, are critical for the success of any business but also are positively related. Various studies indicate that there is a positive relationship between resilience and engagement, while engagement, as a positive organizational outcome, has a positive association with resilience (King et al., 2015).

3. METHODOLOGY

The study was conducted in Spain, in 4 different companies, with different corporate well-being programmes, in 2 different periods, before and during a pandemic. To facilitate the presentation of results, the 3 companies in which the study was carried out before the pandemic have been grouped, thus achieving a similar sample size as the company in which the study was carried out during the pandemic.

The total sample is composed of $n = 538$ employees, of which belong to the male sex $n = 365$, and the female sex $n = 173$. This total sample has been divided into two groups: the pandemic group of $n = 251$ (Group 1) and the pre-pandemic group of $n = 287$ (Group 2). Group 2 (the pre-pandemic group) is the union of three different Spanish companies; one software company, a food company and an engineering company. The information collection period in the pre-pandemic companies started in May 2015 and ended in May 2016. The pandemic group is composed of one of the biggest beverage manufacturing companies in Spain, with more than 4.000 employees, and one of the most awarded companies for its corporate wellness programme. They started this well-known programme in 2001, and since then, they have been improving it year by year, becoming, therefore, a benchmark. This company had to adapt its worksite well-being programme to the new reality provoked by COVID-19, and this is the period that will be studied; data collection began on 16th October 2020 and ended on 20th November 2020.

The collection of data was made by self-administered questionnaires and two instruments have been used. The first one, the International Physical Activity Questionnaire (IPAQ) in its reduced version was used to measure the level of physical activity, which has valid and reliable psychometric characteristics (Brown et al., 2004). The second one, to measure engagement and resilience, healthy employee questionnaire (Salanova et al., 2012) in its adaptation by Gómez-Chacón et al. (2020). In both models, of eight dimensions and five dimensions, they show a good fit, since the incremental indexes (CFI and NNFI) and the absolute SRMR are higher than .90 and lower than .08 respectively (Gómez-Chacón et al., 2020). In this case study, in order to achieve the aim of the research, only engagement and resilience will be considered.

The normality test was performed between the variables of the healthy employee, type of physical activity, and type of company, analyzing the means, standard deviations and significant differences. Non-compliance with the assumption of normality led to nonparametric tests using the Mann-Whitney U test. All analyses were conducted with the SPSS 24 statistical program.

4. RESULTS

In the following tables results are presented, showing the influence of physical activity levels on engagement (Table 1) and resilience (Table 2):

Table 1. Influence of physical activity levels on engagement

Physical Activity Level	Group	N	Average	Standard deviation	Mean standard error
High	Group 1	41	4,7060	,67292	,10509
	Group 2	81	4,3745	,79542	,08838
Moderate	Group 1	157	4,4533	,76315	,06091
	Group 2	124	4,3992	,72277	,06491
Low	Group 1	53	4,4570	,78026	,10718
	Group 2	82	3,6836	,70731	,07811

Source: Own elaboration

In table 1, it can be observed that Group 1 presents better engagement averages than Group 2 in all the three different levels of physical activity. The employees with a higher level of physical activity and with a lower physical activity present significantly (see table 3) better engagement.

Table 2. Influence of physical activity levels on resilience

Physical Activity Level	Group	N	Average	Standard deviation	Mean standard error
High	Group 1	41	4,6864	,65326	,10202
	Group 2	81	4,4286	,87657	,09740
Moderate	Group 1	157	4,4122	,81392	,06496
	Group 2	124	4,4816	,78107	,07014
Low	Group 1	53	4,5445	,75751	,10405
	Group 2	82	3,7787	,74524	,08230

Source: Own elaboration

In table 2, it can be observed that Group 1 also presents a better resilience average than Group 2 in all the three different levels of physical activity. The employees with a low level of physical activity present significantly (see table 3) better resilience.

Table 3. Independent samples test

		Sig. (bilateral)	95% of interval difference confidence	
		Lower	Upper	
High Physical Activity	Engagement	0,024	0,04428	0,61867
	Resilience	0,099	-0,0492	0,56485
Moderate Physical Activity	Engagement	0,546	-0,1222	0,23044
	Resilience	0,471	-0,2585	0,11973
Low Physical Activity	Engagement	0,00	0,5166	1,03024
	Resilience	0,00	0,50425	1,02721

Source: Own elaboration

These results are in line with Gómez-Chacón et al. (2021) and Gerber et al. (2014) respectively as physically active workers are more engaged, healthier and more resilient.

5. FUTURE RESEARCH DIRECTIONS

The covid-19 pandemic is still active and changing, as the measures adopted by governments. It would therefore be of interest to practitioners and researchers to update this study once the pandemic is over. It would also be advisable to compare the results of the same company at different times, or companies with the same characteristics and similar welfare programs, to draw conclusions and adopt better solutions and improvements. Finally, it would also be advisable to compare bigger samples and segment these samples by age, sex, or position in the company.

6. CONCLUSION

The COVID-19 pandemic is affecting employees' physical and mental health dramatically, and this is also affecting companies' outcomes as a result of this worsened health, lower engagement and resilience.

This research responds to the importance of pandemic investigation in generating resources to foster worker resilience and engagement (Salanova, 2020), proving the importance of corporate well-being programmes to improve physical activity levels of employees as a means to maintain and improve resilience and engagement. Engagement and resilience are of significant importance for companies around the world, as resilience is required for businesses to respond to disruptions as well as positively adapt in the face of challenging conditions, leveraging

opportunities and delivering sustainable performance improvement (Deneyer, 2017). On the other hand, as Harter et al. (2013) stated, business units with high employee engagement achieve higher productivity, higher customer loyalty, and higher customer engagement, better safety, and higher profitability, among other positive business outcomes, having a significant impact on corporate results, and on customer engagement (Chandni & Rahman, 2020).

Organizations and their leaders need to recognize the influence of employee wellbeing and employee engagement on workforce resilience (Gallup, 2021). Therefore, a corporate well-being programme, adapted to COVID-19 times and telework, as this case study shows, may be of major help to maintain and even improve employee's resilience and engagement.

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Employee Development in Retail Organization

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Abstract: *Employee development became one of the key topics in the field of human resources management in current organizations. Taking a proper approach to employee and business development in this area can be a source of competitive advantage for organizations. However, few empirical studies have been conducted on the subject matter; there is still a need for further research to be conducted.*

The research deal with the analysis of the perception of development activities in the retail organization based on a survey conducted through a structured questionnaire survey and analysis of internal company materials. The goal is to point out the perception of development activities by employees based on the survey, as well as to find out the main barriers that prevent employees from their development.

The results of the survey show that employees perceive the development on an individual level, the greatest benefit is seen in their professional and personal growth. The employees are interested in development, but only in their working hours, they are interested in training such as foreign language and computers skills. The primary motive for development is financial. The main barrier that prevents employees from their development is time or perceived lack of time. Another negative factor is that manager does not check, or control acquired knowledge and skills after training. On the other hand, as a positive result is seen the internal trainer at the training and receiving feedback from the manager on employees' performance.

This paper is created for the retail organization to improve the area of employee development, as well as for scholars researching this topic and others interested in the development of employees in an international company.

1. INTRODUCTION

In recent years, the area of employee development and investment in this area has become a major field on which organizations have begun to place great emphasis. It is becoming increasingly clear that an organization that has qualified professionals in a particular field, who are constantly evolving and improving their skills and knowledge, can create products and offer services that will represent a competitive advantage in the market. It is important to be aware of what development activities bring to an individual as a personality and how he or she can use this knowledge throughout his or her professional or private life. (Mikołajczyk, 2021) stated that there are implications in tailoring activities and offering for development to fit the needs of employees to progress in their work. Therefore, an agile approach is necessary in these times.

In the organizations, some employees are developed and perform their best, their needs are fulfilled, and they are developed in an appropriate style, but some employees are underdeveloped, which means their skills and knowledge could be developed to perform their job (Singh, Singh

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and Pushkar, 2021). The employees are a valuable form and vital source of competitive advantage in the company (Kimani, Gesimba and Gichuhi, 2020). It is an employee who forms the core of the company, and although information technology is becoming more and more important today, there is no need to forget about people as the cornerstone of any organization, as a thinking and creative element that brings meaning and order.

There are employees who remain in their position for many years, but there are also employees who leave the organization due to a lack of growth opportunities (Kimani, Gesimba and Gichuhi, 2020). Employees should take part in training or other development activities to learn new skills, ideas, or concepts. Employee development is used to increase the abilities and efficiency of the individual to help organizations to reach their goals. Another important part of employee development are leaders who should stimulate it.

This paper focuses on the gap in the literature about the perception of development activities from the employee point of view, and barriers affecting employee development, especially in a retail area.

The structure of this paper is the following: (1) Literature review – introduces the main topic of this paper and the latest results of research in this area. (2) Methodology – describes the data used in research and the whole methodology. (3) Discussion – presents the results of the survey. (4) Conclusion – shows concluding remarks about employee development and the limits of the research.

2. LITERATURE REVIEW

Nowadays, employees are expected to take more responsibility for their own development, increasing their knowledge, enhancing current skills and adding new ones to meet job demands or prepare for leadership roles (Molloy and Noe, 2010). Employee development in organizations is a topic becoming more and more important. The time of current changes means the need to redefine the required competencies. According to Thomas Friedman (an American journalist and publicist), passion and curiosity are nowadays the most important components of employee development (Mikołajczyk, 2021; Goldglantz, 2013). Employee development may be diverse in its form: (1) training related to work; (2) training not related directly to work; (3) assessments and feedback; (4) promotions and enlargements of responsibility scope; (5) relationship among workers; (6) career planning actions; (7) projects and workgroup (Kedziora, Piotrowicz and Kolasinska-Morawska, 2018; Pierce and Maurer, 2009). Training should have specific goals such as increasing the personal effectiveness of employees (e.g. competence development), increasing the added value being achieved currently, generating future value, broadening the knowledge or skills required in a job or future job (Mikołajczyk, 2021). Research shows that training and development during the COVID-19 pandemic have consequences on many levels. It turns out that companies had to change the way of employee development and in some organizations, the development area has completely ceased to exist due to layoffs or reduced budgets; other organizations are investing in remote tools to continue employee development which caused the rapid development of the digital transformation of human resources departments (Kniffin et al., 2020; McGuire et al., 2021). New technologies are crucial in the fight against the crisis because of enabling communication, remote working, or online learning. The biggest advantage for employee development is the possibility to access the training materials online from anywhere, anytime and using various devices (Fake and Dabbagh,

2020). Before the COVID-19 pandemic started, there have been conducted various researches in the field of employee development. One research by Deloitte showed that one of the three most significant challenges of companies is to transform and accelerate organizational training and development (Fajčíková, Fejfarová and Urbancová, 2016). Organizations often do not communicate properly the purpose of training and what are they trying to accomplish, and how the training will benefit each employee (Latif, Jan and Shaheen, 2013). Establishing the utility of the training program will make a positive impact on trainees to understand the need to learn and answer the basic questions of learners what is the benefit of that training (Jolles, 2005). Acton and Golden (2003) in their study identified that training of employees positively relates to job satisfaction and contributes to building a negative relation to turnover. The objective of their study is to examine the association between job training satisfaction and learning and development aspects of job satisfaction.

3. METHODOLOGY

The object of this survey was an international retail organization operating in over 50 countries. The subject of the survey was an analysis of the perception of development instruments in a unit in Slovakia before the COVID-19 pandemic crisis. The research was divided into multiple steps. Firstly, the analysis of internal materials of a company to understand the ways of working with employee development and the instruments was used. The company has its approach to ways of working with employee development as well as potential determination. According to these materials, everyone should have access to further development and the possibility to attend different pieces of training (in some cases after the manager's approval or available for employees with growth potential). After understanding the company employee development approach, the first phase was finished and started the second one. The current study adopts a survey research design that involves the collection of primary data with the use of a structured questionnaire. The validity of the research instrument was achieved through content analysis and was also discussed with colleagues to ensure that the questionnaire is measuring what it purports to measure. The questionnaire consists of closed questions with the option to add own answer, open questions and questions based on the Likert Scale. As a part of pre-research, the questionnaire was discussed with HR professionals from the company. The collected data were analyzed with the data analysis, abstraction, synthesis, and deduction.

Of a total of 363 employees, 95 took part in this research, which means 26.17 % (64.2 % female, 35.8 % male) - 3.1 % of top management, 11.6 % of middle management. The most of employees 60 % worked for the company for 1-5 years.

4. RESULTS

The questionnaire found out whether employees participate in development activities, and when they last participated in one. The average number of pieces of training that employees have completed in the last year is 3.52. According to the answers, up to 70.5 % of employees have attended training in the last three months. It follows that the company is working on employee development and employees are involved in development activities.

Figure 1 shows the answers to the question in which employees stated what they see as the benefits of development activities. The biggest benefit is in their professional development in the first place, which was cited by 73.7% of employees, followed immediately by personal development,

which was cited by 67.4% of employees. The first three answers are concluded with the answer that it will help them concerning their colleagues. However, with superiors and subordinates, employees do not see much benefit. It follows from the graph that they see the benefits on an individual level rather than in a broader context.

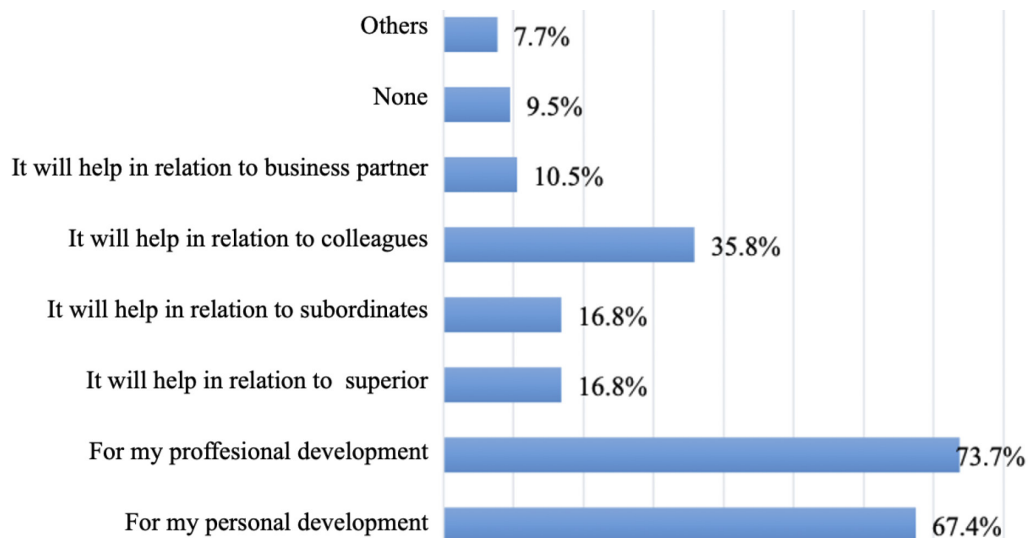


Figure 1. Areas where participation in development activities is beneficial
Source: Own research

The other three questions in the questionnaire focused on interest in training. The first question was about what training employees are interested in, the second question went deeper and found out which trainings employees would attend, and the third question - which training they would attend if they took place outside their working hours. The answers clearly showed a foreign language (especially English, which is used as a communication language in the company), which 76.8% of employees would be interested in, and 68.4% of respondents would also participate outside working hours. Employees would also be interested in training such as conflict resolution, communication skills and training focused on personal growth, but only some of them would take part in off-hours training. The research, conducted among 389 organizations from all regions of the Czech Republic, showed that employees are willing to be trained and developed, but the courses must be proposed by the employer (50.2%). In 8.6% of cases, employees are not willing to train and if a course is proposed by the employer, they will take it (Fajčíková, Fejfarová, and Urbancová, 2016).

It is clear that employees are willing to develop in their free time if they see the activity as a benefit for themselves, their personal lives and not only for their work. They would also be interested in professional training that would take place during their working hours, which could mean that if they were to develop in connection with their work, they only wanted to do it at work. They would also be interested in personal training, leadership, communication skills and other soft skills training, which they would be able to benefit from in their private lives, but they also want to address them earlier during working hours. The reason may be that they tend to associate it with work and do not see a connection with private life.

The questionnaire asked also for motivation. The main motive for further development is a change in financial evaluation (65.3%), supplementing the missing knowledge (60%) and satisfying one's own need for further development (58.9%). A very positive finding is that only 4.3% of employees said that they did not want to develop further, and therefore the company should

continue to focus on the topic of employee development because it makes sense to people. Employees are likely to associate their further development with their career growth, which is why they stated a change in the financial evaluation as the number one motive. Without their further development, it would be very difficult for them to grow to the next position.

