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FACTORS DETERMINING THE EXCHANGE RATE VOLATILITY IN EMERGING MARKET ECONOMIES (EMES)

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Abstract

This study examines the financial- and macro-variables that have effect on the variance of the exchange rate in EMEs over the period between the first quarter of 2005 and the first quarter of 2021. This paper also looks to explore the spillover effects of key central banks (the FED and ECB) monetary policy shocks on this process. The shadow rate differential between the US FED and the ECB is used as a general global monetary environment proxy. A GARCH (p, q) model is employed to estimate volatility and also a panel vector autoregression model to verify theoretical assumptions. We found that the exchange rate fluctuations in EMEs are influenced by the external funding conditions (sovereign risk premium), also domestic inflation, currency depreciation and the unconventional monetary policy of the key central banks can explain some of the volatility in EMEs exchange rates.

Keywords: exchange rate volatility, emerging market economies, unconventional monetary policy, shadow rates, GARCH model

JEL classification: C33, E44, H63

Introduction

The Exchange rate acts as a mirror to describe the market confidence in the macroeconomic condition of an economy (i.e., inflation, public budget) and external balances (i.e., the balance of payments). Meanwhile, this environment highly depends on the monetary policy (especially in the case of the unconventional monetary policy, see: Inoue and Okimoto 2021) through domestic and foreign direct and indirect interventions from the key currency areas (i.e., in the case of the US or the Eurozone).

Globalization, the expansion of the volume of international trade, and increasing cross-border capital movements over the past decade are speeding up the interconnection between different countries. In this globalized world, the international role of the U.S. dollar and the euro in setting international interest rates is quite important. Moreover, because these currencies are supposed to be safe and liquid, foreign reserves held by EMEs are mainly denominated in these currencies. Therefore, in times of crisis when the value of some assets decreases, the central banks of countries issuing these currencies (the FED and ECB) have to implement unconventional measures. These measures most likely have influenced not only the bilateral exchange rates but also the prices of assets held by EMEs' central banks and private individuals.

Therefore, the FED and ECB are important players in international markets and their interventions likely explain to some extent the volatility in macroeconomic variables in EMEs (Apostolou & Beirne, 2019).

Also, the growth differentials have led to different monetary policy decisions among key central banks, for instance, the US growth rate is rising, therefore FED has tended towards monetary policy normalization and it announced in May 2013 that it may slow down its monetary stimulus while ECB has continued to expand its balance sheet. These unsynchronised actions where the ECB is loosening monetary policy and the FED tightening it, have an unsymmetrical effect on the exchange rates volatility and it might be disruptive and should be monitored closely (Apostolou & Beirne, 2019). The interventions by the FED and ECB can be analyzed by estimating the shadow rate differential between the US Fed and the ECB ($Sh_{ECB-USD}$) as a general global monetary environment proxy following Wu and Xia (2016, 2020) to the model. It is expected that these interventions have some volatility spillovers effects on EMEs.

In addition to external monetary shocks, domestic macroeconomic variables such as inflation and sovereign risk premium can influence the volatility of the emerging currency. Şen et al., (2019) found that in the long run, exchange rates and inflation have a co-move in all their sample countries. Also, they claimed that one driver of exchange rate volatility can be the inflationary expectations of market participants which lead domestic currency depreciation because they prefer to exchange domestic currency with foreign currency. Hofmann et al., (2020) found that a lower local currency risk premium means lower EME local currency bond spreads which are associated with an EME currency appreciation against the U.S. dollar. They pointed out that the exchange rates show the overall financial condition that can influence EME local currency bond spreads. In addition, Augustin et al. (2020) stated that there is a tight relationship between the risk of sovereign default and exchange rate fluctuations such that sovereign credit default swap spread shows financial markets' expectations about the interaction between the probability of a country's default and associated currency devaluations. Therefore, this paper is going to answer these particular questions: if an increase of the emerging currency's variance is considered as a response to internal and external shocks for the economy, which financial- and macro-variables derive variance of the exchange rate in EMEs and what's the impact of external monetary policy shocks on this process.

The quarterly data of macroeconomic variables were taken from IMF, while the data of financial variables were acquired from the Refinitiv Eikon database. We used the data of 19 emerging market economies including 4 European countries, 8 Asian countries, 5 American and 2 African countries for a period between 2005-2021.

To answer the research questions, this paper first fits the GARCH (p,q) model to to obtain the standard deviation of the exchange rate (against the US dollar), then uses a VAR model and both impulse response function and variance decomposition to estimate the reaction of exchange rate to the changes in variables. The results shows that volatility in exchange rate are highly associated with external funding conditions (in the risk premium), also domestic inflation, currency depreciation, and the key central banks' unconventional monetary policy can explain some of volatility in EMEs exchange rates.

Theoretical background

Emerging economies' monetary objectives

In emerging market economies (EMEs), from 1980–2000, the main monetary policy objective was exchange rate targeting, but the currency crises of 1994–2001 led the monetary policy frameworks in EMEs, which were often transmitted from exchange rate targeting, toward an inflation targeting (IT) regime, with floating exchange rates (Frankel 2010). Cobham (2021), classified the framework of emerging economies' monetary policy and showed that from the Bretton Woods international monetary system, the monetary policy frameworks oriented to a heavier emphasis on IT and having more systematic monetary strategies, with less focus on exchange rate targeting. Cobham (2021) underlined how inflation targeting became the dominant monetary policy framework in EMEs. However, some central banks are not willing to move toward a price-based approach to monetary policy because they believe that the policy rates are not able to influence output and inflation. Additionally, there are some other factors that may weaken standard monetary policy transmissions such as substantial dollarization, underdeveloped credit markets or low central bank credibility (Brandao et al. 2020).

Keefe (2020) showed that during periods of heightened exchange rate volatility, central banks' policy reactions turn away from maintaining IT commitment, as central banks wanted to focus more on the smoothing volatility in exchange rate than IT monetary policy objectives. She argued that a deteriorating in the central bank's credibility will happen if a high exchange rate leads to a decrease in its ability or willingness to maintain inflation targets. Furthermore, Brandao et al. (2020) investigated the rate of monetary transmission in emerging markets and developing countries and emphasized amplifying the transmission of monetary policy shocks through the exchange rates channel.

Recently the covid-19 pandemic has called for the central banks' quick reactions. The central banks in EMEs are responding to the COVID-19 crisis, as most of them suffered from a relatively low point of the business cycle and a generally low aggregate demand in early 2020. Nevertheless, attempts of central banks in advanced economies in narrowing the appreciation of the US dollar helped EMEs to focus more on the internal goals of monetary policy and supporting aggregate demand while they faced large capital outflows and a sharp currency depreciation (Cantú et al. 2021).

Cantú et al. (2021) provided a database comprising information about both advanced economies' and EMEs' monetary policy response to COVID-19. According to this database, among EMEs central banks, although there were some differences by region, lending operations with 35% was the most common category of policy action, followed by interest rate and foreign exchange rate policy with 20%, reserve policies with 15% and asset purchases with 10%.

As a monetary policy response to the COVID-19, the central banks of Turkey, Brazil, Mexico, Peru, South Africa, Chile, Colombia, the Czech Republic, India, the Philippines, Poland and Russia, reduced the interest rates to historic minimums quickly. However, the interest rate reduction was different during the COVID-19 crisis from other crisis episodes. Previously, they cut interest rates as a result of concerns about capital outflows but this time, they followed advanced economies in cutting interest rates; this gave them greater room for easing the monetary policy (Cantú et al. 2021).

The drivers of the volatility in EMEs exchange rates

One of the main factors that impacts the volatility of the exchange rate in emerging markets is the spillover from the US and ECB shocks. Dominguez (2019) examined the two specific US policy shocks, which consist of the announcement of QE2 in 2010Q4 and so-called “Taper Tantrum announcements” in 2013Q2. As Dominguez (2019) summarized, after the announcement of QE2—that EMEs’ currency appreciated because of the rising net private capital inflows towards them. However, the Taper announcements by Fed led to a decline in the net private capital inflows to EMEs and subsequently resulted in dramatic EMEs currency depreciation. Moreover, Apostolou and Beirne (2019) investigated the impact of changes in the balance sheets’ size of the FED and ECB on the EMEs’ currency, stock and bond markets. They found that the magnitude of spillover from the FED to EMEs’ currency markets was greater than ECB, while volatility spillover to stock and bond markets was similar in magnitude from both FED and ECB. Janus (2020) used the ECB’s shadow rate to estimate the ECB’s non-standard monetary policy and found that the volatility spillovers from ECB’s monetary policy shocks on Poland’s macro-financial variables were modest and time-varying but for the period of 2008–2018 and the ECB’s more advanced unconventional tools don’t have a significant effect on the bilateral exchange rate between Polonia and Euro.

Witte (2012) stated that the absolute interest rate differential between countries was the main driver of European currency depreciation after the credit crisis of 2008 which was amplified by the degree of the crisis. Also, other macroeconomic variables such as high external debt held by central banks or governments, current account deficits, and high domestic inflation indirectly depreciate exchange rates by creating higher domestic interest rates.

Kilicarslan (2018) using the GARCH (p, q) method and FMOLS model, investigated the determinants of volatility in Turkish exchange rate. The results showed that domestic investment, money supply and trade openness have a positive relationship with the real effective exchange rate volatility, while foreign direct investment, output and government expenditures have a negative relationship with the real effective exchange rate volatility.

Alagidede and Ibrahim (2017) used the GARCH model to estimate the volatility in the exchange rate, in Ghana, for the short and long run from 1980 to 2013. The results obtained from the vector error correction model (VECM) showed that three-quarters of volatility in the real exchange rate was self-driven, and only one quarter or so was related to macroeconomic variables such as government expenditure and money supply growth, terms of trade and output shocks. Among these macroeconomic variables, the most important variable that determines the short-run volatility of exchange rates was output, while in the long run, volatility of exchange rates can be explained by the magnitude of government expenditure and expanding money supply and terms of trade shocks. Moreover, the results showed that in the short-run, exchange rate volatility was not influenced by portfolio flows.

Caporale et al. (2017) examined the impact of both equity and bond portfolio inflows on the volatility of exchange rate against the US dollar for seven Asian developing and emerging countries (India, Indonesia, Pakistan, the Philippines, South Korea, Taiwan and Thailand) for the time period between 1993-2015. They found that the flowing of equity (bond) from the Asian countries to the US are associated with the high (low) volatility in the exchange rate. Therefore, they concluded that capital control could be an effective instrument to decrease the fluctuation of exchange rates in the sample countries.

Theoretical model

Our theoretical model (1) focuses on the standard deviation ($FXstd_{i,t}$), which represents investors' confidence in the valuation of the currency and the noises coming from the monetary policy.