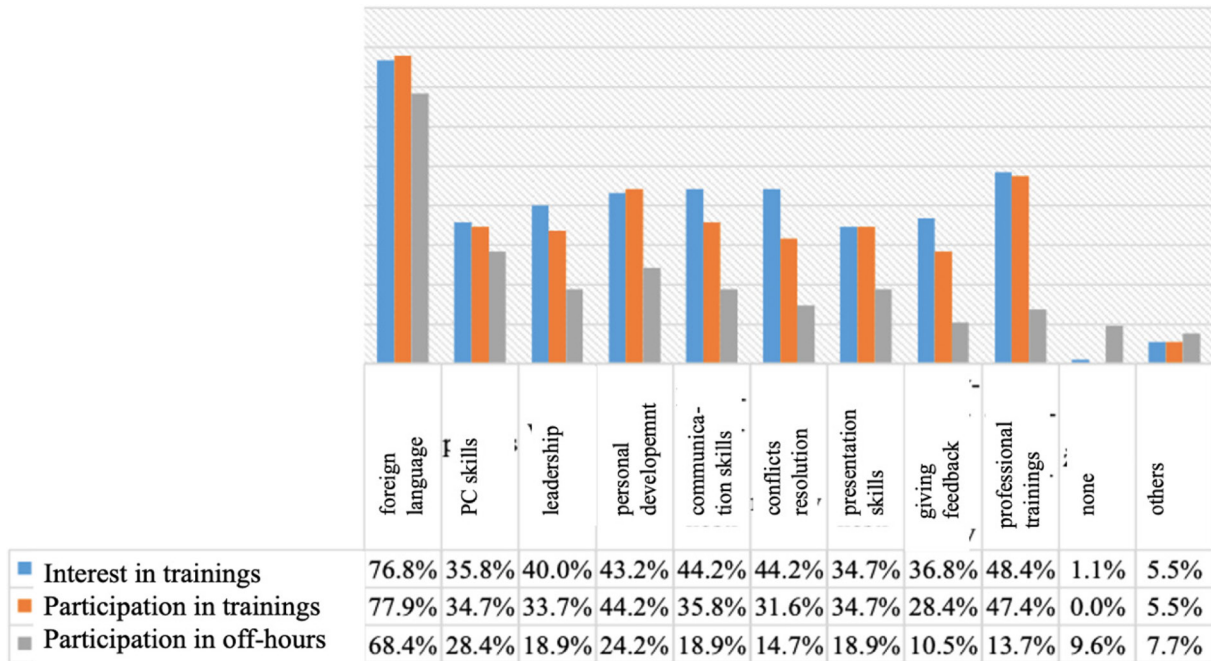


Figure 2. Training interest

Source: Own research

The reason why employees do not participate in development activities is the time stated by 28.8% of respondents. As many as 39.8% of employees stated a different answer, of which 17% of employees did not state any other reason. It is arguable why the employees did not have time. The reasons may be different, for example, the employer did not give them time for further development during working hours, or they think/realize that they do not have room for development activities because they have a lot of work to do, or other reasons why respondents answered, “there was no time”.

Employees see the biggest barriers to development in the lack of time, which was stated by 46.3% of employees. Another reason is the one-time, unsystematic development program. 22.2% of employees stated that they did not see any barriers to development. And only one-tenth of the fewer answers are insufficient options. As in the previous question, in this question, employees stated a lack of time as the biggest barrier. The reasons may be similar to the previous question or other reasons, such as family situation, fatigue, two jobs and others. Other answers included: language skills or work-life balance.

In the following part are summed up the relevant answers to open questions. One of them is about the quality of employee development and how to improve it. The highest number of responses was vocational training, whether it was training in the programs and systems that employees use at work or training focused on practice and their specific position; among other answers were: financial reward, leader, possibility to choose their training, a wider choice of pieces of training, more time, regularity of the training, communication and better information.

The next questions focused on the trainer, specifically what the biggest benefit or shortage of internal trainers is. About 70 % of employees said that the trainer knew the company, procedures, and

processes and had experience directly from the company. Almost 20 % said that the benefit is that the trainer knows the participants personally, creates a friendly atmosphere, is more empathetic and knows the company culture. The rest said it was of no benefit or that the company is saving the cost of an external trainer. The biggest disadvantages, that most employees saw were professionalism and expertise. The external trainer is more professional and has more knowledge of the issue, and sees things more from the outside and not just from the company environment. About 20 % saw no disadvantage of an internal trainer. In the study conducted by Acton and Golden (2003) among 317 Marketers and Offices was found that the trainer has a significant impact on the overall satisfaction with training; the results of the earlier study by Jackson (1999) found that engaging in training and providing discussion prompts are important aspects for a successful training as well as in the study by Choo and Bowley (2007) was found that trainees highly value a helpful and well-prepared trainer.

The last part of the questionnaire consisted of scale questions, where respondents could answer on a scale of one to five, with one meaning disagree at all, two rather disagree, three disagree, four rather agree and five meaning strongly agree.

Table 1. Evaluation of scaling questions from the questionnaire survey

Statement	Average answer
My manager gives me enough feedback about my performance.	4,03
We talk to my supervisor about ways to improve my abilities and skills.	3,75
I consider development activities at company to be beneficial.	3,72
We talk to my supervisor about how I can improve my performance.	3,71
My company supports my development.	3,6
In the future, I plan to develop my career at my current company.	3,58
The knowledge and skills acquired at company's training can be used in practice.	3,57
My company offers plenty of development activities.	3,53
I have enough information about development opportunities from my manager.	3,43
I prefer an internal trainer (company employee).	3,42
I am satisfied with the development opportunities at my company.	3,35
I have enough information about development opportunities from the personnel department.	3,20
After the training, my supervisor checks the acquired knowledge and skills directly during the job.	2,87
After the training, my supervisor checks the acquired knowledge and skills directly in another way.	2,80

Source: Own research

The survey showed that the manager gives enough feedback about performance to the employees but on the other hand does not check the acquired knowledge and skills after training. The research, conducted among 389 organizations from all regions of the Czech Republic, showed that 77.4% (301) of the approached organizations train their employees, of which only 40.2% of organizations systematically evaluate the effectiveness of training and development of their employees (Fajčíková, Fejfarová and Urbancová, 2016).

5. CONCLUSION

The results of the research show that employees perceive the development on an individual level, given that they see the greatest benefit in their professional and personal growth. In the fact, employees are interested in further training, but only during working hours. In addition to their working hours, they are willing to attend training such as a foreign language or computer skills, which

they can also use in their private lives. The unexpected was the motive for further development, where employees most often stated a change in financial evaluation. Financial evaluation is motivating for employees, but as part of the development, the company strives to emphasize strengthening their professional skills and personal growth. Greater awareness could contribute to a deeper perception of the topic and employees would see the positive effects of their further development on their personal and career lives, and not only at the financial level, which they mentioned as their motivator for further development. The biggest negative result is the lack of time for development activities, and also time is perceived as the biggest barrier. It cannot determine exactly in what sense employees perceive time as a barrier to development. They may feel that they have a lot of work responsibilities that they have to do and do not have the space to do other activities. Another negative fact is that the manager does not check the acquired knowledge and skills of his employees in any way after the end of the training. Employees may find training unnecessary if their manager does not verify what they have learned from the training. According to research, one of the biggest advantages positively evaluated by employees was that the trainer at the training was internal, from the company. Another positive fact was receiving feedback from the manager on performance which received the highest rating in the scaling questions.

It is also interesting to note that employees are interested in various other pieces of training that the company does not yet offer, so it would be worth considering these options, or finding out if other employees who did not participate in the questionnaire survey are equally interested. If so, the company could add these pieces of training (some at least online) and include them among the options offered. On the other hand, employees are interested in further training, especially within their working hours, and therefore management must determine the rules as to who and under what conditions each activity or training could take part. Lack of time is considered to be the biggest barrier to further development, so the company's management should find out why this is a barrier. This may be due to labor shortages, or the addition of additional tasks to employees, or work on changes that do not allow them to participate in different activities. As the company provides various opportunities for further development, these barriers must also be taken into account, which may mean that the activities are not available to all employees.

The internal trainer at the training was perceived more positively than the external trainer. Nevertheless, expertise needs to be ensured, so it is sometimes appropriate to use the services of an external trainer who can have more experience in the field, which can enrich the participants. In training for managers, training with an external trainer is often more effective because it can bring an "outside" view of the topic, outside the company environment, which allows managers to come up with other options they may not have been aware of before.

A good picture for the company is that managers provide their employees with enough feedback about their performance. Feedback is very important in further development and can serve as a useful tool for their analysis, so each employee knows their strengths and weaknesses. This knowledge is important if an employee wants to grow into a managerial position, to know what to work on and what he or she is good at, and also to learn to provide feedback to his or her future team. It is also useful for an employee who does not want to move to a managerial position because he or she can eliminate his or her weaknesses and work more efficiently, or also improve his or her strengths and set an example for others.

As the questionnaire survey showed that managers do not check the acquired skills of their employees after the end of the training, it is recommended that the personnel department informs

the managers about the content of the training, which may cause non-verification of knowledge and skills, or set a plan or prepare questions about what managers should check after the training.

The current research has several implications for theory and practice. At the theoretical level, it extends the research to the factors influencing employee development in the COVID-19 pandemic crisis. Moreover, it offers practical information for human resources specialists, especially learning and development specialists and for managers about further ways of working with the topic of employee development in the company; it also provides results in form of barriers that can be avoided in the future to increase the participation rate in training as well as the higher motivation of employees which results in more developed staff.

This research required to address several limitations. Firstly, the present study has a small sample size. In particular, the survey sample consists of only 26% of the company's employees, which may lead to skewed results. If the survey will be conducted repeatedly with a higher number of employees, it could verify the results obtained. Secondly, the survey was conducted before the COVID-19 pandemic crisis has started, therefore it is recommended to compare the current situation in the retail organization. Thirdly, although the questionnaire survey was designed to cover all necessary areas of research, there were unanswered questions that should be examined further. For example, further research could go deeper and find out the perception of development activities specifically after every single activity that the company offers. Furthermore, it is not clear why employees consider time the biggest barrier to development. In addition, the results of this study are based on only one retail organization.

In the case of a repeat, it is recommended to find out which specific training employees are interested in because the survey showed that they are interested in professional training, but it is not clear what they mean by professional training exactly. It is necessary to discuss in more detail why time is the biggest barrier to further development in order to eliminate this deficiency.

In the future, it would be better to investigate the impact of other determinants of development, even in aggregate forms such as salaries, workplace benefits, or overall job satisfaction.

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International Student Mobility – Poland in Comparison with Selected European Union Countries

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Mobility abroad;
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Abstract: *The paper aimed to diagnose Poland's position in terms of students' mobility abroad compared with selected European Union countries and to identify the opinions of students from Polish public universities of economics on the benefits and barriers of international exchange. The research used a multimethod approach (desk research method and survey method), with data triangulation (secondary data - UNESCO statistical data and primary data, obtained in surveys). The research shows that Poland has the lowest outbound mobility rate and the most significant imbalance between incoming and outgoing exchange students of all the countries surveyed. The top three benefits of international exchange include improved language skills, getting to know another culture and the opportunity to find out if a student wants to live and work abroad. The authors found the main barrier to be the cost of studying abroad.*

1. INTRODUCTION

As a result of progressing globalization processes, mobility and working at the crossroads of various cultures have become a distinctive feature of current times. More and more often, employers require from university graduates not only knowledge of foreign languages and international experience, but additionally intercultural competence, defined as the ability to interact effectively in intercultural situations based on intercultural attitudes, knowledge, awareness and skills (Deardorff, 2009). Universities are meeting these demands by helping students find their way in an increasingly interdependent world as part of the internationalization of education (Francis, 1993), positively influencing their ethical commitment by facilitating the identification of their own beliefs and developing a sense of responsibility and civic engagement (Kreber, 2009). One aspect of the internationalization of universities is student mobility.

2. THEORETICAL FOUNDATION

Research shows that participation in international exchange programmes prepares students to work effectively in a culturally diverse environment (Azevedo, 2018), and gives them the opportunity for holistic development by exposing them to the challenges of living and working in a foreign environment (Leung et al., 2008), increases their competitiveness in the labour market (Mammadov et al., 2019), as well as the likelihood of increased mobility in their future working life (Wolfeil, 2009). The students surveyed most often indicate such benefits of mobility as learning a foreign language, personal development, the opportunity to get to know another culture, strengthening and building an international network, the opportunity to see if one wants to live and work abroad, the opportunity to mark on one's CV the fact of having spent a semester at a foreign university, as well as gaining knowledge and skills that the home university cannot offer (Berg, 2016) (Doyle et al., 2010) (Németh et al., 2020) (Prasilova et al., 2018) (Marcinik & Winnicki, 2019) (Kim & Sondhi, 2015).

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The most commonly cited barriers include the cost of studying abroad, having to leave friends and family, lack of language skills, lack of knowledge about exchange programmes, extended study periods, inflexibility of the study programme or uncertainty about the ability to cope with the new environment (Doyle et al., 2010) (Nowakowska & Skrzypek-Czerko, 2016) (Liu, 2018). Most international students choose English-speaking countries such as the United States, the United Kingdom, Australia, and Canada. The main source market for foreign students is China. India comes in second place. An analysis of global student mobility trends shows growing interest in foreign universities by students from Bangladesh, Vietnam, and Indonesia. Currently, the number of students from these countries is around 0.065 million. It is projected to increase to over 2 million by 2030 (Laad & Sharma, 2021).

Over the last two decades, Polish HEIs have made significant progress in internationalizing their activities. Poland joined the Erasmus programme (then known as Socrates) in 1998. As a result, Polish students have had the opportunity to develop and study at foreign universities across Europe for over 22 years. The following critical events favouring mobility were Poland's signing of the Bologna Declaration in 1999 and accession to the European Union in 2004. Today, promoting the internationalization of universities, including international student mobility, is high on the Polish political agenda and receives unanimous support from all government institutions (Bryła & Ciabiada, 2014). The fastest-growing aspect of internationalization is the short-term mobility of staff and students and the slowest - publishing indexed in international databases (ECORYS Sp. z o.o., 2020). In Poland, as in other Central and Eastern European countries (Nowakowska & Skrzypek-Czerko, 2016), integrating international and intercultural dimensions into the formal and informal curriculum for all students in national learning environments has not been a priority so far.

The main purpose of the article was to diagnose Poland's position in terms of students' mobility abroad in comparison with selected European Union countries and to identify the opinions of students at Polish public universities of economics on the benefits and barriers to international exchange. The choice of business schools was not accidental. Business universities have a responsibility to educate deeply ethical and entrepreneurial leaders who think globally and understand the systemic implications of business decisions (Business Education Jam, 2015). They are expected to prepare the leaders of 'tomorrow', equipped with the skills needed to run a productive, inclusive and sustainable economy in the 21st century (Pitt-Watson, David; Quigley, 2019), able to manage people, finances and resources effectively (CABS Chartered Association of Business Schools, 2021), conduct research that addresses social and environmental challenges, such as those related to climate change and social inclusion.

3. MATERIALS AND METHODS

The study consisted of two parts. In the first one - using the desk research method - statistical data of UNESCO organizations on student mobility indicators of selected European Union (EU) countries, including Poland, were analysed. The data covered the period 2017-2019³. Nine countries that, like Poland, joined the EU in 2004, i.e., Cyprus, the Czech Republic, Estonia, Hungary, Malta, Lithuania, Latvia, Slovenia, and Slovakia, were selected for comparative analysis. The second part of the research consisted in conducting a CAWI-type survey from October to December 2020. The respondents were second-year full-time students, with both first

³ 2019 is the last year for which mobility statistics collected by UNESCO are complete for all countries surveyed

and second degrees in two majors: Management and International Economic Relations.⁴ No incentive was offered to participate in the survey. Before collecting the data, the rectors of all five public economics universities in Poland, i.e., Wrocław, Warsaw, Krakow, Poznań and Katowice, had given their consent to the research by e-mail. The questionnaires were sent by internal mail to all the researched years and faculties. Finally, we selected 155 out of 202 completed questionnaires for analysis. Eighty-five questionnaires from Wrocław University of Economics, 35 from Poznań University of Economics and 35 from Krakow University of Economics were analysed. The decision was made to reject questionnaires from the Katowice University of Economics and the Warsaw School of Economics (a total of 15 questionnaires) - because of a too-small number. Another 32 questionnaires were omitted due to lack of data or biased filling (e.g., the respondent marked the lowest or the highest point of the scale in all his answers). Most respondents were women (65.8%). All persons were of Polish origin.

3.1. Results of the Desk Research

Using the desk research method, statistics from UNESCO organisations were analysed. They show (Figure 1) that in the examined period the number of incoming students has been growing year by year. Poland is an exception in this comparison. In 2017, 63925 students arrived at Polish universities, but in the following years, there were respectively 15% and 14% fewer students compared to 2017. However, it should be noted that Poland is the leader when it comes to the number of incoming students. In second place is the Czech Republic and in third place is Hungary. The countries with the fewest students arriving in the period under review are Malta, Slovenia, and Estonia.

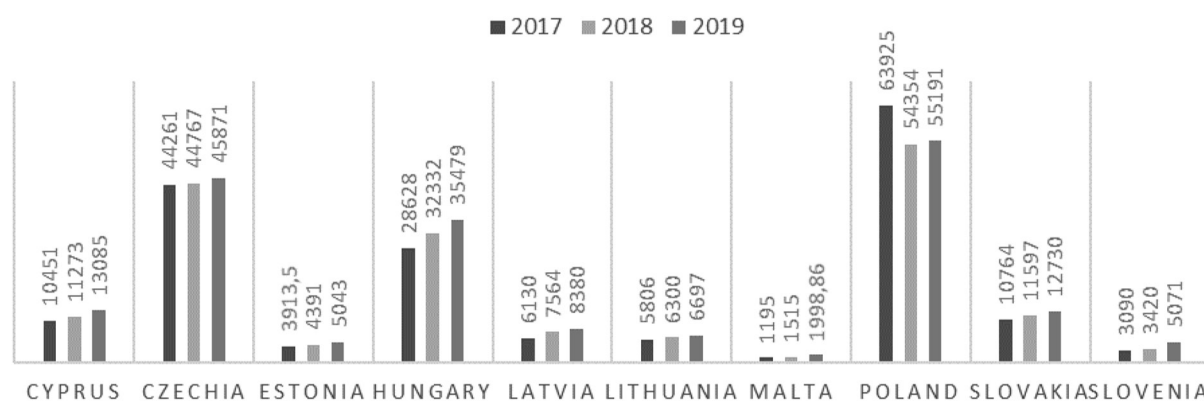


Figure 1. Total inbound internationally mobile students, (number) in years 2017-2019

Source: own elaboration based on data from the website <http://data.uis.unesco.org>

Analysis of the data in Figure 2 shows that in 2017-2018, the most significant number of students went to universities abroad from Slovakia. However, it should be noted that in 2019, the number of outgoing students from this country decreased by 30% compared to 2018. Cyprus and Poland followed in terms of the number of outgoing students. The least number of students studying abroad are from Malta, Estonia, and Latvia.

The net flow of students, i.e., the difference between the number of incoming and outgoing students, is shown in Figure 3. Three of the ten countries (i.e., Cyprus, Lithuania, and Slovakia) have a negative net flow in each of the three years under study. This means that more students

⁴ To ensure the comparability of the research sample, faculties which occur at all universities were selected for the study

leave these countries than come to them. Poland is characterized by a decided excess of incoming over outgoing students. The country has the lowest rate of outgoing mobility (percentage of the total number of tertiary students in a given country who participated in foreign exchange programmes). Its value in the surveyed period did not exceed 1.77 (UNESCO).

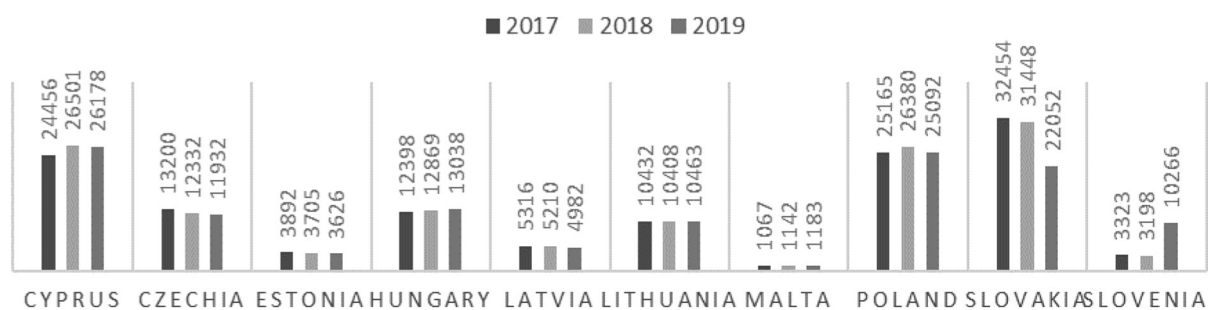


Figure 2. Total outbound internationally mobile tertiary students studying abroad, (number) in years 2017-2019

Source: own elaboration based on data from the website <http://data.uis.unesco.org>

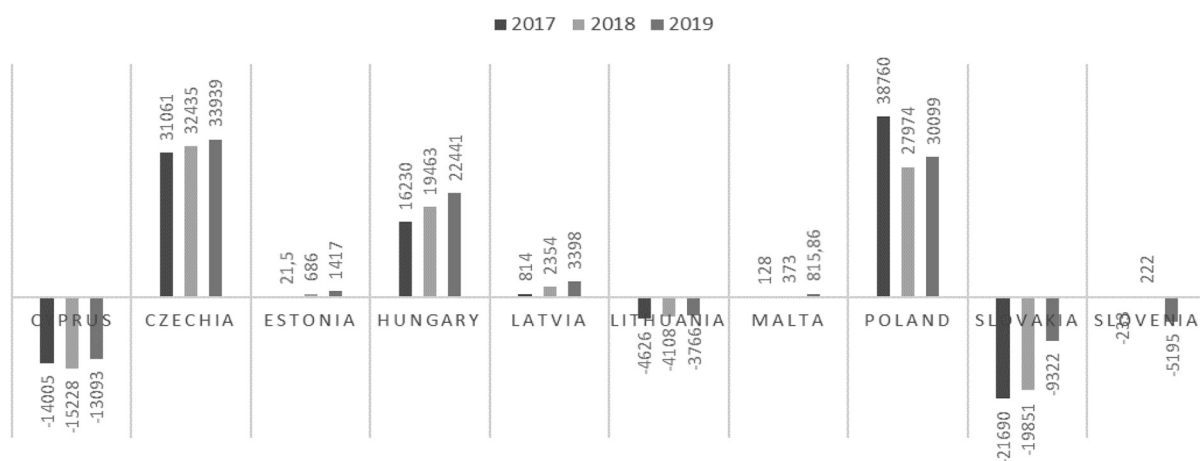


Figure 3. Net flow of internationally mobile students (inbound - outbound) (number) in years 2017-2019

Source: own elaboration based on data from the website <http://data.uis.unesco.org>

3.2. Survey Results

The questionnaire survey asked students about the benefits of international exchange. Students rated them on a five-point ordinal scale with response options: definitely not important, not important, hard to say, important, definitely important.

The three most important benefits were improving language skills, learning about a different culture, and seeing if the student wants to live and work abroad. Playing sports, developing cultural interests, and studying the culture or language of one's family were considered the least important (Figure 4).

The next question concerned the barriers which discourage respondents from participating in international exchange. The research shows (Table 1) that the main obstacle is the cost of studying abroad (72.3%), followed by the need to "make up" curriculum differences when returning home (61.9%) and the need to leave family and friends behind (51%).

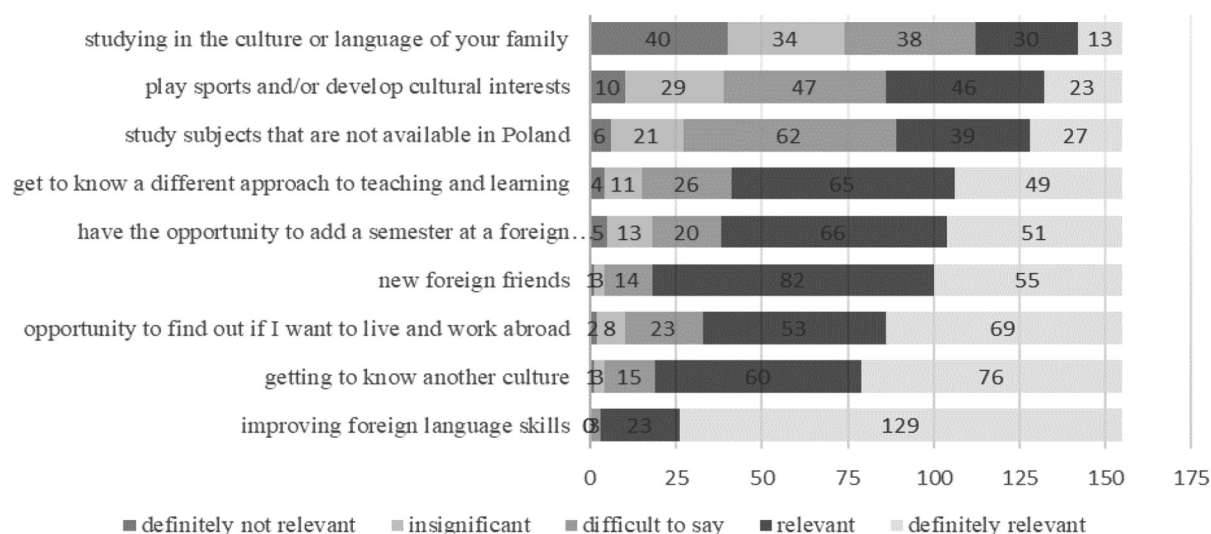


Figure 4. Distribution of answers to the question: How significant are the listed benefits of international exchange for you?

Source: own elaboration

Table 1. Distribution of answers to the question: How significant are the following barriers to international exchange for you (indicate max. five barriers that are most important for you) (N=155)

Specification	Numbers	Percentage of N in column
the cost of studying abroad	112	72.30%
the need to “make up” for differences in curricula when returning home	96	61.90%
the need to leave family and friends behind	79	51.00%
lack of confidence that I will be able to meet the requirements of the foreign university	73	47.10%
the excessive bureaucracy associated with the organization of the trip	67	43.20%
learning in a language other than Polish	46	29.70%
lack of sufficient knowledge about exchange programmes	45	29.00%
extension of the duration of studies	31	20.00%
concerns about the impact of the exchange on academic performance	28	18.10%
the necessity to resign from work	26	16.80%
too low average grades (inability to meet the eligibility criteria for the exchange programme)	24	15.50%
Need to leave home	24	15.50%
Total	155	100,00%

Source: own elaboration

4. FUTURE RESEARCH DIRECTIONS

It seems that taking into consideration the relevance of the topic of internationalization of HEIs in Central and Eastern Europe, it would be worthwhile to conduct further, more detailed research in this area to develop recommendations on actions to be taken by HEIs not only to increase their recognition in the global market of educational services and attract international students but also to build an attitude of openness to intercultural experiences of their students by encouraging and creating conditions for mobility within various international exchange programmes.

5. CONCLUSION

Poland is characterized by the most significant imbalance between incoming and outgoing students among all the countries surveyed. The reason for particular concern about the increase in the number of international students may be that this factor is considered in the algorithms for awarding state subsidies and is one of the evaluation parameters in global university rankings. In Poland, as in other non-English-speaking countries in Central and Eastern Europe (Prasilova et al., 2018) (Németh et al., 2020), among the three most essential benefits associated with international exchange were improved language skills, getting to know another culture and the opportunity to see if the student wants to live and work abroad. Practising sport, developing cultural interests, and studying in the culture or language of one's family were considered the least important. In English-speaking countries, learning a foreign language is not as important (Doyle et al., 2010). However, the main barrier was found to be the cost of studying abroad.

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Addressing Challenges of Smart Cities to Manage Assets and Resources in Emerging Markets

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Abstract: Smart cities received increasing attention in recent years and more and more cities focus on becoming smart. The focus of this research is on cities from emerging markets beginning with the challenges these cities are facing now and in the future. The challenges defined are demographic and social change, urbanization, environment, digitalization, mobility, environment, and energy infrastructure. After elaborating on these challenges, their developments, and the possible consequences, potential solutions through smart technologies for cities in emerging markets to cope with these challenges are investigated. Furthermore, this research explores necessary steps and important factors for emerging market cities to become smart as well as the implementation and integration of smart solutions that work efficiently and do not cause wrong developments. Additionally, interviews with five experts working or researching the subject under study were organized. The results show that there are several challenges for cities in emerging markets led by urbanization, population growth, and issues related to infrastructure. The experts agreed that most challenges can be addressed by smart technologies, but it was pointed out that the technologies will only work if there is also social and cultural change on the part of people and structural faults are addressed. All in all, smart cities can be an appropriate solution to address and solve challenges in emerging markets if implemented in the right way.

1. INTRODUCTION

The world and in some ways especially its cities are currently facing many challenges which, for instance, include demographic and social change, urbanization, climate change, and digitalization. An important factor to cope with these challenges could be smart cities and the concepts based on them. Through such concepts, the negative effects of such challenges as the ones mentioned should be mitigated and opportunities capitalized. This means that cities and regions are becoming smart to improve the quality of life which includes becoming safer, more efficient, and thereby more attractive for residents and businesses as well (Reiche, 2020, p. 164).

Smart city, a term that is used more and more frequently, is a new technology that is based on the Internet of Things. A smart city is a broadly used term, however, basically, it comprises all concepts to modernize cities and make them more efficient and livable with the help of new technological developments, and information and communication technologies. For instance, this could be the more sustainable use of resources by coordinating them better through intelligent systems or the digitalization of administration to save on trips to the authorities. (Saba et al., 2020, p. 249; Siepermann, 2020).

According to studies, almost 66 percent of the world's population will live in cities by 2050, where almost 75 percent of the produced energy is consumed and 80 percent of the greenhouse

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gases that are harmful to nature are released. As a result, many experts and researchers agreed that the best solution to meet challenges like urbanization, population growth, pollution, energy management, etc. is the smart city (Saba et al., 2020, pp. 249–253; Siepermann, 2020, para. 1).

Global cities like New York, London, Paris, and Singapore are considered the smartest cities regarding the deployment of technology, and most companies in this field focus on developed cities in the global west. Moreover, smart city technology is most of the time purpose-built for wealthy cities and therefore often does not suit cities in emerging markets as companies fail to address the most pressing needs of the majority of city residents in those regions. This restricts the ambition and creative potential of smart cities as technologies are targeted to solve problems in developed cities and therefore designed for existing infrastructure, rigid institutions, and a level of risk aversion. However, urban technologists that design solutions for emerging market cities could work as a game-changer simply because the situation with more pressing needs creates a better environment for radical innovation and rapid scale. And the scale is huge as it is expected that 90 percent of all future urban population growth until 2050 will occur in Asia, Africa, and Latin America which are those areas that are least serviced by “smart” urban technologies (Muggah et al., 2018).

Moreover, according to own research, many literature articles and studies deal with smart cities; however, most of them focus on developed markets rather than on emerging markets. Therefore, this is a huge topic that might get more important in the future and where little research is done yet. So, the impact and the various solutions of smart cities in developed countries are studied as well, as general studies are saying that smart cities could help to improve and develop cities in emerging markets. However, it has not been established what the detailed problems of emerging market cities are and how smart solutions/cities could contribute to solving or at least lessen these problems, and how such cities become smart. Therefore, to close the research gap, this research should clearly define the most pressing problems and challenges of cities in emerging markets on the one hand. On the other hand, it should study if smart cities and the underlying technologies can address these problems, which smart technologies/solutions would make sense, therefore, and how this could work in a city in an emerging market. Moreover, it will be investigated which factors are important for becoming smart and how to best integrate smart solutions in a city.

Derived from the problem statement, this research deals with the following questions:

- 1) “What do the most relevant challenges that can be addressed by smart technologies that emerging market cities are facing now and in the future look like?”
- 2) “How can smart cities/technologies address these challenges?”
- 3) “Which factors need to be considered when implementing and integrating smart technologies in a city so that they work effectively and do not cause wrong developments?”

2. THEORETICAL BACKGROUND

2.1. Relevant Theories and Terms Related to Smart Cities

Although the term smart city appears often in literature these days there is no definition of smart city that is generally accepted (Dustdar et al., 2017, p. 3). The idea to develop smart cities got increased attention in the last decade and the number of cities that consider themselves as smart or are making efforts to get there is growing (Bibri, 2019, p. 1; Kummitha & Crutzen, 2019, p. 44). Despite this increased attention to smart cities in literature and practice, there is no

uniform understanding regarding the definition and the expected outcomes of a smart city (Rosati & Conti, 2016, p. 969). The main reason why there is no clear definition is that the focuses of the various smart city initiatives are different as the strategies concentrate mainly on the specific needs of their citizens which are, of course, different in every city (Han & Hawken, 2018, p. 2). This indicates that every smart city concept is distinctive as every city has its own and unique characteristics, the residents have different necessities, and the circumstances surrounding the city play a major part as well (Jaekel, 2015, p. 17).

Nevertheless, for this paper, a definition should be found and therefore the best fitting definitions were chosen. To start with, according to Dustdar et al. (2017, p. 3):

The common contemporary understanding of a smart city assumes a coherent urban development strategy developed and managed by city governments seeking to plan and align in the long term the management of the various city's infrastructural assets and municipal services with the sole objective of improving the quality of life for the citizens.

This process should be supported by information and communication technologies that collect and analyze data, facilitate communication between different city services, and optimize infrastructure utilization. Another definition is that:

A smart city is a well-defined geographical area, in which high technologies such as ICT, logistics, energy production, and so on, cooperate to create benefits for citizens in terms of well-being, inclusion and participation, environmental quality, intelligent development; it is governed by a well-defined pool of subjects, able to state the rules and policy for the city government and development. (Dameri, 2013, pp. 2544–2551)

Giffinger et al. (2007, p. 10) define it as “A Smart City is a city well performing built on the ‘smart’ combination of endowments and activities of self-decisive, independent and aware citizens”. Others define it as:

A city to be smart when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and high quality of life, with a wise management of natural resources, through participatory governance. (Cargliu et al., 2011, p. 70)

To sum up, there is no single correct definition of a smart city as every city is specific and has different challenges with public authorities and citizens that decide differently and have different needs. However, it can be said that it is a development strategy for cities where high technologies improve and manage a city's infrastructure and its municipal services, including careful handling of natural resources and the citizens' participation, which leads to economic growth and in the end improves the quality of life in a city. Saba et al. (2020, p. 254) add that a city is smart when it can fulfill the needs of its citizens automatically.

2.2. Characteristics of Smart Cities

Several models and frameworks exist that have been developed by researchers and experts to describe the characteristics of a smart city. Since there is no common understanding of the term smart city, these models and frameworks follow different approaches and aspects. To define

the key components of a smart city strategy a further conceptualization is necessary (Fernandez-Anez et al., 2018, p. 4).

The model for characterizing a smart city from Giffinger et al. (2007, pp. 11–12) is one of the most relevant and one of most cited in this field. It is often used as a basis for other models and has been further developed as well by different authors in this respective field (Anthopoulos, 2017, p. 8; Ghosal & Halder, 2018, p. 109; Müller-Seitz et al., 2016, p. 5). According to Giffinger et al. (2007, pp. 11–12) a smart city strategy focuses on six dimensions that work as a basis in the smart city process. These six dimensions are smart economy, smart people, smart governance, smart mobility, smart environment and smart living. In the following section Giffinger's dimensions will be elaborated in further detail.