The volatility of an exchange rate can be explained by the currency basis swap rate ($CBS_{i,t}$) where its negative values shows an increasing tensions in dollar-funding market (Kick et al. 2018; Ivashina et al. 2015, Destais 2016); domestic inflation ($CPI_{i,t}$), which determines the changes of the domestic purchasing power of the currency, and it can be targeted by the monetary policy; the country-specific sovereign risk premium ($10Y_{i,t} - 10Y_{US,t}$), which shows the higher internal and external risks for investors (Boros-Sztanó 2021); from the foreign exchange rate ($FX_{USD,i,t}$) which represents the external balance (Hung 2020). Also, to examine the impact of key central banks' unconventional monetary policies on the volatility of EMEs exchange rates, we used the shadow rate differential between the US Fed and the ECB ($Sh_{ECB-USD}$) as a general global monetary environment proxy following Wu and Xia (2016, 2020).

Also to control the exogeones shocks, some dummy variables ($dummy_{d,i,t}$) were introduced to the model including the amount of all types IMF loans to the specific country, the type of exchange rate regime (fixed or stabilized exchange rates) derived from the IMF AREAER database and a dummy variable for controlling the impact of being a member of EU.

$$\Delta FXstd_{i,t} = const. + \beta_1 \Delta Sh_{ECB-USD} + \beta_2 \Delta CBS_{i,t} + \beta_3 \Delta CPI_{i,t} + \beta_4 \Delta (10Y_{i,t} - 10Y_{US,t}) + \beta_5 \Delta \ln FX_{USD,i,t} + \beta_{6:8} dummy_{d,i,t} + \varepsilon_{i,t} \quad (1)$$

Table 1 shows a summary of variables that are used in the above model.

Table 1: Variables and sources

Variable (2005Q1-2021Q1)	Notation	Source
Currency in USD denomination	$FX_{USD,i,t}$	Refinitiv Eikon
Shadow rate in the US Fed and the ECB	$Sh_{ECB-USD}$	Wu and Xia (2016, 2020)
Currency basis swap rate	$CBS_{i,t}$	Refinitiv Eikon
Inflation	$CPI_{i,t}$	IMF
Sovereign 10-year bond rate for each country	$10Y_{i,t}$	Refinitiv Eikon
Sovereign 10-year bond rate for US	$10Y_{US,t}$	Refinitiv Eikon
IMF support	dummy_IMF	IMF Lending Commitments
Exchange rate regime	dummy_FX	IMF Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)
A member of EU	dummy_EU	European Commission

Source: authors' compilation.

The model represents each and all 19 sample emerging countries from four continents for 65 quarter of year (2005Q- 2021 Q1). Table 2 shows the sample emerging countries.

Table 2: Sample countries

Region	Countries
Europe	Hungary, Czech Republic, Poland and Russia
Americas	Mexico, Brazil, Chile, Colombia, and Peru

Region	Countries
Asia	South-Korea, India, Indonesia, China (People's Republic of), Turkey, Philippines and Malaysia
Africa	Egypt and South Africa

Source: authors' compilation.

Methods

Methods

This paper fitted a GARCH (p,q) to estimate volatility, and then applied a panel VAR model to analyse the influence of shocks from macroeconomic fundamentals and monetary policies on the fluctuation of currency pricing in EMEs.

GARCH (1,1)

The GARCH family models are the most common models to estimate the volatility in financial data, as they can capture clustering and persistence in time series volatility (Capeiello et al. 2006).

To estimate the volatility developments and their heteroscedasticity, the symmetric GARCH (p,q) and asymmetric can be used. However, low frequency data (like quarterly and annual) can be estimated better with low complexity models since heteroscedasticity is more present in data with higher frequencies (like hourly, daily or weekly). Therefore, our paper uses the basic GARCH model (2):

$$\text{GARCH (p,q):} \quad \sigma_t^2 = \omega + \sum_{i=1}^p \alpha_i \varepsilon_{t-i}^2 + \sum_{j=1}^q \beta_j \sigma_{t-j}^2, \quad (2)$$

In which ω is a constant variable, p is to show the lag number of squared past ε_{t-i}^2 volatilities multiplied by α_i , σ_t^2 shows the current variance and q denotes the lag number of past volatilities, which is multiplied by β_j to show the volatility persistence.

Panel VAR regression

This paper employs a Panel VAR model to estimate the coefficient of variables. This model assumes a priori endogeneity for each variable and their dynamics on a smaller amount of time series variables: $y_t = (y_{1t}, \dots, y_{Kt})'$.

$$Ay_t = A_1^S y_{t-1} + \dots + A_p^S y_{t-p} + Bu_t, \text{ where } \varepsilon_t = A^{-1}Bu_t \text{ and } S = A^{-1}B. \quad (3)$$

F-matrix (Table 3) represents the long-term effects of shocks under the Blanchard and Quah (1989)'s long-term restriction of (4), each row shows a variable's shock, and the last row represents the variable which has no impact on other variables but only itself.

$$(I - A_1 - \dots - A_p)^{-1} \varepsilon_t = \Psi \varepsilon_t = Fu_t \quad (4)$$

Where Ψ is the long-term multiplier and the accumulative shock's long-term effect is zero.

Table 3: The long-term effects of the shocks of variables in F-Matrix

		Uncertainties in variables					
		ΔSh_{ECB}	$\Delta CBS_{i,t}$	$\Delta CPI_{i,t}$	$\Delta(10Y_{i,t} - 10Y_{US,t})$	$\Delta \ln FX_{USD}$	$\Delta FXstd_{i,t}$
variable	ΔSh_{ECB-US}	f ₁₁	0	0	0	0	0
	$\Delta CBS_{i,t}$	f ₂₁	f ₂₂	0	0	0	0
	$\Delta CPI_{i,t}$	f ₃₁	f ₃₂	f ₃₃	0	0	0
	$\Delta(10Y_{i,t} - 10Y_{US,t})$	f ₄₁	f ₄₂	f ₄₃	f ₄₄	0	0
	$\Delta \ln FX_{USD,i,t}$	f ₅₁	f ₅₂	f ₅₃	f ₅₄	f ₅₅	0

	Uncertainties in variables					
	ΔSh_{ECB}	$\Delta CBS_{i,t}$	$\Delta CPI_{i,t}$	$\Delta(10Y_{i,t} - 10Y_{US,t})$	$\Delta \ln FX_{USD}$	$\Delta FXstd_{i,t}$
$\Delta FXstd_{i,t}$	f_{61}	f_{62}	f_{63}	f_{65}	f_{65}	f_{66}

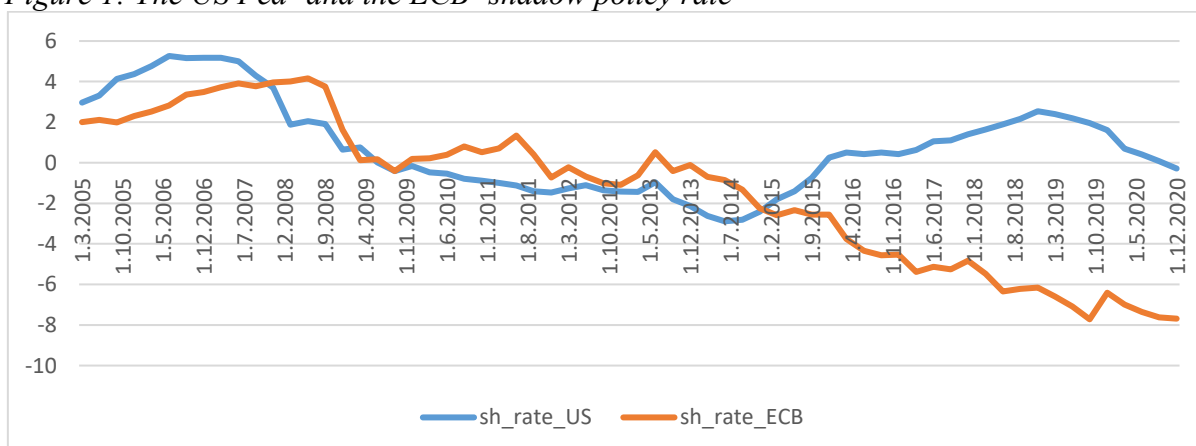
Source: authors' calculation in EViews 11.

Also, the paper employs the impulse response functions and variance decomposition. Impulse response functions shows the impact of each variable's shock on a given model variable with 68% and 95% confidence intervals. Also, to determine the importance of each shocks in uncertainty of particular variable, variance decomposition tool is used.

Shadow rate

According to Lombardi and Zhu (2014), monetary policy is an unobserved variable, and there are several models to estimate it. One of these methods is to use the shadow policy rate, for instance Lombardi and Zhu (2014), used this proxy to estimate the policy gap which is filled by UMP. They considered the policy gap as a difference between the level of federal fund rate when it reached the ZLB and the level of federal fund rate suggested by Taylor rules. Therefore, this study applied the shadow policy rate difference between federal reserve and European central bank as a proxy for both conventional and unconventional monetary policy.

Figure 1: The US Fed' and the ECB' shadow policy rate



Source: Wu and Xia (2016, 2020).

Results

Table 4 represents the descriptive statistic of the similarly scaled and stationary inputs after using logarithm at currencies. Also to clean up the fat tailness of some variables and represent the outliers and structural breaks in the model, the dummy variables were included to the model. Im, Pesaran and Shin tests show there is no unit root in the input variables ($p < 0.05$).

Table 4: Descriptive statistics of the individual samples

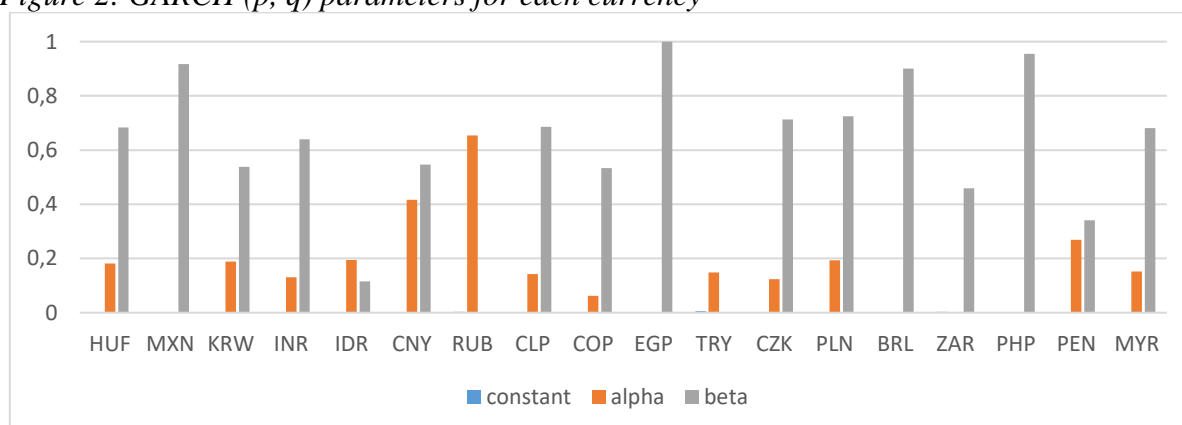
	ΔSh_{ECB-US}	$\Delta CBS_{i,t}$	$\Delta CPI_{i,t}$	$\Delta(10Y_{i,t} - 10Y_{US,t})$	$\Delta \ln FX_{USD.i,t}$	$\Delta FXstd_{i,t}$
Mean	-0.0014	0.0086	-0.0323	0.0399	0.0136	0.0005
Median	-0.0016	0.0000	-0.0162	-0.0288	0.0032	0.0000
Maximum	0.0187	7.7400	6.6442	5.0242	0.3826	0.1775

	ΔSh_{ECB-US_t}	$\Delta CBS_{i,t}$	$\Delta CPI_{i,t}$	$\Delta(10Y_{i,t} - 10Y_{US,t})$	$\Delta \ln FX_{USD.i,t}$	$\Delta FXstd_{i,t}$
Minimum	-0.0160	-7.2700	-6.1270	-3.4120	-0.1355	-0.2545
Std. Dev.	0.0065	0.8504	1.1393	0.8422	0.0657	0.0237
Skewness	0.3402	0.4059	0.5689	1.3869	1.3914	-2.2211
Kurtosis	3.8384	44.5569	12.8424	11.3969	7.3094	59.2337
Jarque-Bera	15.01	22243.26	1263.90	1006.84	338.81	40967.77
Probability	0.0006	0.0000	0.0000	0.0000	0.0000	0.0000
Levin. Lin & Chu panel unit root test stat.	-11.3457	-9.2054	-3.0506	-16.2049	-19.8428	-267.4700
Probability	0.0000	0.0000	0.0011	0.0000	0.0000	0.0000
Observations	309	309	309	309	309	309

Source: authors' calculation in EViews 11.

Figure 2 shows the estimated GARCH (1,1) model's parameters, which were following mostly the well-known formula of strong volatility persistence (beta>50%). It means that a currency's pricing uncertainty in one quarter was inherited by the next quarter as well – which makes a currency-crisis a long-term phenomenon but provides a robustness for the currency as well. However, in case of low betas, currency volatility was determined by market shocks which is a sign of a highly turbulent market.

Figure 2: GARCH (p, q) parameters for each currency



Source: authors' calculation in Matlab, MFE toolbox.

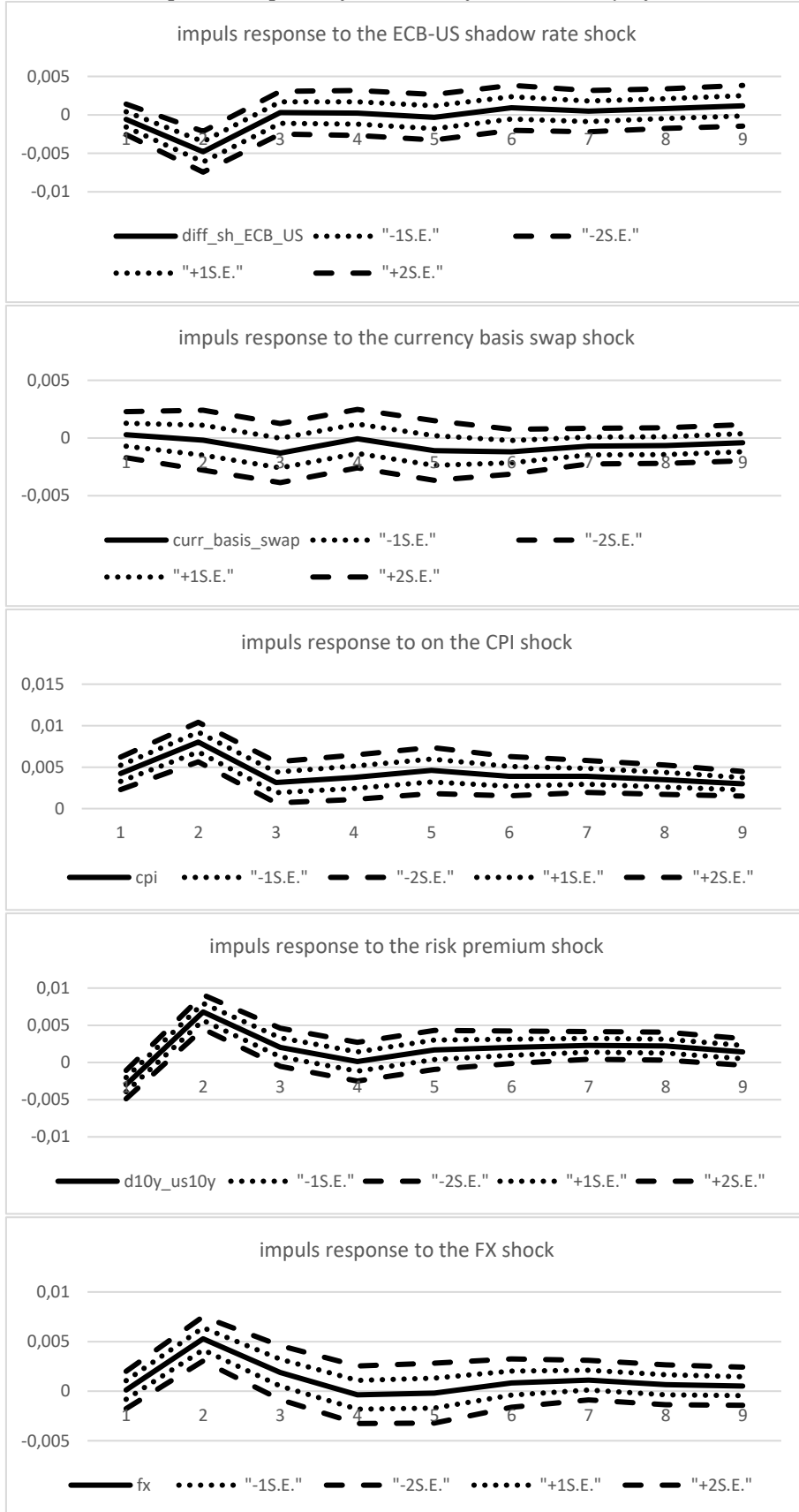
Table 5: Lag length selection

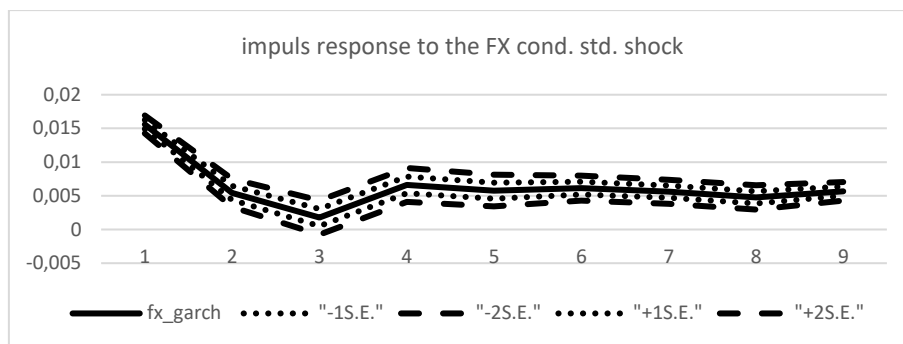
Lag	LogL	LR	FPE	AIC	SC	HQ
0	988.64	NA	0.00	-7.07	-6.75	-6.94
1	1134.67	281.35	0.00	-7.87	-7.08	-7.55
2	1205.28	132.95	0.00	-8.13	-6.86	-7.62
3	1277.76	133.28	0.00	-8.39	-6.65	-7.69
4	1342.26	115.76	0.00	-8.60	-6.38	-7.71

Source: authors' calculation in EViews 11.

Since this paper tests quarterly data, 4 lags were included in the initial model and compared with other alternatives (Table 5). We were applying 4 lags in the later model as well, as the AIC and HQ were bringing out their lowest values at these levels. Meanwhile, this setup provided lower than one modulus variable (see Annex 1).

Figure 4: Accumulated impulse response functions of the volatility of the FX rate

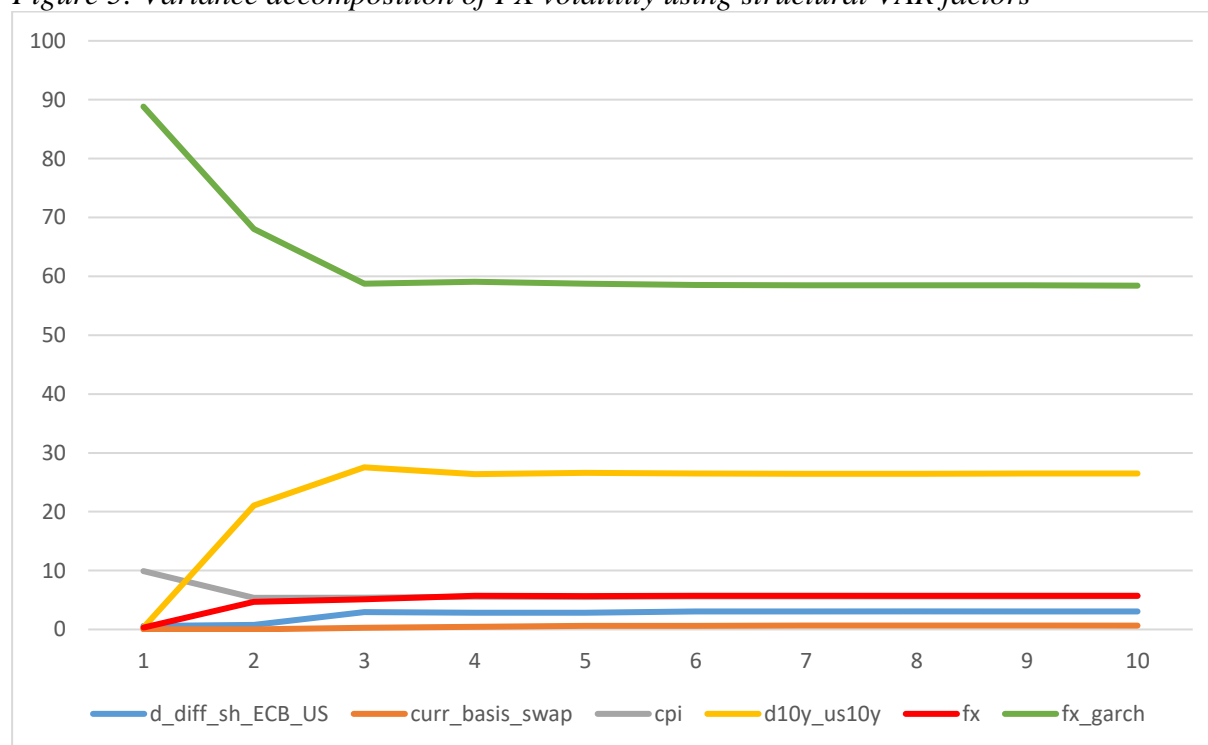




Source: authors' calculation in EViews 11.