- **Smart Economy:** The smart economy dimension comprises factors that reflect the city's competitiveness. These include, for example, innovative spirit, entrepreneurship, productivity, labor market flexibility, and the internationality of the city. Cities can improve their competitiveness through the transformation to a smart city by creating platforms for exchange with the start-up scene, with innovative companies and with investors, and thus lowering the hurdles for the establishment of companies. Networking of companies with each other, with local authorities, service institutions, and employees can stabilize the regional labor market and at the same time make it more flexible (Anthopoulos, 2017, pp. 8–13; Giffinger et al., 2007, pp. 10–12; Müller-Seitz et al., 2016, pp. 5–6).
- **Smart People:** This dimension focuses on human and social capital. The associated factors include the qualification level of citizens, the willingness to engage in lifelong learning, social and ethnic diversity, the participation of citizens in public life, and the cosmopolitanism of the city. The quality of social interactions among citizens determines the social capital of a city. Smart cities could, through the targeted promotion of cultural institutions and events in the individual neighborhoods, encourage their citizens to interact with one another and thus create a counterbalance to the prevailing anonymity in the city (Anthopoulos, 2017, pp. 8–13; Giffinger et al., 2007, pp. 10–12; Müller-Seitz et al., 2016, p. 6). Furthermore, it has to be mentioned that this is one of the very essential dimensions of a smart city to succeed as the skills of the citizens are of high importance. The citizens have to be able to use the smart solutions offered by the city (Visvizi & Lytras, 2018, p. 142).
- **Smart Governance:** Here, factors such as the opportunities for citizens to participate in decision-making, the quality of municipal services, and the transparency of administrative action are mapped. Smart cities can improve political participation with interactive internet presences that lower the barriers to political participation and thus offer new platforms for citizen dialog. This can also improve the transparency of political decision-making processes and thus ensure greater public acceptance of things such as construction projects. Moreover, smart governance also includes smart citizen services. These include online administrative procedures as well as, for instance, the provision of real-time information on the traffic situation or the occupancy of parking garages (Anthopoulos, 2017, pp. 8–13; Giffinger et al., 2007, pp. 10–12; Müller-Seitz et al., 2016, p. 6). However, to implement these new innovative solutions an efficient governance structure is required as the established standards and regulations have to be controlled by the government (Al-Masri et al., 2019, p. 327).
- **Smart Mobility:** This dimension includes factors such as sustainable, innovative, and safe transport systems, the accessibility of the city, and the availability of information and communication technologies. In many cases, smart city initiatives also include connected and intelligent traffic control. Through such intelligent traffic and traffic light controls

- at peak times or during disruptions traffic flows can be improved and congestion can be avoided (Anthopoulos, 2017, pp. 8–13; Giffinger et al., 2007, pp. 10–12; Müller-Seitz et al., 2016, pp. 6–8).
- **Smart Environment:** This dimension includes factors such as environmental protection, the reduction of environmental pollution, the sustainable use of resources as well as the attractiveness of environmental conditions. The main focus is on protecting existing green spaces from land sealing and investing in urban greening. Urban green spaces do not only increase attractiveness, but they also reduce pollution, improve the microclimate and absorb noise to name just a few. In addition, smart cities, especially in the area of “smart mobility”, can reduce the environmental impact of traffic. Examples of technologies in this area are waste management systems, emission control, or sensors for pollution monitoring (Anthopoulos, 2017, pp. 8–13; Giffinger et al., 2007, pp. 10–12; Müller-Seitz et al., 2016, pp. 8–9).
 - **Smart Living:** The factors of this dimension are those that contribute to the quality of life in a city. They include the quality of cultural facilities, health care, safety, housing quality, the quality of educational institutions, and social cohesion. Information and communication technologies can support smart cities, especially in the area of security. Computer-aided, data-based analyses can support police work through so-called predictive policing (Anthopoulos, 2017, pp. 8–13; Giffinger et al., 2007, pp. 10–12; Müller-Seitz et al., 2016, p. 9).
 - Anthopoulos (2017, pp. 8–12), for instance, added the dimensions smart infrastructure and smart services. On the one hand, smart infrastructure includes city facilities like, for example, water and energy networks, streets, or buildings with embedded smart technology like sensors or smart grids. On the other hand, smart services refer to the utilization of technology and ICT in various areas like health, safety, education, or tourism and should become part of the everyday life of the citizens as those services are provided across the entire city.

2.3. Status of Smart Cities in Emerging Markets

In research, there is a gap between the North-centric smart city research and emerging markets which are often underestimated despite their fast rate of uptake (Prasad & Alizadeh, 2020, p. 14). The importance of emerging markets is underlined by the following statistics: In the top 10 urban agglomerations by estimated GDP in 2025, there are only three cities from emerging markets, namely Sao Paulo, Mexico City, and Shanghai. However, when looking at the top 30 one can see that nine cities have risen by more than three places in this ranking compared to 2008 and they are all from emerging markets. It gets even clearer when looking at the top 30 agglomerations by projected average real GDP growth between 2008 and 2025. These 30 agglomerations will grow between 6.3 and 7 percent per year and they are all from emerging markets, led by Hanoi and followed by various Chinese and Indian cities as well as by some other Asian and African cities (Vinod Kumar, 2019, pp. 27–28).

Furthermore, the majority of the world’s population growth is expected to happen in the urban areas of emerging markets. The projected population increase for those areas is from 2.5 billion in 2009 to 5.2 billion in 2050. This fact brings other problems as well such as the so-called slums or also known as shadow cities, informal settlements or favelas (Smart City Hub, 2017b). According to the UN-Habitat (2007, para. 1), a slum is a house, old that lacks access to one or more of the following: sufficient living space, easy access to water in sufficient amounts,

adequate sanitation, durable housing, and security of tenure. Currently, one billion people are living in such slums, however, due to the mentioned developments, this number is expected to rise to two billion by 2030 (Smart City Hub, 2017b).

Regarding smart cities, the highest growth rate until 2026 is expected for the Asia Pacific region with its drivers China and India. While China has around 500 smart city pilot projects, covering big and small cities, India has around 730 smart city projects, however, only ten percent are either completed or in the implementation phase there (Mordor Intelligence, 2020, sec. Asia-Pacific is Expected to Witness the Fastest Growth Over the Forecast Period, paras. 1–2). Moreover, it is expected that megacities from emerging economies become the largest markets for existing premium products and technologies (Mordor Intelligence, 2020, sec. Key Market Trends, para. 5).

A very important development, especially for emerging markets, is the increased access to cell phones and thus also to information. The worldwide number of mobile phone subscriptions increased from 4.6 billion in 2009 to 8.3 billion in 2019 which means the number of phone subscriptions exceeds the number of people on the earth. Over 100 countries have a penetration rate (subscriptions per 100 inhabitants) of over 100 including some emerging countries such as Kenya. A good example of emerging markets is Cameroon, which increased its penetration rate in the last ten years by 40 percent and has now around 82 mobile subscriptions per 100 residents (Statista, 2020).

This development opens up new possibilities and opportunities for the urban poor in emerging markets through many realized projects. A few should be mentioned here. One example is the Kenyan company M-PESA which focuses on customers that do not have access to traditional banking systems. The application enables Kenyans to make cash withdrawals, transfers, and deposits through their mobile phone (Vonwiller, 2018). Another application is called Jana and it offers global organizations access to consumers from emerging markets via their phones. If users complete surveys via SMS they get cell phone air time as compensation, which is used increasingly as a currency form to buy real goods (Webb, 2014). A news application is CGnet Swara from India which allows interested parties and citizen journalists to call a phone number and listen to or record local new content (CGNet Swara, 2021).

To rank smart cities in emerging markets the same two indexes as above will be used again here. As emerging markets are a wide definition that applies to many countries and cities the best emerging market smart cities from Asia, Africa, and Latin America will be ranked.

In the Smart City Index (IMD) the best ranked smart cities in Asia are Taipei City (position 8 of 109), Kuala Lumpur (54), Ankara (57), and several Chinese cities (62–69). The African cities are ranked much worse, as the best ranked are Cape Town (103), Rabat (105), Cairo (106), and Abuja (107). The following are the best-ranked cities in Latin America which are Medellin (72), Buenos Aires (88), Mexico City (90), and Santiago de Chile (91) (IMD et al., 2020, pp. 9–10).

For the second ranking, the IESE Cities in Motion Index is used. The best-ranked Asian cities here are Taipei (position 27 out of 174), Shanghai (58), Beijing (84), Kuala Lumpur (106), and Guangzhou (107). In Latin America it is Santiago de Chile (68), Buenos Aires (90), Montevideo (110), Bogotá (120), and Sao Paulo (123). And the smartest African cities according to this ranking are Cape Town (143), Johannesburg (151), Tunis (152), Nairobi (154), and Casablanca (163) (Berrone & Ricart, 2020, pp. 28–29).

3. CHALLENGES IN EMERGING MARKETS' CITIES

This chapter will focus on the challenges emerging market cities face. Reiche (2020, p. 164) defines four megatrends that will shape the future of cities and regions which are: urbanization, demographic and social change, climate change, and digitalization. These four megatrends will be investigated in this chapter together with other challenges/trends which are transportation, environment, and energy infrastructure. So, developments connected with the mentioned challenges and possible consequences will be elaborated.

3.1. Urbanization

As already discussed, people are moving from rural areas to cities, cities get bigger, and the number of megacities increases as well. Reiche (2020, p. 164) confirms this global trend and concludes that urban centers and their surrounding regions will further growth while rural areas are declining. This urbanization trend will be the fastest in low-income and lower-middle-income countries leading to an exponentially increased demand for key services (Mohanty & Kumar, 2021, p. 143). To speak in numbers, the urban population between 1950 and 2050 will be multiplied by 42 in Africa, by 14 in Asia, by 10 in Latin America, by 4 in North America, and by 2 in Europe (Yatta, 2018, p. 317). So, especially emerging market cities face rapidly growing populations which leads to an increase of cities in all categories. This means that urbanization will be one of the key emerging markets megatrends for policymakers (Biswas, 2018, p. 49).

The rural-to-urban migration flows also bring changes to public service infrastructure as infrastructures such as water pipes and sewage canalization will have to be established or expanded. In contrast, this means that capacities will be downsized and new options for utilizing them need to be explored in shrinking regions (Reiche, 2020, p. 164). However, there are several other challenges as well due to urbanization. In India, for instance, the nature and the extent of growth of the cities are unplanned and unanticipated, and the provision of services is rather reactive than proactive. As a result, the demand for services such as water, transport, and sewage is constantly higher than the supply which leads to a situation of perpetual scarcity and shortages (Sarooha, 2016, p. 81). Moreover, urban infrastructure and housing are insufficient and cannot cope with the high numbers of people coming to cities (Sarooha, 2016, p. 85). Yatta (2018, p. 335) says that a “challenge is the financing of urban investment in Africa to clear the deficit from decades of underinvestment in urban areas and to meet the needs generated by urban growth”. Currently, energy consumption, urban environment, and health of the population are affected by the defective urban transport and communication system as well as by the poor access to basic services (Yatta, 2018, p. 335), which is confirmed by Biswas (2018, pp. 63–64) for all emerging markets. He adds generating sufficient employment is a further key challenge to prevent problems regarding rising unemployment, urban crime, social unrest, and the development of inner-city slum communities. Moreover, Mohanty (2019, p. 9) says that slums or more formal called informal settlements are likely to increase with growing urbanization. It is added that “informal urbanization is likely to be the dominant form of urbanization in most developing countries in the future” (Mohanty, 2019, p. 9) which brings several challenges such as urban poverty, slums, environmental problems, challenges to urban planning as well as social challenges. Another huge challenge for emerging markets which is strengthened by urbanization is to achieve water and food security. Several cities suffer from water stress, there is no or little water distribution in informal settlements, often there is a heavy reliance on septic tanks as well as poor wastewater treatment (Kookana et al., 2020, p. 1). McNabb (2019, p. 83) even says that global urbanization

is one of the most difficult barriers to achieving water sustainability. Evidence from Lagos in Nigeria shows that the main urbanization challenges are overwhelming population and urban growth, poor housing and slum development, rising poverty and crimes, shortage of basic urban services, environmental degradation, and inadequate transportation infrastructure (Dano et al., 2020, p. 1052).

A strategy to cope with these challenges is smart city initiatives, especially regarding sustainable development (Mohanty & Kumar, 2021, p. 143). Ideally, through initiatives, a city can minimize its carbon footprint and integrate water, waste management, energy efficiency, etc. into its architectural design. Nevertheless, not only every region and every country but every city is different and will therefore face a unique range of urbanization challenges (Mohanty & Kumar, 2021, pp. 147–154).

3.2. Demographic and Social Change

During the next decades until 2050, the distribution of the world's population will be substantially altered. While many of the advanced economies face low fertility rates and demographic aging, the opposite happens in developing nations which are often emerging markets as well. Africa is expected to grow from 1194 million in 2015 to 2527 million in 2050 which creates significant challenges for governmental bodies in Africa to manage the social and economic impact of this rapid growth. The long-term projection indicates a population increase to 4468 million for the continent in 2100. The Asian population is expected to grow as well. In the Middle East, defined as Western Asia (including Turkey, Iraq, Israel, Saudi Arabia, etc.) in the UN classification the population will grow from 258 million in 2015 to 397 million in 2050. The projections for Southern Asia (including Afghanistan, Bangladesh, India, Iran, Pakistan, etc.) indicate growth from 1823 million in 2015 to 2382 million in 2050, while in Southeast Asia (including Cambodia, Indonesia, Thailand, Vietnam, Singapore, etc.) the population is expected to grow between 2015 and 2050 from 634 million to 798 million. The population in Latin America and the Caribbean will according to the projections grow from 632 million in 2015 to 780 million in 2050. Only China has a different trend, the expectation there is a slight decline from 1397 million in 2015 to 1364 million in 2050 (Biswas, 2018, pp. 1–3). Together with the urbanization trend, these developments pose a significant challenge for cities, especially for those in emerging markets. On the one hand, those emerging market cities are confronted with a high population growth combined with an urbanization movement, while on the other hand, these cities are already lagging in providing basic infrastructure and a decent quality of life.

Biswas (2018, pp. 3–7) describes Africa as a demographic time bomb due to its huge population increase, its extremely young age profile (in 2017 60 percent of Africa's population was 24 or younger), and because many countries' per capita income is low. A consequence will be that large numbers of young people will join the working-age population each year; therefore, African governments are required to create sufficient new employment opportunities to avoid a high number of unemployed or underemployed people. However, implications of the demographic outlook are that the region could be confronted with significant social unrest and economic malaise because of high levels of unemployment and no or only low improvement in the standard of living if there is no rapid economic growth over many decades (Biswas, 2018, pp. 3–7). An outcome of the described developments can be informal settlements as reasons for it are rapid urbanization, inadequate resources, and rural-urban migration. Growing poverty and inequality often push people into informal housing which is mostly without basic services such as

electricity, water, and sewage, without any input from planning agencies, and on land which is not legally owned. Then, in such neighborhoods often informal economic activities which are often illegal as well become an issue. Besides environmental challenges and health issues, social challenges also arise in informal settlements such as drug addiction, alcoholism, prostitution, and criminal activities (Mohanty, 2019, pp. 1–7).

Another trend in emerging markets, however, a positive one, is the rapidly rising consumption expenditure. In many countries like China or Indonesia, there was a high increase in their consumer markets which results in the growing performance of Asian consumer spending in world consumption. One main reason, therefore, was the growth of household incomes in emerging markets in Asia. Globally seen, the population which is defined as middle-class will rise from 1.8 billion in 2009 to 3.2 billion in 2020 to 4.9 billion in 2030 according to OECD forecasts. The highest growth in this category will happen in Asia which could rise from 500 million people in 2010 to more than 3 billion in 2030, making Asia the most important consumer market in the world. These developments make emerging markets, and they're mainly the cities, an important growth driver for the world economy (Biswas, 2018, pp. 25–26).

3.3. Digitalization

A very important trend, as well as a challenge, is digitalization for cities in emerging markets, of course also regarding becoming a smart city. According to Lambrechts and Sinha (2021, p. 166), there are several challenges for cities in emerging markets which include the following: fixed-line infrastructure is often outdated, not maintained, or does not even exist which limits potential solutions that could bring people online to mobile broadband in a cost-effective way. The actual infrastructure usually only supports 2G or 3G in the best case. Moreover, the average revenue per user is typically low in these markets which discourage mobile operators to invest there. Another factor is that mobile devices are not manufactured in such countries and combined with high import duties and government tax these devices are often overpriced or at least not affordable for many people. Furthermore, language can bear another challenge as the main languages used on the internet are English, Spanish, Chinese, and other languages with a large number of speakers. However, these languages are not necessarily spoken in emerging markets and so, even if people can go online, large parts of the internet remain inaccessible to them. Although there are some big challenges for cities in emerging markets, including limited financial resources as well, modern technology like 5G or millimeter-wave networks brings opportunities. New infrastructure could be developed without the need to support legacy systems and mobile operators could implement and adapt technologies according to their needs instead of the other way round. Some countries like Brazil and India have already been very successful in this way while others lag. Nevertheless, important steps for the digital services sector in emerging markets are to “pursue public-private investment partnerships; encourage the development of local services using digital technology; address local challenges and issues through these digital services; develop innovative funding mechanisms, and develop innovative market access mechanisms.” (Lambrechts & Sinha, 2021, p. 66).

Evidence from emerging markets in Asia shows the positive impact of digitalization as mobile phones, car-hailing services, or e-commerce, which had the most remarkable development, make people better off (Yoshino, 2021, p. 22). Another study by Popkova et al. (2021, p. 431) shows that the advantages of digitalization and a smart economy enable economic growth in a new quality in emerging markets. This includes the development of healthcare, increasing

purchasing power, reduced transport commuting time, and a reduction in inflation due to the development of online economic operations. However, a challenge for the smart economy and digitalization is cyber security and how it is treated, which will determine the quality of economic growth and if emerging markets can gain an advantage from digitalization. De Dutta and Prasad (2020, p. 1394) add that the digitalization of cities results in considerable economic and social change, ultimately resulting in a better quality of life.