Figure 4 shows the accumulated impulse responses of uncertainty of the exchange rate exchange rate to each variable's shock in the long run. The relative changes in the key currency area monetary conditions had a 2-quarter-lagged negative influence, meaning that if the US Fed tightened up or the ECB loosened the monetary conditions, the market became less confident about the pricing of the sampled emerging currencies. The US dollar funding conditions had no long-term impact on the currency volatility since currency base swaps had no significant influence. Meanwhile, the inflation had a significant positive long-lasting impact, meaning that emerging currencies tend to have higher volatilities in case of elevated domestic inflation—pointing on the importance of central bank credibility. The sovereign risk premium or the uncovered interest rate parity had a contradictory effect: while its decline had a calming impact in the first quarter, but it provided an even stronger disturbance in the second quarter, reflecting on the fact that it can be dangerous to navigate away from the risk premium the markets are already gotten used to. The self-reinforcing effects of the devaluations are visible in the currency logarithmic differentials: devaluations generate elevated uncertainty in currency pricing two and three quarters later.

Figure 5: Variance decomposition of FX volatility using structural VAR factors



Source: authors' calculation in EViews 11.

The variance decomposition (Figure 5) ranks the relative importance of the variables. It points on the high importance (~27%) of the sovereign risk premium changes, validating the uncovered interest rate parity rule at the same time. Meanwhile, changes in the inflation (had ~10% in the 1st quarter only) and the exchange rate (~6%) and also the key central bank premium (~3%) had low significance in the long run.

Conclusion

This paper examines the internal and external determinants of EMEs' exchange rate volatility. As we stated in this paper, although the monetary policy frameworks in EMEs have oriented towards a heavier emphasis on inflation targeting, in the case of heightened exchange rate volatility, the focus of EME's central banks turns away from maintaining IT commitment towards smoothing the exchange rate's fluctuations. Also, considering that the swining of exchange rate describes the confidence of market participants in the accuracy of pricing, understanding the internal and external determinants of the variance of the exchange rate is crucial for EMEs.

Therefore, this paper focused on 18 emerging countries from four continents to examine the determinants of variances in emerging currency pricing. GARCH model is used to estimate the uncertainties in emerging currency pricing. Moreover, VAR model was used to investigate the impact of sovereign risk premium and domestic inflation as internal macroeconomic variables and the currency base swaps (CBS) and the ECB and Fed's unconventional monetary policy as external variables. The shadow rate differential between the ECB and the US Fed ($Sh_{ECB-USD}$) is employed as a general global monetary environment proxy for volatility in emerging currency pricing.

The results showed a contradictory impact for the country-specific risk premium. Although in the first quarter, decreasing risk premium led to a decrease in volatilities, in the second period, it had a stronger disturbance impact on the volatilities of EMEs' exchange rate, pointing to the fact that uncovered interest rate parity rule still matter even under unconventional monetary policy dominated environment. Also, the results indicated a significant positive long-lasting influence of domestic inflation, emphasising the crucial role of central bank credibility. Moreover, it was found that in the long run, some of the volatility in emerging currency can be explained by FED and ECB monetary policy shocks. Supporting the results of Apostolou and Beirne (2019), those countries which have more financial and capital linkages with the US and Eurozone are more vulnerable to financial spillovers effects. Also, the results showed that the currency base swaps (CBS) had no significant long-term impact on the currency volatility.

This paper has three policy implications. First, given that uncertainties in emerging currency pricing is a sign of the confidence of market participants, EMEs must pay crucial attention to domestic and external drivers of exchange rate uncertainty and implement economic policies that will minimise exchange rate volatility. Second, results showed that among domestic macroeconomic variables, the sovereign risk premium and domestic inflation had a major influence on the volatility of EMEs' exchange rates. Therefore, to avoid deteriorating the central banks' credibility and market confidence, EMEs' central banks should focus not only on maintaining their inflation-targeting monetary policy commitments but also on sovereign debt management through for instance development of local currency based government bond markets. Third, since EMEs' currency pricing volatility is influenced by the shocks arising from the FED's and ECB's monetary policy shocks of the key central banks, the macroeconomic

policy implemented by central banks should sufficiently protect the economy from inward negative spillovers from abroad.

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Appendix

Table 1: Roots of characteristic polynomial

Variable no.	lag	Real	Imaginary	Modulus
1	1,0000	0,6209	-0,5148	0,8066
	2,0000	0,6209	0,5148	0,8066
	3,0000	0,4517	0,6640	0,8030
	4,0000	0,4517	-0,6640	0,8030
2	1,0000	-0,4654	-0,6205	0,7756
	2,0000	-0,4654	0,6205	0,7756
	3,0000	-0,6034	-0,4427	0,7484
	4,0000	-0,6034	0,4427	0,7484
3	1,0000	0,1087	0,6900	0,6985
	2,0000	0,1087	-0,6900	0,6985
	3,0000	0,6819		0,6819
	4,0000	-0,5906	-0,2254	0,6322
4	1,0000	-0,5906	0,2254	0,6322
	2,0000	-0,6115		0,6115
	3,0000	-0,2802	0,5293	0,5988
	4,0000	-0,2802	-0,5293	0,5988
5	1,0000	0,4697	-0,3678	0,5966
	2,0000	0,4697	0,3678	0,5966
	3,0000	0,0909	0,5885	0,5955
	4,0000	0,0909	-0,5885	0,5955
6	1,0000	-0,4724	0,3256	0,5737
	2,0000	-0,4724	-0,3256	0,5737
	3,0000	0,3260	-0,4352	0,5437
	4,0000	0,3260	0,4352	0,5437

Note: Endogenous variables: *D_DIFF_SH_ECB_US D_CURR_BASIS_SWAP_100 D_CPI D_D10Y_US10Y D_LN_FX D_FX_GARCH*

Exogenous variables: *C DUMMY_IMF DUMMY_EU DUMMY_FX*

No root lies outside the unit circle.

VAR satisfies the stability condition.

Source: authors' calculation.

THE IMPACT OF E-HRM ON ORGANISATIONAL CITIZENSHIP BEHAVIOUR – A STUDY OUTLINED IN THE IT SECTOR

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Abstract

Technology acts as a gateway and has a significant role in shaping an organisation. It helps the workforce in organisations become more effective in their day-to-day work, which in turn helps the organisation achieve its productivity. In this research, the role of technology is linked to Electronic Human Resources Management (E-HRM). Along the similar lines, the concept of Organisational Citizenship Behaviour (OCB) relates to employees and their behaviour towards the organisation, which corresponds to the productivity of the employees from their job duties. The current research performed helps arrive at a conclusion about the relationship between E-HRM and OCB. The primary data collected was through a structured questionnaire, and we used a purposive sampling technique to analyse the results. 20 Information Technology (IT) organisations and 100 respondents participated in the research. A multiple regression test is used to predict the outcome of the research across all the dimensions of OCB and its relationship with E-HRM. The study revealed the behaviour patterns of employees while they are using technology at work. These findings are significant in nature as they help the top management of IT organisations evaluate the causes of employee behaviour towards technology.

Keywords: electronic human resources management, organisational citizenship behaviour, human resources, information technology, management

JEL classification: M5, M12, M15, M21

Introduction

The Human Resources Department (HRD) is known as the Central Processing Unit in an organisation. It is equally important to understand both the strengths and weaknesses of HRD in an organisation, and endeavour to improve the weaknesses. Only then will the organisation be able to achieve its goals. Technology in HRD has an important role, and its positive impact can upgrade HR processes and practices. When technology is combined with HR functions, it helps to create a positive work environment for the stakeholders. The term Organisational

Citizenship Behaviour has a vital role in connecting employee and employer for various HR-related matters (Organ, 1997).

The multi-national companies are spending large amounts of money in their line of business, and for them, it is important to achieve productivity and profitability from their investments. To achieve this goal, employees play a significant role. The behaviour and morale of employees are crucial to determining the performance of the business (Salanova & Schaufeli, 2008). By default, it is the wish of any organisation that their employees display organisational citizenship behaviour, but in practice, this is not completely possible to achieve (Wengrzyn, 2003).

In practice, every organisation tries to achieve so-called organisational behaviour which is required for developing a competitive advantage (Saifi & Shahzad, 2017). According to past studies, there is this tendency for employees to go the extra mile in their work, i.e. when it comes to performing a job. So on the one hand, the employees not only tend to do their regular work but they also try to contribute extra efforts to their job. This indicates the kind of trust the employee gets from the organisation and this type of behaviour developed by the employee reflects their hope that the organisation will take care of them as long as they work hard and contribute to the success of the organisation (Dirks & Ferrin, 2000).

On the other hand, the role of the manager is increasingly challenging due to business dynamics and employee behaviour and expectations. More often than not, the manager struggles to find a proper solution to behaviour related issues with employees (Michel, Newness, & Duniewicz, 2016). With the globalisation of businesses and employees working from various parts of the world, it is a challenge for the organisation to manage both business and its workforce, bring them together and achieve their goals. Organisations tend to look for different ways of operating their business for the best possible outcome. One of the key factors is organisational citizenship behaviour as a capable element to improve the performance of the organisation (Yang, Simon, Wang, & Zheng, 2016).

There is a lack of research to demonstrate the key relationship between E-HRM and OCB, and to be precise, this shortage is observed in the field of the IT sector in Bangalore, India. This study was conducted to address this gap. Social Exchange Theory and the Technology Acceptance Model were used to showcase the relationship between OCB and E-HRM. It is evident that the city of Bangalore has an ample number of IT companies and well-trained IT professionals working at various job levels. The success of these organisations comes from their business model as well as the effort of their employees. It is a known fact that employees in the IT sector are known to be technology savvy. However, what is unknown is to what extent an IT organisation is applying technology in the day-to-day operations and where all the technology is applied. Furthermore, when the technology is applied, what overall outcome is achieved, and how well we understand the overall behaviour of the employees towards the technology and its application. These are all the known and unknown key factors needed to conduct the research.

Theoretical framework

Electronic human resources management (E-HRM)

E-HRM is a technological concept that helps to implement HR strategies and practices in organisations by using web-based technologies (Ruel et al., 2004). The other definitions for E-

HRM were more inclined towards technology and organisational situations by categorising the phases into planning, implementation and applying the information technology while connecting at least two individuals in a shared services environment that involves HR activities (Strohmeier, 2007).

It was stated by Marler (2009) that the strategy of E-HRM contributed primarily to three parameters: saving cost, strategic alignment, and resource building. Whereas it was stated by Grant & Newell (2013), the concept of E-HRM revealed a platform of Human Resources Information System (HRIS) that helped the employees in an organisation use various employee-related data and administer these data by the HR professionals. Here, the employees could generate and access their own data in terms of personal information, skills, managing their time off, and attendance. In addition to this, the managers would have access to review the data of their team members.

Organisational citizenship behaviour (OCB)

The concept of Organisational Citizenship Behaviour (OCB) has been explored and researched by scholars over the past two decades. This area of research remains of special interest to the researchers. OCB corresponds to the known behaviour showcased by the employees while in the organisation (S Tambe, 2014). This paper is an effort to understand the meaning, nature, and scope of OCB, and it attempts to study the various dimensions of OCB. There is a detailed discussion of the five dimensions of OCB given by Organ (1988), and the paper makes reference to other dimensions of OCB given by various scholars from time to time.

The concept of Organisational Citizenship Behaviour has shown a tremendous increase in productivity, efficiency, and customer satisfaction, which in turn has shown motivation among employees at their workplaces in the form of reduced absenteeism and increased productivity (Podsakoff, Whiting, Podsakoff & Blume, 2009).

E-HRM and OCB relationship

The relationship between the application of E-HRM and, correspondingly, the way it affects the concepts of OCB has been defined by a few studies conducted across the globe. There seems to be a gradual development when it comes to adopting the practices of human resources management combined with OCB (Valeau & Paille, 2017). According to the Social Exchange Theory, the concept of Human Resources Management (HRM) practices can result in the ultimate satisfaction of the employees, and their contribution becomes more productive (H. He, 2014). The scope of social exchange theory is to evaluate the output of the HRM practices adopted by organisations by asking the employees about their inputs on the HRM practices adopted by their organisations (Ko & Hur, 2014).

Conceptual framework of the study

Employee needs in organisations can be beyond any limits, i.e. they can be categorised as unlimited needs and expectations from their employer. As stated by Homans (1961) with the amicable persistence of the transactional mindset, there is this tendency that if the employer can satisfy the employee's needs, then correspondingly, it is expected that the employee's

performance at the workplace gets better. Congruently, it was stated by J.A. Forson (2021) that the organisation can attain its goals by virtue of keeping employee motivated and their morale up. The concept of the Technological Acceptance Model (TAM) (Venkatesh & Bala, 2008) was used to develop the model of framework for the study that was conducted.

Problem statement

Based on the various inputs obtained from a theoretical perspective regarding the relationship between E-HRM and OCB and its assessment towards the employees in the organisations, it is becoming evident that the relationship between E-HRM and OCB is significant. The Information Technology sector is always booming, and as the advancement of technology persists, the number of challenges increases from an organisational standpoint. One of the core challenges is employee welfare. An unhappy employee will surely leave the job and the organisation for better prospects elsewhere. The employees who are leaving resemble the slowdown in the organisation growth. It takes an ample number of days, or at times months, to fulfil a particular skill of an employee who is expected to leave versus an employee expected to fill the leaver's position in an organisation. This is by no means a hurdle. It is important to analyse the mindset of the employees while implementing changes in the organisation.

Any strategic move by the organisation needs to be dealt with cautiously. The introduction of technology and its application is a prime example of how it can make or break employees' attitudes and behaviours towards the organisation. This reflects a change in Organisational Citizenship Behaviour from an employee's perspective towards their organisation. To address the issue of employees and organisational behaviour, in this study, we were trying to evaluate E-HRM practices adopted in the IT companies in the city of Bangalore. This was followed by an evaluation of employee behaviour towards technology. After analysing the literature review and various factors in reference to this area of research and domain, the attitude of the employees towards technology, and to be specific, the use of E-HRM and the behaviour aspect of employees, was found to be a novel concept that was not researched neither in the information technology organisations nor in the city of Bangalore.

Research methodology

The objective of the study was to assess the OCB dimensions and combine them with the concepts of E-HRM to understand the behaviour of employees towards technology adoption and change management in information technology (IT) organisations.

The research was categorised as relational E-HRM wherein a hypothetical scenario between two modules was created and compared. The relationship was created and developed as per guidelines of previous research conducted in different environments using a similar topology. A purposeful sampling technique was used to collect the data. The reason for using purposive sampling is based on the user experience of the E-HRM tool in organisations. It is important to know the amount of hands-on experience a user has with reference to the application and adoption of E-HRM in organisations.

The structural constructs were measured by keeping in mind the past research conducted in this field and its attributes. A 5-point Likert scale was used to measure the OCB dimensions in the form of altruism, conscientiousness, courtesy, civic virtue and sportsmanship.

The E-HRM modules used for testing the sequences were in the lines of E-Recruitment, E-Performance and E-Separation. The dependent variable was OCB, and its concept was explained as stated by Podsakoff et al. (1990).

The concept of E-HRM relates to the modalities of technology. When it comes to the modality, it refers to the application of E-HRM tools in organisations. In this case, the study was performed in an IT business that is based outside the city of Bangalore. Inferring from the technology aspect and its presence, the study adopted the TAM 3 (Technological Acceptance Model) (Venkatesh & Bala, 2008).

The given theory explicitly talks about the various processes and procedures involved in adopting technology and innovation. It further explains that it is up to the organisation and its people to decide what is good and useful for employee and organisational needs.

The decision makers in the organisation should know how to effectively implement any new technology at the workplace by buttressing the challenges. The decision makers should know what all the areas are to expedite the adoption of technology in the organisation to become more agile and productive.

A centralised system with the application of technology and its advancement can bring the people and processes of the organisation together on a single platform. However, it is equally important to evaluate the pulse of the employees towards the introduction of technology at the workplace.

Employees are the biggest strength of the organisation (Peters & Waterman, 1982). It is the responsibility of the management and the organisation to ensure that the morale and motivation of the employees are not affected due to the introduction of E-HRM (Mohamad & Ramayah, 2011; Mohd, Ramayah, & Ibrahim, 2010).

Hence, the hypothesis can be defined as:

H01: There is a significant impact on the attitude and the aspects among employees that construe OCB while using the E-HRM system at the workplace.

Data collection and interpretation

The research was conducted in the information technology sector and targeted Bangalore as a location. The number of people selected for this survey was eighty IT professionals working in the capacities of Software Engineers, Senior Software Engineers, Managers and Directors. The distribution of the employees is as shown in Table 1. The questionnaire was developed using OCB measurement in various studies (Podsakoff, MacKenzie & Bommer, 1996; Van Dyne et al., 1994). The Cronbach alpha of the questionnaire was found to be 0.87.

Table 1 indicates the type of respondents required to conduct the survey and reach a conclusion about the various behaviour-related patterns among employees in organisations that are predominantly in the information technology sector.

It is significant to select more employees in the Engineer and Senior Engineer categories as they are the end-users of the E-HRM system (referred to as operational activities). Employees at the Director- and Managerial levels were using the E-HRM system to review and approve employee-related work functions (referred to as strategic activities). They were also classified as the end-users.

However, the employees in Engineer and Senior Engineer roles were involved in performing day-to-day tasks that were classified as operational activities. To gauge the actual efficiency of the E-HRM system, the operational tasks were especially relevant, but both the operational and strategic were of equal importance. Operational E-HRM practices drove the efficiency of the organisation by streamlining HR activities (Lepak & Snell, 1998; Parry, 2011).

Table 1: Classification of respondents in reference to the job level

		Number of Software Professionals
Classification of Software Professionals	Engineers	40
	Senior Engineers	40
	Managers	10
	Directors	10

Source: authors' research.

Table 2 shows the years of work experience of the software professionals against the research respondents with different job roles. It was important to have some experience within or background in E-HRM from the respondent's point of view. This helped to add a maturity level to the recorded responses.

Table 2: Classification of the respondents in reference to the job role and years of experience

		Years of Experience
Job Role	Engineers	1 to 3 years
	Senior Engineers	3+ to 7 years
	Managers	7+ to 12 years
	Directors	12+ years

Source: authors' research.

Table 3 represents the research categorisation of respondents by gender and their level of education. From a gender perspective, more female respondents were actively participating in the survey compared to their male counterparts.

From the educational background of the respondents, the majority were people with engineering degrees, either holding bachelor's or relevant master's degrees. There were responses from people at the entry level of the career with the minimum qualification of a diploma in engineering. Some had the highest level of education in the field of engineering, which is the doctorate degree.

Table 3: Classification of respondents in reference to Gender and Education
Gender-wise summary and distribution

	Gender	Frequency	Percentage %
Demography	Male	33	41.25
	Female	47	58.75

Education-wise summary and distribution

	Qualification	Frequency	Percentage %
Demography	Diploma	8	10.00
	Bachelors	39	48.75
	Masters	27	33.75
	Doctorate	6	7.50

Source: authors' research.

Table 4 shows the correlation between the OCB dimensions in the form of Altruism, Conscientiousness, Curtesy, Civic Virtue and Sportsmanship.

A multiple linear regression test was used to predict the output of the hypothesis across all the five given dimensions of the OCB, which are mentioned in Table 5. The correlation was calculated by keeping all five dimensions in order. Here, the p-value is greater than 0.01 across all five dimensions of OCB, which are Altruism, Conscientiousness, Courtesy, Civic virtue, and Sportsmanship.

As a result of the above analysis, it can be interpreted that the presence of E-HRM in the workplace makes a major contribution to the mindset and related behaviour of the employees in an organisation.

Table 4: Correlation between the OCB dimensions

Dimensions	M	SD	AL	CS	CT	CV	SM
Altruism	4.54	1.22	.77				
Conscientiousness	5.89	0.89		.63			
Courtesy	5.23	1.11			.78		
Civic virtue	4.95	0.79				.75	
Sportsmanship	4.61	1.23					.86

AL = Altruism, CS = Conscientious, CT = Courtesy, CV = Civic Virtue, SM = Sportsmanship
Source: authors' research.

Table 5 shows the regression analysis performance to predict the hypothesis status. Here, the regression equation is insignificant, resulting in a p value greater than 0.01. It indicates that the null hypothesis (H0) is a workaround, and it is within acceptable limits.