The sections presented before are the four megatrends that were defined by Reiche (2020, p. 164). Apart from the fact that many areas are interlinked in this topic, there are other important sectors as well that play a major role for a city when getting smart and improving the standard of living. These are the following:

3.4. Mobility

It is necessary to address mobility issues properly when discussing the future of cities and their sustainability (Barreto et al., 2020, p. 290). More and more people in urban and suburban areas pose several challenges for cities, such as high traffic congestion, high noise levels, shortage of parking areas, CO₂ emissions, and inefficient public transport (Barreto et al., 2020, pp. 275–276).

One example, therefore, is Lagos, the capital of the emerging market country Nigeria. Challenges the city faces are, besides the already mentioned insufficient public transport and traffic congestion, overstretched and deteriorated roads, air pollution, and obsolete and underutilized ferry transportation and public rail transport. Other problems which are often the reason for traffic congestion are severe potholes, widespread violation of traffic regulations, garbage disposal on roadsides, traffic signs that are inadequate or do not work, road rehabilitation works, roadside trading, accidents, vehicle breakdowns, and flooding. Combined with one of the highest vehicle densities in the world this led to a high and increasing number of road accidents. However, the city developed a strategic transport master plan to create a modern public transport system (Dano et al., 2020, p. 1047). Similar challenges occur in Indian cities which are among the worst hit in the world regarding traffic problems. This also results in economic problems as described below:

For urban areas to be able to support the required level of economic activity, they must provide for the easy and sustainable flow of goods and people. Unfortunately, however, such flow of goods and people has been facing several problems. Billions of man-hours are lost with people “stuck in traffic.” The population of India’s six major metropolises increased about 1.9 fold during 1981–2001, and the number of motor vehicles increased by more than 7.75 fold during the same period. (Saroha, 2016, p. 90)

The reasons, therefore, are similar to the ones in Lagos, as they include a lack of reliable, comfortable, and efficient public transportation and the rapid growth of personal vehicles. These developments resulted in congestion and consequences are travel delays, air quality deterioration, loss of productivity, increased road fatalities, and noise pollution. This affects a city’s sustainability on the one hand, but also the energy security on the other hand as demands increase. Additionally, cities have to deal with poorly maintained roads, long delays at intersections, frequent accidents, and traffic jams. So, strategies are necessary to overcome these challenges, especially as transportation should be focused on efficiency, ecological awareness, equity, and

land economy (Saroja, 2016, pp. 90–91). Digital technologies could be a game-changer in this regard as they support new business models and increase the efficiency of traditional schemes. A key tool, therefore, is the smartphone which makes access to a wide range of services possible. Such services could include access to shared fleets of scooters, bikes, or cars, and driving services as well as to find various mobility options, such as the most comfortable, cheapest, or fastest option (Noussan et al., 2020, pp. 51–52).

3.5. Environment

Many fast-growing cities in emerging markets face environmental challenges. A very important aspect in this regard is water, in various types and forms. The water demand in cities is expected to increase by 50 to 80 percent by 2050 and droughts and water shortages have already been experienced in recent years. Around two-thirds of the global population faces water scarcity in at least one month of the year. So, urban water insecurity is one of the biggest challenges which is caused by several factors. These include population growth, infrastructure, the existence of suitable water sources (regarding quantity and quality), use and supply efficiency, overall urban planning, and waste management. Another topic is sewer connectivity as many people, often living in informal settlements, are not connected to piped water or a sanitation system. This fact led to a heavy reliance on the use of septic tanks in emerging economies, however, a leakage and overflow of those can result in the contamination of groundwater and surface water. Moreover, globally, over 80 percent of wastewater is released into the environment without adequate treatment, although numbers are often even worse for emerging markets. Untreated wastewater can affect the quality of freshwater supplies and significantly pollute surface and groundwater resources, which are often limited (Kookana et al., 2020, pp. 2–6). One approach therefore could be to identify and advance technical and smart tools to foster greater transparency and achieve more sustainability in water management (Abou Rayan & Djebedjian, 2016, p. 323). A huge challenge for cities regarding the environment is presented by informal settlements, which include air and water pollution, cultural and noise pollution (which becomes a more and more dangerous threat) as well as lack of personal hygiene and sanitation. Moreover, informal settlements are often in environmentally unsafe areas like floodplains or polluted sites and on marginal land exposed to the risk of fire or storms. Another challenge in this regard is the illegal dumping of waste within the city by slum dwellers (Kalawapudi et al., 2020, p. 151; Mohanty, 2019, pp. 5–6). There is also a risk for human health when there are certain environmental problems. No or bad treatment of wastewater can result in a disease outbreak or in having chronic health problems (Kookana et al., 2020, p. 6). In Lagos, chest pains or skin irritations are regular health problems because of the polluted air (Dano et al., 2020, p. 1048).

3.6. Energy Infrastructure

Energy is seen as an important driver to achieving overall development goals in developing countries and emerging markets. Moreover, household electricity connections contribute to economic growth and the reduction of poverty. However, although there are electrification initiatives implemented by national governments, “the rising demands and energy needs of poor households in urban and peri-urban areas continue to be marginalized when it comes to planning electrification policies” (Singh et al., 2015, p. 350). According to the World Bank (2018, para. 1), there are still a billion people living without electricity and hundreds of millions more are living with unreliable or expensive power. This fact poses a key barrier for emerging economies in achieving economic development.

Both grid and off-grid solutions are vital for achieving universal access – but they must be supported by an enabling environment with the right policies, institutions, strategic planning, regulations, and incentives. ... Lack of sufficient power generation capacity, poor transmission and distribution infrastructure, high costs of supply to remote areas, or simply a lack of affordability for electricity, are among the biggest hurdles for extending grid-based electricity. For off-grid electrification, including mini-grids, the biggest challenges are poor policies, inadequate regulations, lack of planning and institutional support, lack of financing for off-grid entrepreneurs, and affordability for poorer households (World Bank, 2018, sec. 1).

Fortunately, many emerging market countries such as Vietnam, Bangladesh, Ghana, China, and India have made good progress in expanding electricity access in recent years. Another challenge in this regard is the last-mile access which is about getting electricity to people's homes, public facilities, and local businesses. However, by having smart technologies and solutions cities can make a huge step toward achieving universal access (World Bank, 2018, secs. 2–4). The city of Delhi is a good example for illustrating the challenge many cities in emerging markets face:

The imbalance between power demand and supply has increased. In 1951, the population of Delhi was 1.4 million, and in 2006 it became 12.79 million. The peak power demand in 1951 was 27 MW; it is now 4,100 MW. The city's five power plants generate only one-fourth of its power needs. There is a shortage of 900–1,000 MW, which is reflected in 3- to 12-h power cuts. For the worsening urban crisis, there is an urgent need to focus on the improvement in energy services. There is an urgent need to develop decentralized renewable energy resources, such as solar and wind energy. (Saroha, 2016, p. 88)

To conclude, cities in emerging markets face several challenges. Many of the presented challenges are connected or consequences of each other. Of course, every city is unique and some will need to focus more on one topic and other cities on another topic; however, if cities in emerging markets want to develop, raise their living standards, and ultimately become smart, they will need to tackle the challenges discussed in this chapter. So, if a smart city wants to make an impact its solutions and technologies should address these challenges and the problems that come with them in one or another way. A smart solution will then be successful if it solves or lessens a problem of the citizens and thereby raises the living standard. And a successful smart solution will need to address the challenges mentioned in this chapter.

4. EMPIRICAL RESEARCH

A qualitative approach was chosen for the empirical research in this research, namely the expert interview, which seemed to be the most suitable for answering the research questions. Expert interviews have the task of making the special knowledge of the people involved in the situations and processes accessible to the researcher (Gläser & Laudel, 2010, p. 13). In the case of expert interviews, a distinction is made between exploratory expert interviews, plausibility interviews, and guideline-based expert interviews. The first serves to gather general information on less researched topics, while the second focuses on research findings and the practical recommendations for action that can be derived from them. The guideline-based expert interview selected for this research has a more structured form of questioning, the aim of which is to obtain hard facts that could only be obtained to a limited extent or not at all from other sources. The interview guide helps to answer the research question that has already been formulated (Kaiser, 2014, pp. 28–35). Key features of this interview are, for example, that there is a fixed

distribution of roles between the questioner and the answerer in the dialog; that the questioner conducts the dialog, which is directed toward a specific information goal; and that culturally defined communication rules apply, such as that the interviewee may refuse to answer without having to expect sanctions (Gläser & Laudel, 2010, p. 112). In this research, the experiences and personal assessments of experts, in this case, smart city experts with a focus on emerging markets, were examined and evaluated. The experts are themselves part of the field of action that constitutes the research object. Who is addressed as an expert is primarily dependent on the respective research interest, so the status of expert, which is limited to a specific question, is to a certain extent conferred by the researcher him- or herself (Meuser & Nagel, 2002, p. 73).

The target group is people who are related to smart cities in emerging markets in their everyday work. These are either people from universities researching this topic or people working in companies that work with smart city solutions in emerging markets to get a versatile impression. In the end, three men and two women were chosen for the qualitative interview. Three of the experts are researchers in the field of smart cities at universities in Hongkong, Indonesia, and Austria. The other two experts are working for companies that are active in offering products and services for smart cities and their implementation in developed countries as well as in emerging markets.

In advance, research was conducted on the Internet to find suitable interviewees. Those whom the authors considered interesting and relevant were then contacted and asked whether they would cooperate in the empirical research. The five experts were then selected. The interviews were conducted between May 28 and June 16, 2021, and all interviews took place on MS Teams. The interviews had a duration of between 33 and 43 minutes, with 30 to 45 minutes quantified for them in advance. A guideline was drawn up for the interviews, which formed the basis for the conversation and provided a common thread. Before the start of the interview, the experts were once again informed about the topic, the content, and the course of the interview as well as about their rights. The complete interviews were recorded by voice memo on the cell phone so that transcription and an exact evaluation could be carried out later. The interviewees were informed about this upfront and all agreed to the recording. To simplify the analysis, dialect/slang words were converted into standard English during the transcription and rough sentence construction errors were removed. Since the content is in the foreground, speech phrases and other utterances irrelevant to the content and statement are omitted from the transcription (Mayring, 2015, p. 57). For data protection reasons, the names of the experts and the names of their companies are not given in the paper.

An interview guide was prepared for the interviews. For the most part, open-ended questions were used so that the experts could elaborate on their assessments and experiences when answering the questions. The open-ended questions gave the interviewees the freedom to determine the content and wording of the answers themselves so that the interviewee could say as much as possible about the topic. The interview guide was structured into an introduction part and three main parts which were “Smart cities in general”, “Challenges in emerging markets”, and “Becoming smart and future outlook”. There were eleven main questions in the guide and subsidiary questions/topics for inquiry for each main question. The subsidiary questions were intended as assistance and options to inquire during the interview, but not all of them were used in the interviews. The main topics of the guide also formed the basis for the categorization.

The transcriptions were analyzed according to Mayring's (2015) qualitative content analysis. The content is systematically analyzed using paraphrases and reduced to the essentials. These

results were in turn divided into different categories, which were created with the help of theory and according to the different topics. Since only essential core statements are to remain, the data is sorted, shortened, and evaluated one after the other. Mayring proceeds step by step and the content analysis is divided into three process steps. The first step is paraphrasing, in which all parts of the transcription that are not relevant to the topic area be removed. To facilitate the latter analysis, the text passages are simplified and brought to a uniform language level. The second step is the generalization, in which the paraphrases are brought to a level of abstraction, which should make it possible to recognize connections and where paraphrases with the same content can be deleted. In the last step, the reduction, those paraphrases are summarized, which are content-wise the same or similar, to make an interpretation possible. In the end, it must be checked once again whether the core statements summarized in the categories still reflect the source material. These must contain all important information from the interviews (Mayring, 2015, pp. 68–72). In the evaluation, this process was applied twice. First, separately for each expert interview (reduction 1) and then for the reductions of the individual interviews this process was repeated a second time together for all interviews (reduction 2).

The graphic below provides an overview of the three main categories and the corresponding subcategories, which were also used for the evaluation.

Overview categories	
Smart cities in general	C1: Smart cities in general and in the developed world C2: Smart cities in emerging markets C3: Main benefits of smart cities
Challenges in emerging markets	C4: Main challenges of smart cities in emerging markets C5: Future challenges of smart cities in emerging markets C6: Addressing these challenges through a smart city approach C7: Smart cities deal (not) better with these challenges C8: Most important smart technologies
Becoming smart and future outlook	C9: Steps for cities in emerging markets to become smart C10: Obstacles for cities in emerging markets to become smart C11: Factors when implementing smart solutions in a city C12: Possible negative effects of smart solutions C13: Future of smart cities in emerging markets

Figure 1. Overview categories

Source: own display

Smart Cities in General

This main category is about the current status of the development of smart cities. On the one hand, it is about smart cities in general and in the developed world, and on the other hand, it is about the status of smart cities in emerging markets. Additionally, the main benefits of smart cities are discussed.

C1: Smart cities in general and in the developed world

In this category, the experts agreed that there is a good smart city development in the developed world which is based on urbanistic development. Good examples, therefore, are Vienna and Amsterdam. What makes the smart development for those cities easier is that they grow slower in population than cities in emerging markets. The IoT technology including the integration and development of cities based on data gets better and better. One

expert mentioned that smart city policy is driven by political pressure, new technologies, and corporate actors and that soft factors, as well as a higher engagement of society, get more and more important in these countries.

C2: Smart cities in emerging markets

Some of the experts thought that there are good initiatives and some investment funds that drive development in emerging market cities. Usually, best practice examples from the developed world are used. Compared to the cities in developed countries which use an urbanistic approach, cities in countries like China follow a more technological approach. The other interviewed experts argued that smart cities in emerging markets focus on basic functions as they are limited by budget and public services are often bad as well. Other problems are the lack of resourcing and poor analytical capabilities as well as the fast population growth and the huge challenge that the infrastructure needs to grow equally fast as the population.

C3: Main benefits of smart cities

A few experts said that there are huge benefits to smart cities such as access to public services via a smartphone or better management of energy resources, mobility, and communication. Other benefits mentioned are the higher convenience and the larger offer regarding possibilities for work and leisure activities. Two experts were more tentative and said that meaningful impacts can only be achieved if the citizens are involved in the development through empowerment and engagement. Moreover, there are only real benefits if the smart solutions are based on resource aspects.

Challenges in Emerging Markets

In this main category, the experts were asked about their opinion regarding the main challenges of smart cities in emerging markets and what challenges could evolve there in the future. Then, it was discussed how and if these challenges can be addressed through a smart city approach and if smart cities deal better with such challenges than cities that are not smart. Moreover, the experts were asked what the most important smart technologies could be.

C4: Main challenges of smart cities in emerging markets

Many challenges were discussed for this category and several challenges are also interlinked with each other. According to the experts, the main challenge is rapid urbanization as organizational systems are not prepared for such a development. Combined with infrastructural deficits such as bad public transportation rapid urbanization is one of the factors that lead to deteriorating living and environmental conditions. Other challenges mentioned were growing economic inequalities, tensions regarding ethnic or racial diversity, loss of human resources, and the fast growth in those cities which could lead to more mistakes and a low chance to correct them. Vulnerability to climate events, financial issues and fiscal constraints in emerging markets, political stalemate, and elite capture were also discussed as challenges.

C5: Future challenges of smart cities in emerging markets

A general but important aspect mentioned for this category was to develop smart city concepts with the right offering for the people. Moreover, more people will be displaced due to droughts, floods, or food insecurities and as a result, they will move to cities. So, adaptation to climate

change is an important topic for the future as well as economic inequality, immigration and clustering in certain city districts, and populism and authoritarianism regarding politics. Other future topics are the health system and all aspects of energy such as energy generation or storage.

C6: Addressing these challenges through a smart city approach

Some issues were mentioned, such as the underground of a city or sea-level rise, which are impossible or difficult to deal with. One expert expects from a smart city approach only marginal improvement and some positive effects regarding communication and climate change. He/she pointed out that the underlying logic of policymaking must be understood, otherwise structural faults and cultural and societal reforms will not be addressed. Another expert mentioned something similar and said that many useful technologies are available, however, for a successful implementation a social change in emerging markets is needed. The other experts believed that smart technologies can address the challenges and support learning about and optimizing infrastructure. It will be important that technology connects all services of a city, to make those for the citizens accessible, for example through an app, and then even communicate tailored offers to the citizens.

C7: Smart cities deal (not) better with these challenges

The majority of experts agreed that smart cities deal better with challenges as systems can be optimized and are more efficient through smart technologies. However, it was pointed out that smart solutions that address current challenges do not necessarily have to be technological to be effective. In addition, smart cities deal with challenges better because they open up the possibility of subtly manipulating citizens to be more sustainable, which is more efficient than rules. In contrast, one expert clarified that smart cities deal not necessarily better with the challenges as every city is unique and needs its solutions. Moreover, the problems and challenges of the cities need to be addressed anyway regardless of a smart city approach. When smart cities are supposed to deal with challenges in emerging markets the local wisdom should be included.