Table 5: Regression analysis to predict the output of the hypothesis

Dependent Variable	Altruism	Conscientiousness	Courtesy	Civic Virtue	Sportsmanship
r ²	0.21	0.79	0.8	0.12	0.7
F	3.39	2.55	1.39	2.33	2.56

Note: The regression equation is insignificant (F value = 3.39, adjusted r² = 0.21; altruism, F value = 2.55, adjusted r² = 0.79; conscientious, F value = 1.39, adjusted r² = 0.8; courtesy, F value = 2.33, adjusted r² = 0.12; civic virtue, F value = 2.56, adjusted r² = 0.7; sportsmanship). The p value is greater than 0.01.

Source: authors' research.

Discussion

Comparing the various levels of inferences obtained during and after the study, it is of utmost importance to mention that it is the top management in the organisation that helps to make or break a decision (M. Aboramadan, 2020). The decisions taken by the top management can influence the organisation and its people in both a constructive and destructive manner. It is important for people holding key positions in organisations to behave as mature citizens of the organisation, especially when it comes to decision making (Nielsen, 2010).

In a similar way, it is the duty of the organisation to evaluate the capability of the people in decision-making roles and present them with frequent challenges in order to review their activity. According to the Upper Echelon Theory (Hambrick and Mason, 1984), the different characteristics shown by people in the job role can be one way to influence the management to make decisions.

These decisions can be linked to the education, experience and age of the employees, which in turn affect the organisational performance and metrics. On the one hand, the organisation must know that its employees are always going to be its key strength. It is equally important that the morale and motivation of the employees are boosted during any ups and downs in the business. The organisation should assess its key stakeholders in the decision-making role to ensure that any wrongdoing does not affect its employees and business functions.

On the other hand, the employees are the soft targets of any change that the management introduces. The employees should know how to address the issues they face at the workplace. However, it is equally important for employees to remain mature and possess the required patience while handling the issues faced at the workplace through a proper channel of communication. The retaliation from employees can interrupt the workplace operation, with the possibility of even closing the organisation. This could lead to further job losses and potentially cause physical and mental stress.

The role of technology has made a major contribution. The presence of technology can bring about the changes desired by management and the organisation. It is important to apply the technology in the organisation for better cause and reasoning. The introduction of technology in the work processes can bring discord among the employees and the organisation, as it can potentially create more job losses due to employees' workload being taken over by the application of technology.

The present research elaborates on the type of relationship between E-HRM and OCB, and the ways in which the presence of technology can influence the behaviour patterns of employees in the organisation at various levels. The outcome of the research shows a positive correlation between the various HR functions that are linked to the technological platform E-HRM. The statistical tools used have shown adequate relevance and contribution to the research. The result of the study has supported the findings and relationship between OCB and E-HRM. The results obtained shed light on innovation in analysis of the behaviour of employees and their perceptions of technology as well as its application in organisations.

Conclusion

The study focused explicitly on the employee behaviour towards the technology and all the internal and external factors responsible for such behaviour. The results obtained from the analysis of the research provide an overall impact on organisational behaviour with reference to the technology, which in this case is E-HRM. It is evident from various past studies on electronic human resources management and organisational development that employees are the key strength of the organisation. Without proper nurturing and growth plan for the employees, the success of the organisation is in vain. Along the similar lines, it is important for an organisation's point of view to sustain their line of business. This is only possible when they have a well-defined system or process to drive their business (Dubey & Ali, 2011). In general, the organisation should be more process-driven than people-driven. One of the organisation-wide process initiatives is E-HRM, which helps to drive people-related matters in the organisation and analyse the behaviour patterns of the organisation and its employees.

Implication and limitations of the study

The study is expected to help the top management in organisations evaluate the root cause of employee attitude and behaviour towards technology, which in this case is E-HRM. It will also help them plan the future scope of their business as well as strategise the overall organisational behaviour towards E-HRM. From a theory point of view, this study encompassed the various points covered under the umbrella of E-HRM and OCB through a review of the literature. Further inputs received from the research performed in the IT sector outside the city of Bangalore have the required potential to supplement the literature contents.

The area of the study is limited to the city of Bangalore and inclined towards the information technology sector. This may simplify the results obtained and restrict them to a specific geography and industry. A detailed and diversified approach can quantify the obtained results towards a better understanding of the application of E-HRM tools and how they affect the overall culture and behaviour of the organisation.

Future research directions

The research was conducted within the information technology sector and the city of Bangalore in India. However, in order to attain similar viewpoints and conclusive evidence, future research can be conducted and executed in other parts of the cities in India as well as in any other

locations. Considering the enhancement of the global job market and the widespread use of information technology, which is not just the expansion of global business but also a hub for creating jobs for people, the research can be further explored in the information technology sectors and based in various countries. The exploration of research in other business sectors is another possibility that can be explored and executed.

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CLUSTER ANALYSIS OF THE EU MEMBER STATES ACCORDING TO ECONOMIC FREEDOM INDICES, CORRUPTION, AND INCOME INEQUALITY

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Abstract

Aim of the paper is classification of the EU countries according to differences in their income inequality, economic freedom indices (tax burden and government spending) and corruption perception. Previous studies show that the EU member states differ significantly in their perception of corruption. Thus, the goals of this research also include disclosure and explanation of the causes of income inequality among the EU member states, as well as evaluation of the influence of tax burden, government spending and corruption perception on income inequality. The empirical analysis consists of two parts. Firstly, the Ward's method with squared Euclidean distances was performed and five clusters were chosen by the dendrogram and intuitive interpretation. Secondly, the non-hierarchical cluster analysis was performed using the k-means method. The five clusters chosen by the Ward's method were used as the initial number of clusters in the k-means method. Cluster analysis endorsed the notion that clusters which consist of highly developed European Union member states have lower corruption perception which is related to lower income inequality. Baltic-Eastern Balkans cluster showed notably high corruption perception and high income inequality, and the Mediterranean cluster has slightly lower corruption perception and faintly lower income inequality. The cluster which consists of post-transition countries and Cyprus showed surprising results, where corruption perception is relatively high and income inequality being noticeably low. The fiscal policy indicators, namely tax burden and government spending, confirmed the assumption that higher tax burden is mostly related to higher income inequality, as well as higher government spending leads to lower income inequality, because of the social protection policies which are paid by the government. Cluster analysis endorsed the notion that clusters which consist of highly developed EU member states have lower corruption perception which is related to lower income inequality. Baltic-Eastern Balkans cluster showed notably high corruption perception and high income inequality, where the Mediterranean cluster has slightly lower corruption perception and lower income inequality.

Keywords: cluster analysis, economic freedom indices, income inequality, corruption perception, tax burden

JEL classification: C38, O15

Introduction

Income inequality has been one of the problems at the centre of economic science for decades. At the global level, but also at the EU level, income inequality has increased in the period after the last financial crisis, as well as the COVID-19 pandemic. However, it is difficult to find which factors influence increase, or what could effectively reduce them.

Furthermore, there is a constant question on the significance of income inequality and its influence on the economy. According to Krueger (2012), social mobility is lower in societies with greater levels of income inequality. Therefore, people in post-industrial democracies with lower levels of income inequality have larger capacity to advance in comparison to societies with lower social mobility. As a result, the current generation's inequality will be passed down to the following one, and chances for increasing social advancement will also be reduced (Greenstone et al., 2013).

Numerous authors have been focused on inequality in wage distribution (e.g. Milanovic, 1999 and Obadić et al., 2014) and concluded that this can be one of the reasons for increase in inequality. In this research, political, sociological, and economic factors that affect income inequality will be investigated. Therefore, the EU member states will be clustered according to the index of economic freedom, the corruption perception index, but also government spending and tax burden will be considered.

Index of economic freedom was considered because the indicators calculated in the respective indices could be valuable for testing the relation to corruption perception and income inequality, and there is a research gap in the mentioned topic. The level of corruption can affect income inequality which is a well-known fact, and the EU member states with higher level of corruption also have bigger inequality issues (Batabyal and Chowdhury, 2015; Nguyen et al., 2020; Aktaş, 2022). On the other hand, bigger government spending or public consumption, of course if this consumption is productive, such as investments in education or welfare can reduce income inequality (Anderson et al., 2017; Sanchez and Perez-Corral, 2018). The role of tax policy in reducing income inequality is not easy to prove, but in general if the progressive taxation is applied in the personal income tax system in appropriate way it can reduce income inequalities.

The paper is structured as follows. Section 2 summarizes the existent literature on the determinants of inequality, which are then used in the empirical research. Section 3 considers the data set and explains the applied methodology. Section 4 presents the results. Section 5 summarizes the findings and gives some concluding recommendations.

Literature review

Taxation can have different implications on income inequality, but most often has a negative impact. Depending on the structure of the observed tax system, taxation policy can be more progressive, which means that the population with higher income will carry the larger amount of tax burden, or less progressive (frequently named “regressive”), which implies that the population with the lowest income heavily bear the tax burden. Thoresen (2004) measured the reduction of tax progressivity in Norway in the 1990s, which consequently increased income inequality. On the other hand, Žarković Rakić and Vladislavljević (2021) analysed the redistributive effects of establishing progressive tax systems in former Yugoslav countries and data for 2017, where they found that Slovenia achieved larger decrease in inequality due to

higher tax burden on the top income population.

Government spending, which is the second aspect of fiscal policy that is analysed in this paper, has a significant impact on reducing income inequality by providing social benefits to households which struggle with earning income (e.g. Wang et al., 2012 and Caminada et al., 2018). Analysis performed by Anderson et al. (2017) identified 84 separate studies containing numerous estimates of the effect of one or more measures of spending on one or more measures of income inequality. Their results showed a negative relationship between government spending and income inequality, which is most significant for social welfare and similar types of social spending. Similarly, Sanchez and Perez-Corral (2018) analysed the relationship between public social expenditure and income inequality distribution in the 28 EU member states throughout the period 2005-2014 by using dynamic panel models. The correlation between public social spending and income inequality was negative.

Corruption is a phenomenon which is present in every country, to the lesser or greater extent. It implies a misuse of entrusted power for personal benefit. It diminishes the institutional foundations of good governance, which are necessary for sustained growth and development, and it challenges the rule of law. The poor are frequently those in society who are most negatively impacted by corruption. Batabyal and Chowdhury (2015) found that the high level of corruption in the Commonwealth countries is closely connected to greater income inequality. Similar results can be found in other world regions. The research conducted in Vietnamese provinces by Nguyen et al. (2020) showed a strong relationship: greater level of corruption increased regional income differences and income inequality. In addition, their results also suggested that an increase in per capita income will reduce the level of corruption. Greater level of corruption can also impede income inequality-social transfers nexus, as the empirical research showed that in the greater presence of corruption, there is an inverse relationship between social transfers and income inequality (Aktaş, 2022). It is clear how the literature demonstrates that corruption impedes economic growth and increases income inequality.

Several papers analysed the relation between income inequality and other macroeconomic variables using cluster analysis. Ekici (2022) found that the Gini coefficient and the composition of a country's tax revenues are related, and that income inequality is lower in countries with a higher income tax relative to those with a higher tax on goods and services, while income inequality is higher in those with a higher tax on goods and services. The social spending and income inequality relation is, as previously mentioned, significant in every democratic country. Therefore, Šimurina et al. (2017) performed both hierarchical and non-hierarchical cluster analysis to identify the social spending-income inequality nexus in the Central and Eastern European (CEE) post-transition countries of the EU, while also analysing unemployment rate and internet use. The similar cluster structure was found for the observed countries both with and without internet use included in the model. Evidently, it is clear that cluster analysis can be convenient for explaining relations between various macroeconomic indicators.

Data set and methodology

The aim of this paper is to classify the EU member states in clusters and to analyse the connection between the variables which are used in the research. Since the theoretical framework suggests that these variables have a significant impact on each other and on the economy (Batabyal and Chowdhury, 2015; Sanchez and Perez-Corral, 2018; Nguyen et al.,

2020 & Aktaş, 2022), they are used in this cluster analysis to confirm the relation empirically. The following variables were used for the analysis: tax burden, government spending, corruption perception, and Gini coefficient of equalized disposable income – the EU-SILC survey. Tax burden and government spending are measured on a scale between 0 and 100, where a higher value means higher tax burden and higher government spending. Corruption perception is measured by the Corruption perception index, which is also measured on a scale between 0 and 100, where a higher index means lower corruption perception (less corrupt countries have a higher index). The Gini coefficient is used as the measure for income inequality, which is measurable on a scale between 0 and 100, where 0 means maximum equality and 100 means maximum inequality. Data for tax burden and government spending are collected from the *Index of Economic Freedom*, corruption perception data is acquired from *Corruption Perceptions Index*, and Gini coefficient data is collected from the *Eurostat* database. All the data refer to the year 2021.

Cluster analysis is used for grouping similar research objects into homogenous clusters. There are various methods that can be used for this type of multivariate analysis and also numerous distant measures, where Euclidean and squared Euclidean distances are most commonly used. Before choosing the adequate method for the research, it is suggested to use different methods and distance measures then compare the obtained results and choose the best clustering solution (Hair, 2018).

Firstly, hierarchical cluster analysis was performed on all the variables, to identify homogenous groups within the EU member states. For this purpose, the Ward's method with squared Euclidean distances is used. Afterwards, the k-means method is used to perform the non-hierarchical cluster analysis. In this part of the empirical research, members of each cluster are defined, analysis of variance is conducted, and the graph of means is discussed. Lastly, discriminant analysis was performed to discuss the classification matrix, which suggests if the cluster analysis is made correctly, and validates the conducted research.

The variables used in this paper have different measurement units, which requires standardization of the data because cluster analysis is based on distance measures. The standardized values for all the variables are used in further analysis.

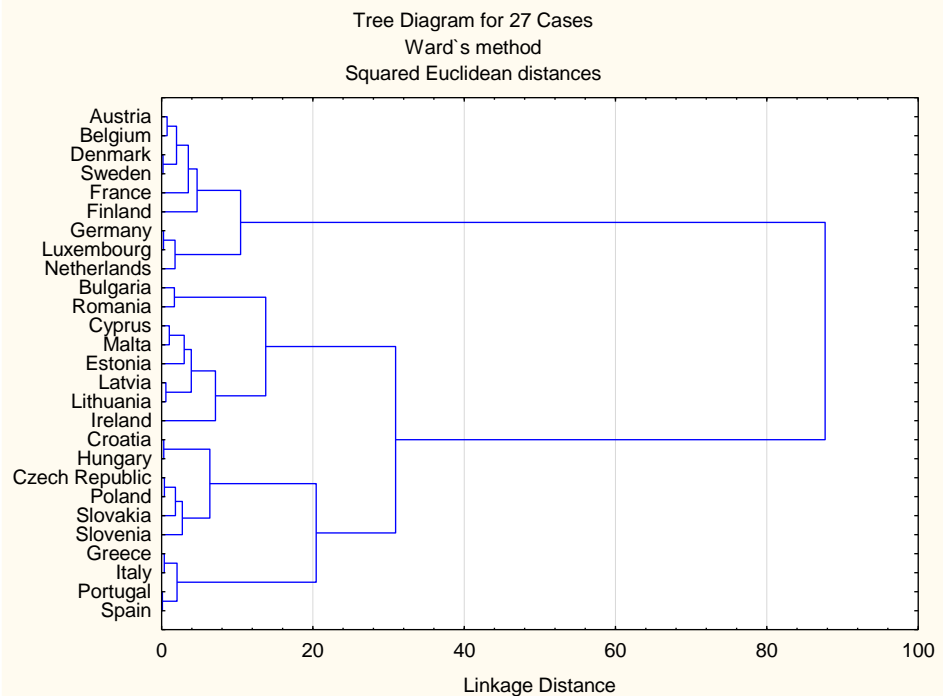
Results

Before performing the cluster analysis, the presence of multicollinearity was tested. If multicollinearity is present, the results of the cluster analysis could be questionable. The indicator of multicollinearity which is used in this paper is the variance inflation factor (VIF). For the absence of multicollinearity, the VIF value should be smaller than 5 for all the variables (Hair, 2018). All the VIF values for the variables used in this research are below 5, therefore there was no issue of multicollinearity.

Hierarchical cluster analysis is first used, and after using different methods and distance measures, the Ward's method with squared Euclidean distances is chosen for the analysis. The analysis of the dendrogram obtained by Ward's method shown in Figure 1, indicates a few possible clustering solutions: from two to five clusters. Based on the cluster structure, a solution with five clusters was chosen: first "highly developed EU member states" cluster (which includes Austria, Belgium, Denmark, Finland, France, and Sweden), second "Baltic-Eastern Balkans" cluster (which includes Bulgaria, Latvia, Lithuania, and Romania), third

“Mediterranean” cluster (which includes Greece, Italy, Malta, Portugal, and Spain), fourth “post-transition countries and Cyprus” cluster (which includes Croatia, Cyprus, the Czech Republic, Hungary, Poland, Slovakia, and Slovenia), and fifth “mixed” cluster (which includes Estonia, Germany, Ireland, Luxembourg, and the Netherlands).

Figure 1: Results of hierarchical cluster analysis – dendrogram



Source: the authors according to <https://www.heritage.org/index/explore?view=by-region-country-year&u=638124020791612779>, <https://www.transparency.org/en/cpi/2021>, https://ec.europa.eu/eurostat/databrowser/view/ilc_di12/default/table?lang=en.

Secondly, the non-hierarchical cluster analysis was performed using the k-means method. The five clusters obtained by Ward’s method was used as the initial number of clusters in the k-means method. The structure of the clusters and the associated distances are shown in Table 1. It is visible that the observed countries belong to the correct clusters, which is shown by the associated distances of each country. Therefore, the composition of all clusters is identical and it can be concluded that non-hierarchical analysis based on the k-means method confirmed the results obtained by hierarchical analysis using Ward's method.

Table 1: Results of non-hierarchical cluster analysis using the k-means method – clusters and distances

Clusters	Countries	Distances
1 st Cluster (6 countries) “Highly developed EU member states” cluster	Austria	0.352477
	Belgium	0.393210
	Denmark	0.360198
	Finland	0.699313
	France	0.590269
	Sweden	0.381012
2 nd Cluster (4 countries) “Baltics-Eastern Balkans” cluster	Bulgaria	0.566139
	Latvia	0.483007
	Lithuania	0.355326
	Romania	0.422013

Clusters	Countries	Distances
3 rd Cluster (5 countries) “Mediterranean” cluster	Greece	0.361908
	Italy	0.418293
	Malta	0.587556
	Portugal	0.211001
	Spain	0.225458
4 th Cluster (7 countries) “Post-transition countries and Cyprus” cluster	Croatia	0.489277
	Cyprus	0.475304
	Czech Republic	0.270162
	Hungary	0.518600
	Poland	0.216275
	Slovakia	0.598893
	Slovenia	0.713417
5 th Cluster (5 countries) “Mixed” cluster	Estonia	0.538531
	Germany	0.502381
	Ireland	0.883923
	Luxembourg	0.276439
	Netherlands	0.614917

Source: the authors according to <https://www.heritage.org/index/explore?view=by-region-country-year&u=638124020791612779>, <https://www.transparency.org/en/cpi/2021>, https://ec.europa.eu/eurostat/databrowser/view/ilc_di12/default/table?lang=en.

Table 2 contains the analysis of variance, additional non-hierarchical cluster analysis results. The *F* value indicates which variables contribute the most to the separation among objects, i.e. EU member states. The variable *corruption perception* with an *F* value of 26.55 contributes the most to the separation between the member states, followed by the *Gini* variable with an *F* value of 17.89.

Table 2: Results of non-hierarchical cluster analysis using the k-means method – analysis of variance

Variable	Between SS	df	Within SS	df	F	signif. p
Tax burden	18.42602	4	7.573980	22	13.38043	0.000011
Government spending	18.16489	4	7.835106	22	12.75119	0.000016
Corruption perception	21.53867	4	4.461329	22	26.55323	0.000000
Gini	19.88709	4	6.112907	22	17.89312	0.000001

Source: the authors according to <https://www.heritage.org/index/explore?view=by-region-country-year&u=638124020791612779>, <https://www.transparency.org/en/cpi/2021>, https://ec.europa.eu/eurostat/databrowser/view/ilc_di12/default/table?lang=en.

The final component of the k-means method conducted in this research is the plot of means shown in Figure 2. The plot of means is used to portray the mean standardized values for all the variables which are used in the model.

In the first “highly developed EU member states” cluster which consists of Austria, Belgium, Denmark, Finland, France and Sweden, it is visible that variables *tax burden* and *government spending* are considerably below average, *corruption perception* index is the highest in comparison to other clusters, which makes corruption perception lower (higher corruption perception index = lower corruption perception), and variable *Gini* is below the average, which means that these countries are characterized by relatively low income inequality.