C8: Most important smart technologies

In general, it is very important to collect a lot of data, use and process it and optimize the systems and resources. Another important aspect is to connect smart ideas and technologies with a cultural and behavioral dimension. Important technologies will be IoT, all circularly oriented technologies (cradle to cradle), power grids, sensing technologies, smart water management, tracking apps, and ICT applications which improve efficiency and effectiveness. ICT is so important because it enables a city to be completely connected and allows it to set quick countermeasures in case of an emergency or congestion, for example.

Becoming Smart and Future Outlook

In this main category, the experts were asked if there are certain steps for cities in emerging markets to become smart, if there are more obstacles for such cities and if there are factors that need to be considered when smart solutions are implemented in a city. Moreover, possible negative effects and outcomes of smart solutions and the future of smart cities in emerging markets were discussed.

C9: Steps for cities in emerging markets to become smart

Important steps are to have a clear vision and a clear strategy, manage expectations, collaborate with providers, and that many stakeholders including the city administration are

interested in it. Moreover, ensuring a high quality of the smart city projects, including local technology know-how, and available digital infrastructure are important steps as well. In addition, before becoming smart research should be conducted if a city has already undergone a similar process and if learnings can be derived. However, if a city wants to become smart the people must become smart as well. Hence, the democratic engagement of the people to reduce structural failures is vital as well as that projects are addressed to the people.

C10: Obstacles for cities in emerging markets to become smart

The experts agreed that there are more obstacles for cities in emerging markets to become smart. Obstacles are that cities in emerging markets are less structured and have a less resilient system, countries are not so technology-driven, many things are not yet on an IoT level, living habits, and there might be wrong hopes that smart cities address all structural problems. These factors are connected to the fact that there is often a weak existing infrastructure, democratic deficits, fiscal constraints, and financial issues. However, in some cases, inefficiencies can be afforded as labor is usually cheap in emerging markets. Nevertheless, for a successful smart city implementation, a society should be self-aware and social-oriented which is usually the case in higher developed countries. One expert mentioned the rapid development in emerging market cities, which makes irreversible mistakes likely.

C11: Factors when implementing smart solutions in a city

For this category, the cities themselves must promote smart city development and integrate smart solutions. Then, those should be used to collect and process data and to make cross-links to optimize and learn. Other important factors for a successful implementation of smart solutions are democratic participation, an educated workforce, ICT systems, good communication and organization, an open-minded approach to ideas, and finding relevant business models for emerging market cities. When implementing smart solutions, it is vital to ensure long-term capital for maintenance. In contrast, two of the experts argued that rules that certain things must be implemented and are not optional are necessary. Furthermore, for the fast development, many emerging market cities are following a democratic way may be hindering.

C12: Possible negative effects of smart solutions

A negative effect of smart solutions could be that people could think that technological and smart solutions excuse them from altering their unsustainable and harmful culture and behavior which makes it necessary that smart solutions are connected to the awareness and behavior of people. Other negative effects include privacy and security issues as smart solutions are usually managed remotely in clouds, for example. Thus, they could be penetrated, data could be stolen and, in the worst case, even electricity could be cut off which would have tremendous consequences and could become a modern art of war. There could also be negative effects on social aspects and if smart solutions are implemented in the wrong area for the wrong people.

C13: Future of smart cities in emerging markets

Regarding the future of smart cities in emerging markets, the experts mostly agreed that those cities have to become smart to grow in a prosperous way. More cities will become smart which will bring improvements to the people and boost the economy. Furthermore, there will be variations between the various regions in emerging markets that depend on fiscal, political, and democratic factors. According to the experts, the Asian region will

take the lead regarding the adoption of urban technologies as there are a huge workforce, technology hotspots, a stable fiscal environment, and political ambitions. However, one expert mentioned that it is questionable whether cities in emerging markets should follow the Western approach, which is brought by Western companies, in terms of smart cities. These cities and countries should rather develop a smart city approach that fits their needs.

5. DISCUSSION

The first research question is “What do the most relevant challenges that can be addressed by smart technologies that emerging market cities are facing now and in the future look like?”. According to the literature research, demographic and social change, digitalization, mobility, environment, and energy infrastructure are the biggest challenges for cities in emerging markets. The urbanization triggered by rural-to-urban migration flows leads to rapidly growing populations, especially in emerging market cities. As a consequence, there will be an exponentially increased demand for key services such as water, transport, or sewage as well as for urban infrastructure and housing (Mohanty & Kumar, 2021, p. 143; Reiche, 2020, p. 164; Saroha, 2016, p. 81). However, most cities are not prepared for such fast urbanization and the cities’ nature and extent of growth are often unplanned. Effects of these developments could be an increasing number of informal settlements and a lack of basic urban services (Mohanty, 2019, p. 9). But not only urbanization but also demographic change poses a challenge as most emerging market countries are growing tremendously. According to forecasts, many people will be unemployed or underemployed which could lead to social unrest and economic malaise (Biswas, 2018, pp. 3–7). Key priorities regarding climate change are to reduce vulnerability to extreme weather events and to strengthen the resilience of food production (Biswas, 2018, p. 216). Issues for cities regarding mobility are high traffic congestion, high noise levels, CO₂ emissions, and inefficient public transport. However, an easy and sustainable flow of goods and people is essential to support the required level of economic activity in a city (Barreto et al., 2020, pp. 275–276; Saroha, 2016, p. 90). Another aspect emerging market cities are facing is environmental challenges in several forms including droughts and water scarcity as well as the release of wastewater without adequate treatment (Kookana et al., 2020, pp. 2–6). Energy is seen as an important driver of development and at the same time one of the biggest challenges in emerging markets. Challenges in this regard are poor transmission and distribution infrastructure, lack of sufficient power generation capacity, and a lack of affordability for electricity as well as poor policies or inadequate regulations (Singh et al., 2015, p. 350; World Bank, 2018, sec. 1).

The answers of the experts were similar to the ones described in the literature. The main challenges according to them are the rapid urbanization and the huge population growth in emerging market cities. These two developments put pressure on infrastructure, which often already has major deficiencies, such as poor public transportation, to make existing infrastructure more efficient and establish more of it. The organizational systems of cities are not prepared for such huge growth and communication platforms, facilities, or services need to be adapted and upgraded which, in the best case, should be done in a resource-efficient manner. Another challenge is seen in the fact that everything is growing so fast, approximately half of the time compared to Europe, so more mistakes happen with less chance to correct and solve them due to the fast growth. An example that was mentioned in China which did a lot of electrification, however, there was not enough time to build proper infrastructure which means that electricity still comes from coal plants. So, some cities might be neutral regarding emissions, but these are still there in the areas of the coal plants. Furthermore, deteriorating living and environmental

conditions and vulnerability to climate events are labeled as challenges, particularly because many of the largest cities in, for example, Southeast Asia, are along coasts such as Manila, Jakarta, Dhaka, or Bangkok. Other challenges that were mentioned are growing economic inequality, tensions regarding ethnic or racial diversity that exist in many rapidly growing mega-cities, and a loss of human resources. From a governance standpoint challenges are fiscal constraints, political stalemate and elite capture, and financial issues as many emerging market cities and countries have to operate with limited budgets.

So, many challenges that are presented in the literature overlap with those presented by the interviewed experts. The main challenges are urbanization, fast population growth, all issues related to infrastructure meaning that it grows equally fast as the population, that at least the basic services work, and that all citizens have access to them. Additionally, the experts mentioned some challenges for emerging markets that were not investigated in the literature such as growing economic inequality, political and financial issues, ethnic and racial tensions, and the development of the right smart city offerings.

After challenges for cities in emerging markets were identified and defined it can be moved on to the second research question which is “How can smart cities/technologies address these challenges?”. According to Mohanty and Kumar (2021, pp. 143–154), smart initiatives are a strategy to cope with these challenges as they bring improvements regarding water and waste management or energy efficiency, to name just a few. Moreover, modern technology like 5G networks brings opportunities as new infrastructure could be developed without the need to support legacy systems (Lambrechts & Sinha, 2021, p. 66). And the positive impact of digitalization can be seen in emerging markets in Asia where mobile phones or e-commerce had a remarkable development. Digitalization and a smart economy enabled several developments such as improved healthcare and reduced transport commuting time and ultimately resulted in a better quality of life (Popkova et al., 2021, p. 431; Yoshino, 2021, p. 22). Noussan et al. (2020, pp. 51–52) add that digital technologies could be a game-changer for mobility aspects as new business models are supported and efficiency can be increased. As already described, wastewater management is a challenge in several cities and according to Abou Rayan and Djebedjian (2016, p. 323) cities should identify technical and smart tools to foster transparency and achieve more sustainability in water management.

According to Joia and Kuhl (2019, p. 206) cities are required to become smart and to find ways to tackle several challenges intelligently and effectively. Therefore, a city’s unique attributes including demographics, resources, and infrastructure as well as the needs of the citizens must be understood (Mohanty & Kumar, 2021, pp. 149–150). Then, a city can decide to address its challenges and there are various smart solutions and applications in different areas which can help to achieve this goal. Examples of such smart solutions are crowd management or emergency response optimization regarding security aspects as well as real-time public transit information or intelligent traffic signals in the area of mobility, smart streetlights in the area of energy, and water quality monitoring in the area of water (OECD, 2019).

The experts agreed that a few challenges such as a sea-level rise or the underground of a city are hard or impossible to address, however, in general, they agreed that smart cities and technologies can address these challenges. Mainly it is about good planning on infrastructure which is manageable and then, many smart and intelligent technologies are available to solve problems and to support improving infrastructure and make it more efficient. Furthermore, it will be important that technology connects the various services of a city and bring it, for example, through

an app, to the citizens where they get tailored offers. So, if citizens perceive that they are getting the most out of their city through such services, these services can also be a powerful tool for governments. However, it was highlighted that those technologies alone cannot address these challenges and that also social change and knowledge are essential for the successful implementation of smart technologies. Only one expert disagreed and argued that smart cities could lead only to marginal improvements and positive effects on communication and aspects regarding climate change. It was pointed out that the underlying logic of policymaking must be considered because otherwise smart cities are limited to addressing challenges as deep structural faults and cultural and societal reform cannot be addressed by smart cities. The same expert argued that smart cities are not necessarily better at dealing with and solving those challenges as every city has unique challenges which need individual policy interventions. Problems are that local wisdom is often ignored although it could help to find the appropriate smart solution and that problems are not addressed as it is believed that smart cities will do. All the other experts agreed that smart cities deal better with those challenges as additional smart technologies can optimize the systems and make them more efficient. One expert mentioned that smart cities deal better with challenges because citizens can be manipulated in a subtle way to act more sustainably which is more efficient than making rules. Another expert pointed out that a smart solution does not necessarily have to be a technology as there are other smart ways to deal with challenges such as resilient systems aimed at new challenges. However, if smart means only controlling everything as is the case in some Asian countries, smart cities might not deal better with those challenges. Regarding the most important smart technologies, the experts agreed that IoT and ICT will be important as they improve efficiency and effectiveness. The whole city will be connected which is also a possibility to have an indirect connection to the citizens. So, situations like an emergency, congestion, etc. can be detected immediately and countermeasures can be set. Further important technologies mentioned are smart water management, power grids, sensing, and all circularly oriented technologies. In general, it will be important to collect lots of data, use and process it and optimize the old systems and resources. Nevertheless, smart ideas should be connected with a cultural and behavioral dimension to improve policy.

So, according to the majority, most of the challenges can be addressed by smart cities and their underlying technologies. There are several technologies and solutions suitable to cope or at least lessen the impact of challenges for emerging market cities. Moreover, smart cities deal better with challenges than cities that are not smart and do not have smart initiatives. However, smart technologies are not enough to combat the problems of cities, also people need to change and adapt, which is why smart technologies should be connected to culture and behavior as well.

Now it can be moved on to the third question “Which factors need to be considered when implementing and integrating smart technologies in a city so that they work effectively and do not cause wrong developments?”. According to the literature, it is important to have goals and objectives as well as engagement with all stakeholders. The interviewed experts share this opinion and mentioned that a clear vision and strategy are essential as well as to manage expectations and that many stakeholders including the city administration are interested in it. Furthermore, for a successful implementation of smart cities ICT is crucial. Smart cities work usually with large numbers of IoT applications where billions of digital devices need to be connected which is done by ICT (Rao & Prasad, 2018, p. 165). The experts agree on this aspect as they argued that ICT and digital infrastructure but also the use of local technology know-how and ensuring the quality of smart city projects are key factors. Moreover, the interview partners pointed out how important the people themselves are that smart technologies can work in a meaningful way.

One important aspect thereby is that cities allow democratic engagement in the development process of the smart city and that its projects are addressed to the people. Citizens in smart cities should also be self-aware and socially oriented which presents a challenge in many emerging markets. Therefore, smart solutions should be connected to the awareness and behavior of people as they could think that technological solutions excuse them from altering their unsustainable and harmful culture and behavior. Chatterjee and Kar (2018, p. 224) mention this topic in their four pillars for smart cities in emerging economies where one pillar is the social infrastructure which is about the development of social and human capital. However, smart people are only slightly discussed in the literature while this topic was for the interviewees way more important. Two of the other pillars are institutional infrastructure, which is about efficient management and ensuring implementation, and physical infrastructure. These coincide with the answers of the experts who pointed out that cities in emerging markets are less structured and have a less resilient system as well as that these are not so technology-driven and lag regarding IoT. However, in some cases, it is not seen as such a problem as labor is cheap and inefficiencies can be afforded. Other important factors for successful integration and implementation of smart technologies are an educated workforce, finding smart city business models which are relevant for cities in emerging markets, clarifying long-term financing for the maintenance of smart technologies as well as good communication, good organization, and an open-minded approach for new ideas. Different opinions prevailed regarding democracy, while one expert argued that democratic participation is an essential factor for a successful smart city, two other experts thought that democracy hinders fast development which could also explain the fast development in some Asian countries. In addition, it was argued that for a successful smart city approach, rules are needed to ensure that certain things are put in place and are not optional.

However, there can also be some negative effects that should be considered when implementing smart technologies. Nautiyal et al. (2018, p. 46) describe cybersecurity as a highly important topic for smart cities and so do the interviewed experts as well. An example, therefore, is smart streetlights that have GPS or WIFI and are controlled remotely, often from a cloud. So, if somebody would intrude on such a cloud, he/she could shut off the light and as a further consequence, this could happen with networks or the whole electricity of a city. And no power in a city would be the worst case. An expert mentioned that such methods could become a modern form of war to strategically take off a country or a city. As smart cities generate and collect lots of data privacy and data protection is important to factor to consider as well. Moreover, smart cities are seen by policymakers as a way to appear committed to improving services and wrong hopes could arise that smart cities address all structural problems which is not the case.

6. CONCLUSION

To conclude, it can be said that much research exists about smart cities in general and cities in developed countries, however, little research is done yet about smart cities in emerging markets. Therefore, this research investigates the main challenges of cities in emerging markets, how those challenges can be addressed, and which factors are important to consider when implementing and integrating smart technologies in a city. In the beginning, the most important terms were identified and defined for a clear understanding. So it was found out that the ultimate goal of a smart city is to improve the quality of life in a city. Then, the current status of smart cities around the world was evaluated. While the smartest cities with the best smart initiatives are located in the developed world, emerging market cities are lagging. However, cities in emerging markets are catching up with the best and fastest developments in Asia where

countries like China and India are following huge pilot projects. Besides that, the main findings of this research are that the main challenges of cities in emerging markets are urbanization and the fast population growth which will push even more people to move to cities in the future.

Directly related to these challenges are all aspects regarding infrastructure including mobility, energy, digitalization, and environment as the infrastructure should become smart as well as it should grow equally fast as the population to ensure a working basic infrastructure. Smart initiatives can be used to address these challenges as improvements can be achieved and systems can be optimized and made more efficient. Important factors, therefore, are digitalization and modern technology like 5G networks. Then, several solutions and technologies are suitable and can be used to cope with the challenges cities face. However, smart technologies alone are not enough to combat the challenges, people need to be smart as well, therefore it is wise to connect smart solutions to culture and behavior. Further findings in this research are that several factors should be considered to successfully implement and integrate smart technologies in a city. The most important factors are having a clear strategy and vision, a well-developed ICT infrastructure, and that people are included in the development of the smart city. Not to forget that there could also arise negative effects in a smart city, especially regarding cybersecurity and privacy. In the future, cities in emerging markets will have to become smart to further grow in a prosperous way. Moreover, there will be variations in the various emerging market regions depending on fiscal, political, and democratic factors, however, Asia will take the lead in implementing urban technologies. So, this research provides a good overview and a framework for smart cities in emerging market cities. It explains challenges and problems in those cities and points out that there are possibilities to address those challenges and what factors must be considered. It can be concluded that smart cities are an appropriate way for cities in emerging markets to deal with several challenges and to make those cities more livable for their populations.

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Preconditions of Wine Tourism Development in Slovenia and the Czech Republic – Selected Aspects

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Abstract: *Wine tourism is considered to be niche tourism. The synergy of tourism and viticulture, which has become a significant phenomenon, is the focus of interest not only in European countries but also in other parts of the world. Old World wine regions have been inspired by the recognized and remarkable practices of New World wine producers. Two small wine producing countries, Slovenia and the Czech Republic were chosen for a study of tourism concerning grape growing and wine production. The countries appear to be very similar and share many similarities, for instance, in wine tourism development, and wine production tradition but also with the size of the vineyard area. However, these two countries are not renowned as leading wine producers. This, therefore, is a problem when endeavoring to attract potential visitors, customers, and the public in general. This paper focuses on introducing the above countries as wine destinations and illustrating their common characteristics. Methods such as description and comparison are presented to show the trends and strategies used to sustain wine tourism in small wine countries. Slovenia and the Czech Republic are countries with a long winemaking tradition. Drinking wine or wine tasting is seen by wine visitors as a social activity, often accompanied by authentic local food amid rural surroundings and natural landscapes. Above all, this paper draws attention to two small wine-producing countries.*

1. INTRODUCTION

Wine production, culture and traditions are deeply entrenched not only in well-known and large wine countries such as Italy, France, and Spain but also in smaller countries, especially in the wine regions of the Old World, where vineyards and wine settlements were established as the first wine-growing areas. They founded most of the common practices and conventions related to winemaking. Although the local tradition of winemaking has a long history, this does not mean that the level and development of other concurrent and complementary sectors are the same today. Wine processing, distribution and sales, complementary services and products, hospitality, collaboration, sustainability and respect for nature are aspects that every winery has had to deal with to some extent so far. In a broader sense, these aspects can be called a form of heritage. As described by Ramírez-Guerrero et al. (2021), the concept of heritage is a human construction that can change depending on the historical and social context. They divide this concept into three dimensions: culture, history, and nature. Heritage is often associated with history, tradition, identity, or authenticity and delineates an area where its use is meaningful. Therefore, it is also used to refer to a wine region or country. However, heritage is also associated with other areas such as tourism, geography, communication or marketing. Thus wine tourism can be presented as products, services and activities related to viticulture and wine production in a delimited area such as a wine region. Wine, tourism and related activities have been integrated into the wine business and

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marketing in several wine destinations (Jurinčič & Bojnec, 2009; Kubát, 2021; Veselá & Malacka, 2015). Tourism is generally considered a tool for enhancing and preserving cultural assets and the territory for tourism and social development (Ramírez-Guerrero et al., 2021). Accordingly, wine tourism contributes to the preservation of wine culture and its tradition in the region by offering wine products and services and educating visitors.

The purpose of this paper is to present the state of the art of wine tourism in two Old World wine regions. The Czech Republic and Slovenia are presented with their un/common characteristics and turn out to be regions where wine has a long-standing tradition in society. These two countries were chosen because of their similarities in the development of wine culture and other aspects of wine, such as tourism, as will be shown. This case study presents aspects of wine tourism which, for the sake of clarity, are presented in a table for comparison. It also examines the trends and strategies used to support wine tourism in small wine countries. As Gačnik (2017) mentions, the wine culture and tourism visibility of a geographically small country, but abundant in heritage and traditions, should not depend on the quantity of wine sold on the market but should focus on the communication and experiences that a (wine) destination can offer.

2. THE CASE OF SLOVENIA

Viticulture has existed in Slovenia since the time of the Celts and Illyrian tribes (about 2,400 years ago), long before the Romans introduced viticulture to France and Spain. Pliny the Elder (23-79 AD), for example, mentions viticulture in Slovenia in Roman times. In the Middle Ages wine production was predominantly controlled by the Church through the monasteries. Under the Austro-Hungarian Empire, privately owned viticulture flourished. After the fall of the Empire and the establishment of Yugoslavia, there was a rapid decline (Sedlo, 2020). This was also due to the phylloxera insect epidemic which caused great damage to the vineyards elsewhere in Europe (National Wine Center, 2020). After the Second World War, vineyards were mainly concentrated in agricultural cooperatives focused on mass production, although there were also some private wine farms (Sedlo, 2020). In the socialist era, most private grape growers sold their grapes to their cooperative, which produced wine. The decisive year was 1991, which marked the transition from socialism to a market economy and in which Slovenia also became an independent country. Thus, there was a rapid development of private wineries. The relatively open cross-border situation between Slovenia and Italy (i.e., the neighboring Collio wine region³) contributed significantly to technology transfer and market innovations (Jurinčič & Bojnec, 2009). In this context, certain wine districts such as Goriška Brda developed very quickly compared to other wine districts in the country (Gačnik, 2017). Since that time, the Slovenian wine industry has been the most advanced and developed of the former Yugoslav republics (Sedlo, 2020). When Slovenia gained its independence, a strong interest in local traditions and the development of tourism began in the countryside. The basis for this is the rich local heritage and culture, including wine culture (Gačnik, 2017).

Viticulture is divided into three wine-growing regions (vinorodne dežele) – in the northeast of the country the Drava Valley (Podravje/Land of the Drava), in the southeast the Lower Sava Valley (Posavje/Land of the Sava) and in the southwest the Primorska (The Littoral/ Coastland). These three regions are divided into districts (see Table 1.), sub-districts, and wine villages (Evinice, 2022; Slovenia Estates, 2022). The Primorska wine-growing region has the warmest

³ A trans-border appellation of origin between these neighboring wine regions (Collio-Brda) has begun in recent years.

climate of all the Slovenian wine-growing regions. It is the largest region accounting for almost 50% of total wine production. These selected aspects are further enhanced by the common border with Italy (Slovenia Estates, 2022). Wine categories are divided according to the sugar content of the must, similar to the Czech classification. In terms of wine legislation, Slovenia has a total of PDO⁴ wines and PGI⁵ wines. Slovenia is a member of the OIV⁶ and has a wine-growing area of 15.2 thousand hectares (in 2020, see Table 1), slightly smaller than the Czech Republic. The under-vine area has decreased by 32% in the last 24 years (Sedlo, 2020). Slovenian viticulture is unique in growing many old local varieties. Maribor is home to the oldest still-bearing grapevine in the world (Evinice, 2022), which is over 400 years old and therefore is recorded in the Guinness Book of Records (Žibert et al., 2020). The mayor of Maribor uses this wine obtained from the grape plant for protocol gifts (Kerma & Gačnik, 2015). In recent years, several attempts have been made to include it in the World Heritage List (Gačnik, 2017). In the EU, the Slovenian wine region of Primorska is classified into wine-growing zone C, while the regions of Posavje and Podravje are classified into wine-growing zone B (Sedlo, 2020).

Slovenian wines are of high quality, which is due to a large number of small Slovenian wine-makers (Evinice, 2022). Given the small population, wine consumption per person per year (age over 15 years) is relatively high, about 45 liters in recent years, but twenty years ago it was over 60 liters (Evinice, 2022; Sedlo, 2020). Compared to another source, an average Slovenian drank 35 liters of wine (or 46 bottles of wine) in the 2020-2021 marketing year, which is almost three liters per month (THE Slovenia, 2022). Almost all of the wine produced is also consumed in Slovenia (Sedlo, 2020). As mentioned in the Slovenia Wine guide (THE Slovenia, 2021), “There is one vineyard or winery for every 70 inhabitants in Slovenia.” Slovenians also use wine for other products such as wine vinegar, creams, soaps, liqueurs and spirits. In some parts of the country, viticulture and winemaking are part of daily life, for example, in the northeast of the country in the Štajerska region and the southeast in the Dolenjska region (Žibert et al., 2020). The most important markets for Slovenian wine is Germany, the US, Croatia, the Netherlands, Bosnia and Herzegovina, and in recent years also the Czech Republic (GOV.SI, 2021). The average last five-year wine production (629 thousand hectoliters) is comparable to the Czech Republic (Sedlo, 2020).

Wine tourism in Slovenia has recently increased significantly (Jurinčič & Bojnec, 2009; Kerma & Gačnik, 2015). However, systematic development began as early as 1993 (Gačnik, 2017). One of the key development incentives was the establishment of wine tourist routes (WTR), at least in the infrastructural sense (Kerma, 2018). The Ministry of Agriculture, Forestry and Food introduced wine tourist routes to preserve not only wine production but also wine culture. Until 2000, development was moderate and fragmented, with different dynamics in different wine regions, but also with substantial differences in development within these regions in the wine districts (Gačnik, 2017). According to Žibert et al. (2020), wine is a component of many tourist activities in most municipalities of Slovenian wine regions. In many municipalities, there are documents related to development strategies for tourism. Mayors' views on the use of wine for tourism promotion can show the importance of wine and tourism development. However, at the national level and in strategy documents, wine, winemaking and viticulture do not play a major role, despite the relative importance of the industry and the rich winemaking tradition.

⁴ PDO (Protected Designation of Origin), in Slovenia denoted as ZOP (Zaščitena Označba Porekla), stands for a wine from which the grapes have to be 100% from one of the nine designated Slovenian districts.

⁵ For wine to be PGI designated (Protected Geographical Indication), in Slovenia it is denoted as PGP (Priznano Geografsko Poreklo), at least 85% has to come from one of the three Slovenian wine regions.

⁶ International Organization of Vine and Wine.

Slovenia is the only European country that combines the Alps, the Mediterranean, the Karst and the Pannonian Plain. Slovenia, as a green, active and healthy country, relies on its gastronomy, which is inseparable from its culture (IGCAT, 2019). This is one of the reasons why Slovenia was awarded the title of European Region of Gastronomy 2021 in 2018 (Slovenian Tourist Board, 2022). In this context, Kerma (2014) indicates that food and wine are complementary forms of tourism that lead to a related segment of the tourism market. Therefore, tourism can be considered a tool that connects tourists and countrymen with their cultures and traditions (Žibert et al., 2020).

The development of tourism in the villages of the Slovenian countryside sees this opportunity and the potential that arises from the richness of local traditions and customs. It is impossible to talk about Slovenian identity, culture and national consciousness without mentioning wine (Gačnik, 2017). The rather rigid situation in the global wine market dictates the integration or the intertwining of the activities of wine and tourism making them one common economy. Often and increasingly so, the mentioned sectors complement each other, resulting in the synergistic effects seen in the flourishing development of wine tourism regions. The development of wine tourism – even if it takes place in cities, as well as outside wine-growing areas – is in any case directly linked to rural development (Kerma, 2018).

3. THE CASE OF THE CZECH REPUBLIC

The earliest archeological evidence of viticulture in the region dates back to Roman times when Emperor Marcus Aurelius Probus allowed the planting of vineyards north of the Alps. A wine knife was found in the now flooded village of Mušov below the Pálava Hills in the Moravian wine region (National Wine Center, 2020). Probably the oldest vineyards in the area were planted there. At the time of the Great Moravian Empire (9th century), many findings already indicate a well-developed wine industry. According to legend, in 892 the Great Moravian prince Svatopluk sent a barrel of Moravian wine to Czech prince Bořivoj, who then supported the first planting of vineyards in Bohemia (today a smaller Czech wine region). There are written records of the establishment of vineyards in Bohemia and Moravia dating from the 11th century. These are mostly deeds of donation and the foundation of monasteries. In the Middle Ages ownership of vineyards gradually passed from the church to the nobility and later to the burghers. From the 14th century onwards mountain laws were enacted to regulate the cultivation of vineyards in individual towns and villages. Vineyards are long-term crops that require a high initial investment and intensive annual maintenance, so their mortal enemy is war and economic crises. Therefore, periods of prosperity for viticulture have alternated with periods of misery. But the introduction of new diseases and pests at the beginning of the 20th century was no less negative. In particular, phylloxera destroyed most of the vineyards, but the First World War also had its impact. It took more than half a century for vineyards to recover from this, due in part to the changes in ownership associated with the advent of socialism after World War II (Sedlo, 2020). Great changes arose with the Wine Act of 1995 and its later harmonization with the legislation of the European Union upon our accession to the EU in 2004 (National Wine Center, 2020).

Viticulture is a traditional part of Czech agriculture. Although vineyards account for only one percent of cultivated agricultural land, wine-growing areas contribute significantly to shaping the typical character of the landscape (Lhotská, 2021). Viticulture is divided into two wine-growing regions (*vinařské oblasti*) – in the northwest of the country the Bohemian region and the southeast the Moravian region. These two wine regions are subsequently divided into six sub-regions (see Table 1.) and also into wine villages. Due to its landlocked position

in central Europe, the Czech Republic has a marginal and continental climate. The Moravian wine-growing region is the dominant and leading area of wine production in the country. It has also the warmest climate due to its southern location and it covers 96% of domestic wine production (National Wine Center, 2020). These aspects are further emphasized by the common border with Austria and its cross-border wine-growing region Lower Austria (Niederösterreich), specifically Weinviertel (Flamik, 2020). The Czech Republic is a member of the OIV and has a wine-growing area of 17.9 thousand hectares (in 2020, see Table 1) (Králiková et al., 2021), slightly bigger than Slovenia. Regarding the wine classification, the Czech Republic has the wine of origin (PDO, PGI) just like Slovenia (National Wine Center, 2020). Furthermore, Wines of Original Certification (WOC)⁷ was developed as a quality approval that reflects the region where the grapes come from and thus the evaluation of wines is carried out by the winemakers themselves as members of the relevant WOC association (Kubát, 2021). In the EU, the Czech wine region of Moravia is classified into wine-growing zone B, while the region of Bohemia is classified into wine-growing zone A (Sedlo, 2020).

Wine consumption in the Czech Republic is reported differently by different institutions. For example, the OIV gives a figure of 637 thousand hectoliters and 7.56 l/person/year for 1995, while the Ministry of Agriculture (MoA) gives 15.4 l/person/year for the same year, which is more likely. The wine balance (production + imports - exports) shows an annual consumption in recent years of over 2 million hectoliters, which is over 20 l per person per year. This is also consistent with the figures given by the OIV and the MoA after 2007. The Czech Statistical Office works with a figure of 18.9 l/person/year for 2015. The OIV estimates consumption for the Czech Republic at 2.1-2.2 million hectoliters for the years 2015 to 2019, which is over 20 l/person/year (age over 15 years). This ranks the Czech Republic in 24th place⁸ in the world for wine consumption in 2019 (consumes less than 1% of the world's wines), behind Austria and ahead of Greece. Within the 27 EU member states, it ranks 12th with 18.2 thousand hectoliters of vineyards in 2019, behind Croatia and ahead of Slovenia; see Table 1. The Czech Republic now has a ten-year average of 600 thousand hectoliters, placing it 13th in the EU countries for wine production in 2019 with 568 thousand hectoliters, behind Slovenia and ahead of Slovakia (Sedlo, 2020). Therefore, domestic wine production is insufficient to meet domestic demand for wine. Naturally, Czechs are inclined to travel rather within Europe and visit the wineries and vineyards of Germany, Italy and France as well as others thus stimulating wine consumption in these wine-growing regions (CBI, 2016).

The whole area of the Moravian wine-growing region represents vast and miscellaneous activities, attractions, and experiences not all directly bound up with wine but also with other forms of active tourism (Kubát, 2021). Wine tourism in the Czech Republic began to develop approximately 20 years ago while the crucial project was the establishment of wine (cycling) routes in 1999-2003 coordinated by the Partnership Foundation (Nadace Partnerství) and their ongoing development. This unique 1,200 km long network of marked cycling routes interweaves four Moravian wine sub-regions and involves 230 wine villages and towns. It consists of ten separate trails interconnected with the spinal eleventh Moravian Wine Trail (National Wine Center, 2020). To guarantee a high-quality service in the wine region regarding cycling routes a certificated system of service facilities has been implemented – cycling certification Cyclists Welcome (Cyklisté vítáni) (Kubát, 2021). The current situation and further expansion of wine

⁷ Wines of Original Certification, in the Czech Republic are denoted as VOC (Vína Originální Certifikace).

⁸ In 2019, 128 million hectoliters of wine was consumed in the EU, representing 53% of global wine consumption.

tourism conditions go hand in hand with the development and growth of the wine trade (National Wine Center, 2020). Flamik (2020) infers that the common denominator of all the successes and strengths of viticulture, winemaking, and tourism in the region of Moravia is the fact that Moravian winemakers and entrepreneurs in tourism started on their own.

4. COMPARISON OF WINE TOURISM PRECONDITIONS

The preceding text highlights the development of wine tourism, thus showing the preconditions for the development of this form of tourism in selected wine-producing countries. These countries, due to their invariable characteristics, are not oriented towards greater wine production or a high influx of foreign tourists. Quite the contrary. Their strength lies in their smallness, although they also draw inspiration from the great wine-producing regions, so their adaptation must consider the local culture, history and tradition, but above all the vision of the future direction.

As Table 1 shows, the Czech Republic is larger in terms of vineyard area. However, wine production is larger in Slovenia. In 2019, the Czech Republic recorded about 37.2 million international arrivals, including same-day visitors and overnight tourists. In Slovenia, the number is much lower at 4.7 million. The year 2019 was deliberately chosen before the start of COVID-19 to avoid a drop in tourist flows in subsequent years. This fact also relates to the number of beds available in the whole country at any one time, given that the Czech Republic offers more than three times as many beds for accommodation compared with Slovenia.

Table 1. Selected wine and tourism aspects in the Czech Republic and Slovenia, 2020

	Czech republic	Details	Slovenia	Details
Vineyards (ha)	17.925		15.261	
Wine production (hl)	584.000		725.000	
Vine-growers/wineries (registered)	14.640/app. 1.000		app. 28.000	
Wine regions	2	Bohemia, Moravia	3	Podravska, Posavska, Primorska
Wine sub-regions/districts	6	Litoměřice, Mělník, Znojmo, Mikulov, Velké Pavlovice, Slovácko	9	Prekmurje, Štajerska Slovenija, Bizeljsko-Sremič, Dolenjska, Bela krajina, Slovenska Istra, Kras, Vipavska dolina, Goriška Brda
Accommodation establishments capacity (number of beds)	592.314		182.827	
Food and beverage serving establishments (2019)	app. 40.000		7.648	
Foreign tourists' arrivals (2019)	37.202.000		4.701.880	

Source: AMSP ČR, 2018; CZSO, 2020; GOV.SI, 2021; Králiková et al., 2021; Slovenian Tourist Board, 2020; Statista, 2022; SURS, 2021a, 2021b; THE Slovenia, 2021; ÚKZÚZ, 2021; World Tourism Organization, 2020.

Another similarity between the two wine countries is the way they comprehend wine and wine tourism. Wine is not only consumed. It is a means of getting to know the country of origin and the people who grow it. Nowadays, tourists taste wine and traditional dishes and explore all that wine regions have to offer, including their culture, landscape and nature. They are co-creators of their experience and part of the so-called winescape.

5. FUTURE RESEARCH DIRECTIONS

As Gačnik (2017) mentions, even in traditional wine destinations the focus is no longer on developing wine routes, but on developing gastronomy routes. The same could happen in Slovenia after the adoption of the Slovenian Gastronomy Strategy in 2006, which lists no less than 24 gastronomic regions, and in the Czech Republic, where there is no gastronomy strategy. Nevertheless, there is a lack of synergies between wine and gastronomy at the national or regional level. Both the improvement of digitalization in this sector and detailed statistics on wine visitors and their (profile) classification in wine regions are key issues that need to be addressed.

6. CONCLUSION

Wine tourism and its development have a fundamental understanding, involvement and demand in the destination within its general growth. This area, with its characteristics and players, contributes towards attracting visitors and creating new opportunities or turning them away. In this paper two wine countries, Slovenia and the Czech Republic were chosen because of their similarity in the development of wine tourism and other aspects of wine tourism mentioned in the paper. This case study presents the aspects of wine tourism and its development preconditions up to the present day. Slovenia and the Czech Republic are countries with a long winemaking tradition. When trying to identify the policies or strategies of tourist promotion in the context of wine tourism development in the Slovenian and Czech wine regions, there is a constant reiteration that wine tourism in development plans is (still) not given the attention it deserves. Even though almost all documents, at least in writing, emphasize its importance for local and regional development. Many winemakers participate in both local and international competitions and events. As a result, they gain international recognition, which is not based on the quantity of wine or the influx of tourists, but on the quality of the wine, aspects such as nature and hospitality, as well as wine culture, tradition and narratives. Drinking wine or wine tasting is seen by wine visitors as a social activity, often accompanied by authentic local food in rural settings and natural landscapes.

The rather rigid situation in the global wine market dictates the integration or the intertwining of the activities of wine and tourism making them one common economy. Often and increasingly so, the mentioned sectors complement each other, resulting in the synergistic effects seen in the flourishing development of wine tourism regions. Both countries have developed simultaneously in the field of viticulture and wine production. Wine consumption per person per year is an uncertain fact in both countries where different bodies present distinct numbers. This paper also shows that both wine countries and their wine tourism development were established mainly on the infrastructural aspect as the formation of wine routes in a particular wine-growing region. The existence of other wine regions behind the borders of Slovenia (Italian and Austrian wine regions) and the Czech Republic (Austrian wine regions) was beneficial and a driving force for the beginning of the development of wine tourism. With some exaggeration, it can be said that the Czech wine region of Moravia and the Slovenian wine region of Podravje are connected by an imaginary line through the Austrian wine regions, which runs through the eastern part of this country. Thus, future cooperation in the field of wine and wine tourism, e.g., by connecting wine and cycling routes through this area, would bring a crucial international wine area and co-operation. Some of the aspects mentioned in this paper can support and further develop this idea.

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Segmenting Wine Festival Visitors Based on Their Visit Experience

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Abstract: *Wine tourism experiences can be offered in many ways, such as visiting wine festivals. They can provide a wide range of experiences that differ from day-to-day living and could be viewed as lifestyle tourism experiences. The goal of the research was to segment wine festival visitors and describe them within the experience economy context. Data was collected using a structured questionnaire at wine festivals in Croatia. Research hypotheses were tested using cluster analysis and ANOVA. Segmentation results show four significantly different groups of wine festival visitors (business visitors, explorers, devotees and companions). The identified segments significantly differ in their motivation and experience at the wine festival. Based on the results of this research, recommendations for specific marketing strategies can be given to festival organizers, wineries and destination management organizations. Research expands previous knowledge about customer segments in wine tourism. To the authors' knowledge, this is the first empirical study that has developed a wine festival visitor profile based on the experience economy framework.*

1. INTRODUCTION

Travel for the purpose of visiting festivals represents a fast-growing segment of the tourism market and is a unique opportunity for destination development based on the fact that festivals provide various economic benefits to the local community (Godovykh & Tasci, 2020). Festivals can have a significant effect on the promotion and brand awareness of a destination and are capable of generating significant tourism income (Dash & Samantaray, 2018). Organizing festivals can attract visitors to the destination outside of the main tourist season and possibly even to destinations and regions they would not otherwise consider visiting (Getz, 2008). The Festival environment can provide a unique and memorable experience to the visitors based on their specific interests (Manthiou, 2014). Providing memorable experiences to festival visitors leads to multiple positive outcomes and should be the focus of festival organizers and researchers.

Wine festivals combine elements of wine and festival tourism and are a perfect opportunity to create unique experiences (Lee, Hwang & Shim, 2019). They are defined as special events which are based on showcasing local wines, food and culture (Quadri & Fiore, 2013). Wine festivals are usually held in picturesque settings within wine regions which only adds to their attractiveness and makes them an ideal platform to create memorable experiences (Lee, Bruwer & Song, 2017). Visiting wine festivals can be the main motive for travel to a certain destination as well as a specific experience that visitors want to immerse in during their stay at a destination (Lee, Bruwer & Song, 2017). Comprehensive literature reviews have revealed a limited amount of research that views the wine festival experience as a multidimensional construct.

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Experience economy research has been based on the assumption that consumption has a hedonistic component and that decisions on purchases (or travel) are made with a combination of rational (cognitive) and irrational (emotional) elements (Carvalho, Kastenholtz & Carneiro 2021; Chang 2018; Godovyk & Tasci, 2020; Oh et. al., 2007; Pine & Gilmore, 1999). A multidimensional model of consumer experience has been originally proposed by Pine & Gilmore (1999) which consisted of four dimensions (escape, education, entertainment and environment) and since then it has been the base of a large number of tourism studies that have empirically tested the concept in various tourism settings (Dieck et al, 2018; Manthiou, 2014; Mehmetoglu & Engen 2011; Park et al, 2010; Rivera et al, 2015). Research has shown that tourism experiences are subjective to the consumer and context-specific (Fernandes & Cruz, 2016; Kim et al, 2017; Lee, Sung & Zhao, 2017; Lee Hwang & Shim, 2017).

In other words, experience and its underlining dimensions will greatly vary depending on the platform on which they are created (i.e., restaurant, festival, resort, shopping) and will depend on the different kinds of socio-demographic and psychological characteristics of the consumer (Geus et al, 2016).

Therefore, the purpose of this research is to segment and describe wine festival visitors based on their motivation and visit experience so the following hypothesis are proposed:

Hypothesis One: Wine festival visitors are significantly different regarding their motivation.

Hypothesis Two: Wine festival visitors are significantly different regarding their visit experience.

2. METHODOLOGY

In order to test the proposed research hypotheses, an empirical study based on primary data was conducted using the self-administered survey method. The used questionnaire was based on a comprehensive review of previous research on tourism experience, festival experience, wine tourism experience and wine festival experience. The questionnaire was designed in English, Croatian, German, Spanish and Italian language. It consisted of twenty-one items regarding the visitors' experience, and six items regarding visitor motivation while the final section was designed to collect data about the demographic profile of the visitors.

Based on an extensive literature review six wine festival visitor experience dimensions were proposed. Measurements were drawn from previous research and were adapted for this study concerning: cognitive experience (Rivera et al, 2015), affective experience (Kim, 2010), social experience (Chang & Horng, 2010), sensory experience (Geus et al, 2016), experiential value (Kim et al, 2011) and service experience (Chang & Horng, 2010).

To test content validity, clarity and comprehensibility as well as to determine the exact time needed to complete it, a pretest of the questionnaire was conducted on a sample of academic and non-academic community.

The sampling strategy was based on the assumption that there are different types (segments) of wine festival visitors so for purposes of data collection three distinctly different wine festivals were chosen. The empirical analysis was carried out using univariate (average scores), bivariate (ANOVA), and multivariate (cluster analysis) statistical methods.

3. RESULTS

As shown in Table 1 research sample consisted of 462 respondents with more than half of the respondents coming from WF1 (Diocletian Wine Cellar Split) and others from WF2 (Vinstra, Poreč) and WF3 (Fine wine festival, Skradin). Sample is fairly evenly distributed among male (48,7%) and female (51,3%), married (44,7%) and unmarried (50,1%) respondents. Most of the respondents are employed (61,5%) with college (39,8%) or higher education (31,4%) and higher than average income (55,8%). Slightly more than half of the respondents are first-time visitors to the festival (58,2%).

Table 1. Socio-demographic profile of the respondents

		Total WF1		Festival					
				WF2		WF3			
		%	n	%	n	%	n	%	n
Gender	Male	225	48,7	68	27,6	101	81,4	56	60,9
	Female	237	51,3	178	72,4	23	18,6	36	39,1
Total		462	100,0	246	100,0	124	100,0	92	100,0
Marital status	Married	205	44,7	121	49,7	51	41,1	33	35,9
	Unmarried	230	50,1	104	42,8	69	55,6	57	61,9
	Other	24	5,2	18	7,5	4	3,3	2	2,2
Total		459	100,0	243	100,0	124	100,0	92	100,0
Festival visit	First	265	58,2	163	68,2	67	54,0	35	38
	Repeated	190	41,8	76	31,8	57	46,0	57	62,0
Total		456	100,0	239	100,0	124	100,0	92	100,0
Employment	Employed	283	61,5	145	59,4	73	58,9	65	70,7
	Self Employed	72	15,7	39	15,9	23	18,5	10	10,9
	Retired	31	6,7	27	11,1	2	1,6	2	2,2
	Unemployed	18	3,9	6	2,5	10	8,1	2	2,2
	Other	56	12,2	27	11,1	16	12,9	13	14,1
Total		460	100,0	244	100	124	100,0	92	100,0
Education	High school	130	28,8	67	27,9	48	40,0	15	16,3
	College	180	39,8	100	41,7	34	28,3	46	50,0
	Masters, PhD	142	31,4	73	30,4	38	31,7	31	33,7
Total		452	97,8	240	100	120	100	92	100,0
Income	High	75	16,2	27	10,9	35	28,2	13	14,1
	Above average	183	39,6	90	36,5	51	41,1	42	45,7
	Average	162	35,1	98	39,8	31	25,0	33	35,9
	Below average	12	2,6	9	3,6	1	0,8	2	2,2
	Low	30	6,5	22	8,9	6	4,9	2	2,2
Total		462	100,0	246	100,0	124	100,0	92	100,0

Source: Own research

The sample was mainly international as 31 countries were represented which account for 94,2% of the sample. The largest amount of respondents originated from the USA (30,7%) and the UK (18,4%).

To better understand the role of motivation in the creation of experience cluster analysis was used to segment wine festival visitors. The level of their motivation to taste and buy wine at the festival was used as segmentation criteria.

Initial hierarchical cluster analysis showed the existence of five clusters; however, ANOVA showed that clusters three and five are not significantly different ($p > 0,05$) so further non-hierarchical cluster analysis would be done using four clusters.

To segment the visitors' nonhierarchical k means clustering procedure (CLUSTER = 4, MXITER = 10, CONVERGE = 0) was conducted which revealed four significantly different clusters of wine festival visitors using motivation (tasting wine, buying wine) as criteria variable.

Table 2. K means cluster analysis results

		Sum of squares	df	Mean Square	F	Sig.
Tasting wine	Between groups	1203,782	3	401,261	482,855	,000
	Within groups	375,619	452	,831		
	Total	1579,401	455			
Buying wine	Between groups	960,167	3	320,056	480,969	,000
	Within groups	300,779	452	,665		
	Total	1260,945	455			
Cluster				n	%	
Cluster one				151	32,68	
Cluster two				98	21,21	
Cluster three				73	15,8	
Cluster four				134	29	
Respondents assigned to clusters				456	98,7	
Unassigned respondents				6	1,3	
Total				462	100	

Source: Own research

Results of cluster analysis show that there are four different segments of wine festival visitors based on their motivation. Results show clusters are significantly different in their desire to taste and buy wine at the festival (Table 1) but are also significantly different in level of motivation to meet the winemakers ($F_{3,452} = 32,621$, $p < 0,001$), socialize ($F_{3,452} = 37,580$, $p < 0,001$), learn about wine ($F_{3,452} = 482,855$, $p < 0,001$) and conduct business on the festival ($F_{3,452} = 15,006$, $p < 0,001$).

Results of cluster analysis and ANOVA support hypothesis one which states that wine festival visitors are significantly different concerning their motivation to visit the festival.

Respondents from the first cluster ($n = 151$) show a higher level of motivation for buying wine at the festival ($\bar{x} = 4,60$), while tasting wine was a lesser motivating factor ($\bar{x} = 2,99$). Focus on transactional activities like buying wine suggests a business-oriented type of visitor so respondents from the first cluster are named "*Business visitors*". Respondents from second cluster ($n = 98$) show a higher level of motivation for tasting wine ($\bar{x} = 5,02$) then for buying wine ($\bar{x} = 2,53$). Seeking out new wines and not being interested in transactional activities shows an inclination to exploring so the respondents are named "*Explorers*". Respondents from third cluster ($n = 73$) show a low level of motivation for both buying wine ($\bar{x} = 1,56$) and tasting wine ($\bar{x} = 1,53$). Those results indicate that these respondents are not interested in the theme of the festival and are present only as companionship, hence are named "*Companions*". Respondents from the fourth cluster show a high level of motivation for both tasting ($\bar{x} = 5,94$) and buying wine ($\bar{x} = 5,40$) which shows their interest in various festival activities and are named "*Devotees*".

Visitor experience was measured through six dimensions with satisfactory Cronbach Alpha scores: experiential value ($\alpha = 0,887$), sensory experience ($\alpha = 0,873$), emotional experience ($\alpha = 0,741$), cognitive experience ($\alpha = 0,870$), social experience ($\alpha = 0,825$), service experience ($\alpha = 0,738$).

To explore the experiences of identified visitor clusters ANOVA analysis was conducted for all six experience dimensions (Table 3).

Table 3. Experience dimensions mean scores and ANOVA analysis

Experience dimensions	Cluster mean scores				ANOVA
	<i>Business visitors</i>	<i>Explorers</i>	<i>Companions</i>	<i>Devotees</i>	
Experiential value	4,63	4,77	4,33	4,84	$F_{3,451} = 2,400$, $p > 0,05$
Sensory experience	4,68	4,67	4,42	5,17	$F_{3,452} = 6,280$, $p < 0,001$
Emotional experience	5,19	5,47	4,90	5,48	$F_{3,452} = 4,211$, $p < 0,01$
Cognitive experience	4,67	4,80	4,34	5,09	$F_{3,452} = 4,594$, $p < 0,01$
Social experience	5,43	5,65	5,51	5,72	$F_{3,452} = 2,873$, $p < 0,05$
Service experience	4,67	5,2	4,68	4,91	$F_{3,452} = 3,748$, $p < 0,05$

Source: Own research

Results of ANOVA analysis shows there are significant differences in visit experience between identified clusters of wine festival visitors for each experience dimension other than the experiential value which supports hypothesis two which states that wine festival visitors are significantly different in regard to their visit experience. In other words, based on the results shown we can conclude that visitors will significantly differ in their motivation to visit a wine festival which in turn will determine the type of experience they will have during the visit.

4. FUTURE RESEARCH DIRECTIONS

While significant differences were found among respondents in regards to their visit experience it is necessary to further explore the nature of experience dimensions for each visitor segment. For example, the social experience dimension was scored fairly high by all visitor segments even though it is obvious they come to the festival for different reasons and will have different needs while attending the festival. It stands to a reason that different social environments will affect visitors (business environment, personal environment, etc.) experience depending on which segment they belong to. The same goes for dimensions such as sensory or emotional where future research needs to identify which senses and emotions affect the visit experience the most.

Experience in this study was measured at a single point in time while the consensus is that experience creation is a process so adapting the methodology to measure visit experience at different points in time (during the festival and after the festival) would bring greater insight into what creates a truly memorable experience.

Additionally, future research should use multivariate statistical analysis to understand what effect will these experience dimensions have on the future behavior of identified market segments.

5. CONCLUSION

To better understand the nature of subjective wine festival experiences wine festival visitors were segmented into four significantly different groups (business visitors, explorers, devotees and companions) using motivation as segmentation criteria. The identified groups of visitors are significantly different in their motivation and experience at the festival.

Business visitors are motivated by buying wine and experiencing the festival mostly through its social component (dimension). Explorers represent a segment of consumers interested in tasting new wines and engaging in casual social activities at the festival. Devotees are a visitor segment that in literature is often referred to as wine lovers or enthusiasts. They visit wine festivals to experience their senses being stimulated, their knowledge expanded, their emotions triggered and their need for socialization fulfilled. More than any other visitor segment, the devotees highlight the need for the creation of multidimensional memorable experiences. Companions are uninterested participants of wine festivals. Their role is to support and companionship for visitors from other segments. Their festival experience is based on the social and emotional dimensions.

In conclusion, based on the results of this research it seems wine festival experience will significantly differ between specific groups of visitors attending the festival and that psychological characteristics such as motivation will greatly determine their visit experience. Since motivation exists in visitors' consciousness before the visit it could be viewed as an experience antecedent.

The results confirm the fact that there isn't one universal type of wine tourist which has been suggested in previous research on the topic. According to these findings festival organizers, wineries and other stakeholders in wine tourism should adapt their marketing strategies to better suit the needs of specific customer segments to build strong memories and in turn loyalty towards the festival and destination.

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