The second “Baltic-Eastern Balkans” cluster which includes Bulgaria, Latvia, Lithuania and Romania, shows the opposite results in comparison to the first cluster. *Tax burden* and

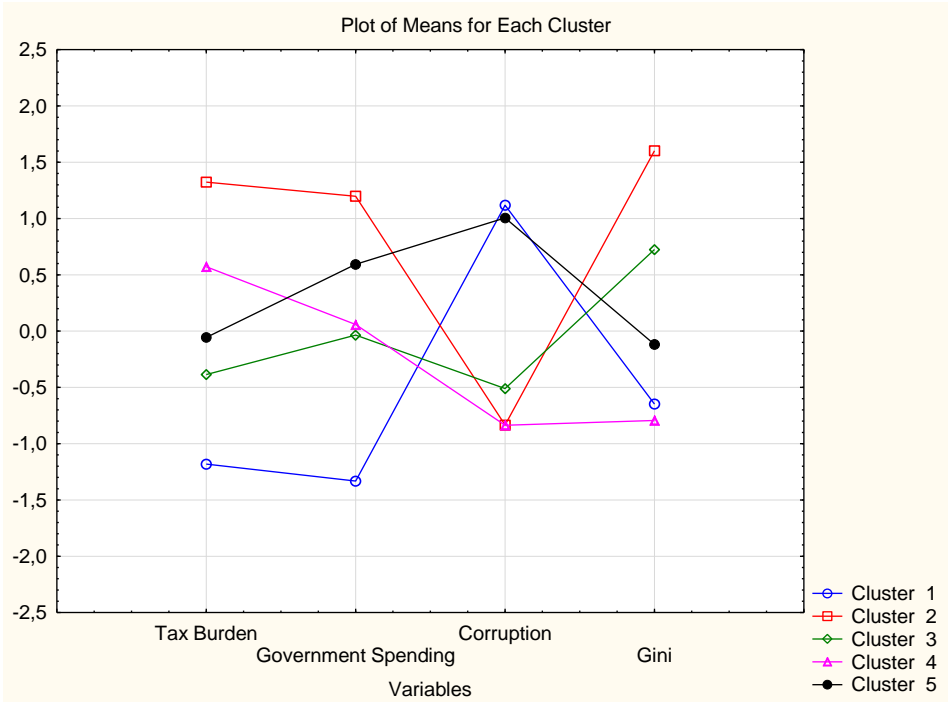
government spending variables are notably high, with low corruption perception index (high corruption perception) and the variable Gini is the highest in this cluster. Corruption perception index of 42 for Bulgaria is the lowest of all the analysed countries. It can therefore be observed that high tax burden and high corruption perception are related to high income inequality.

In the third “Mediterranean” cluster where Greece, Italy, Malta, Portugal and Spain are, variables tax burden and government spending are near the average, corruption perception index is below the average, and the variable Gini is above the average. This shows that Mediterranean member states have similar structure of the observed variables.

The fourth “post-transition countries and Cyprus” cluster consists of Croatia, Cyprus, the Czech Republic, Hungary, Poland, Slovakia and Slovenia. In this cluster, which consists of post-transition countries and Cyprus as a Mediterranean country it is visible that the corruption perception index is considerably high, and the variable Gini is the lowest in comparison to other clusters. This is unusual relation of these variables, which can be explained by the post-transition system of these countries and their active and successful social policies. Cyprus is clustered with the post-transition countries mostly because of the similar corruption perception and Gini coefficient.

In the fifth “mixed” cluster with the remaining 5 countries (Estonia, Germany, Ireland, Luxembourg, and the Netherlands) the values for the variables government spending and corruption perception index are above the average, with variable Gini below the average. This confirms the relation between higher government spending and lower corruption perception on one side, and lower income inequality on the other side.

Figure 2: Results of non-hierarchical cluster analysis using the k-means method – plot of means



Source: the authors according to <https://www.heritage.org/index/explore?view=by-region-country-year&u=638124020791612779>, <https://www.transparency.org/en/cpi/2021>, https://ec.europa.eu/eurostat/databrowser/view/ilc_di12/default/table?lang=en.

Finally, discriminant analysis was performed to validate the results of the cluster analysis. For this purpose, in Table 3 the classification matrix shows percentage of correctly classified objects. It is clear that all the objects, i.e. EU member states were classified adequately in the cluster analysis.

Table 3: Results of discriminant analysis – classification matrix

Group	Percent correct	G_1:1 p=,22222	G_2:2 p=,14815	G_3:3 p=,18519	G_4:4 p=,25926	G_5:5 p=,18519
G_1:1	100,00	6	0	0	0	0
G_2:2	100,00	0	4	0	0	0
G_3:3	100,00	0	0	5	0	0
G_4:4	100,00	0	0	0	7	0
G_5:5	100,00	0	0	0	0	5
Total	100,00	6	4	5	7	5

Source: the authors according to <https://www.heritage.org/index/explore?view=by-region-country-year&u=638124020791612779>, <https://www.transparency.org/en/cpi/2021>, https://ec.europa.eu/eurostat/databrowser/view/ilc_di12/default/table?lang=en.

Conclusion

In this paper the EU member states are classified according to differences in their fiscal policies, corruption perception and income inequality. Also, it is analysed how those indicators are related to each other and which country-specific factors led to the current state of the researched indicators. Cluster analysis endorsed the notion that clusters which consist of highly developed EU member states have lower corruption perception which is related to lower income inequality. Baltic-Eastern Balkans cluster showed notably high corruption perception and high income inequality, where the Mediterranean cluster has slightly lower corruption perception and lower income inequality. The cluster which consists of post-transition countries and Cyprus showed surprising results, where corruption perception is relatively high and income inequality being noticeably low. The fiscal policy indicators - tax burden and government spending, confirmed the assumption that higher tax burden is mostly related to higher income inequality, as well as that higher government spending leads to lower income inequality, because of the government's social policy which is mitigating the problem of income inequality.

Corruption perception mostly contributed to the separation into clusters, with Baltic-Eastern Balkans cluster having the lowest value of the corruption perception index. Both clusters which consist of highly developed countries have, on the other hand, the highest values of the corruption perception index, making them the least corrupt in the analysis. The Gini coefficient also strongly contributed to the separation into clusters. The highly developed countries clusters and the cluster which consists of post-transition countries and Cyprus showed below average income inequality, while Baltic-Eastern Balkans and Mediterranean clusters have income inequality above average.

The research discussed in this paper combined fiscal aspects, corruption and income inequality, which filled the gap in the existing literature, especially by using multivariate statistical analysis to empirically test the theoretical framework. The main limitation of this paper is the fixed time point which is analysed, therefore in the future research it is suggested to compare different time points. Also, the indices for the year 2021 were relatively volatile because of the various government programs which are introduced for economic boost of the EU countries in the COVID-19 crisis. Cluster analysis performed in this paper can be a starting point for further

research which is dealing with the phenomenon of income inequality. It would be adequate to investigate other world regions which also have significant economic and social issues that are closely related to this research.

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CHANGES IN TOURISM ACCOMMODATION FACILITIES IN THE LOWER SILESIA REGION AFTER POLAND'S ACCESSION TO THE EUROPEAN UNION

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Abstract

The study aims to illustrate post-accession to the European Union temporal and spatial regularities in the use of accommodation facilities in a Polish province of Lower Silesia. For this purpose, the data of the Statistics Poland office (GUS) for the years 2004-2021 were used. Among the analysed factors there were: the number and structure of accommodation facilities, the use of beds by structure of facilities, including domestic and foreign tourists, as well as the number of overnight stays. The research method was statistical analysis, and the research results were illustrated with charts and tables. After joining the European Union, new opportunities appeared for the development of the tourist base in Poland and Lower Silesia. This can be seen in the increase in the number of accommodation facilities and the changes in the structure of accommodation facilities. The changes are also related to economic, political and sporting events of the period in question. At present, in the structure of Lower Silesian tourism accommodation facilities, private accommodation, guest rooms and pensions play a significant role in addition to hotels while the number of facilities associated with the social tourism of the past regime has dropped significantly. Moreover, the use of accommodation facilities in Lower Silesia increased during the period in question and approached the average for Poland. Also, between 2004 and 2021, there were changes in the structure of foreign tourists by country of arrival. The undisputed leader in this aspect has been Germany, but the share of German tourists dropped with time and arrivals from new countries are noticeable, generating more and more tourist traffic to the Lower Silesian region.

Keywords: tourism accommodation base, Lower Silesia, accommodation facilities

JEL classification: R12, Z30, Z32, Y10

Introduction

The purpose of the study is to indicate temporal regularities in the use and the number of accommodation facilities in Lower Silesia after Poland's accession to the European Union. The authors posed several research questions, regarding: (1) changes over time in the number and structure of collective accommodation facilities in Lower Silesia after joining the EU; changes

in the use of collective accommodation facilities; (2) changes in the number of foreign tourists using collective accommodation facilities; and (3) an attempt to identify the factors affecting changes in the number and structure of collective accommodation facilities. The data of the Statistics Poland office (GUS) for the years 2004-2021 were used. The number and structure of accommodation facilities were analysed, alongside with the use of beds by structure of facilities with a division into domestic and foreign tourists, as well as the number of overnight stays. The study analysed collective accommodation facilities, i.e. those with at least 10 beds, including guest rooms and agritourism lodgings. That is, the analysed data do not cover all accommodation facilities in Lower Silesia, they do not include data on small facilities offering up to 10 beds. This approach is justified, and it results from the structure of accommodation facilities in Lower Silesia and the possibility of obtaining reliable and comparable data series, enabling the analysis of the phenomenon. The authors are aware of the imperfections of the adopted research convention, but the benefits at the level of preliminary analyses prevail. The presented analyses can certainly be extended in further stages of research.

The following paper used statistical analysis of time series and the research results were illustrated with charts and tables.

The following research questions were posed:

- are there visible changes over time regarding the number and structure of collective accommodation facilities in Lower Silesia after joining the EU (in the years 2004-2021)
- are there visible changes in the use of collective accommodation facilities in Lower Silesia after joining the EU (in the years 2004-2021)
- has the period of accession to the EU caused changes in the number of foreign tourists using collective accommodation facilities in Lower Silesia
- an attempt to identify the factors affecting changes in the number and structure of collective accommodation facilities in Lower Silesia after joining the EU (in the years 2004-2021).

The undertaken analyses are important for many reasons. Firstly, changes over time show trends, which is important from the point of view of analysing tourism in the region (tourist behaviour). This is the starting point for detailed segmentation of the tourist market, divided into domestic and foreign tourists. Secondly, changes over time in the number and structure of accommodation facilities are a basic element of the tourism competitiveness of regions. The accommodation base is the basic element of the region's tourist development, which is a prerequisite for the development of tourism in the region. Finally, knowledge of changes in accommodation over time facilitates tourism planning in the region in the context of matching tourism demand and supply.

Study background

Poland's accession to UE and its development

The collapse of communism in 1989, followed by the dissolution of the Soviet Union in December 1991, changed the political situation in Central and Eastern Europe. In Poland and other Eastern European countries, democratization of political systems and deep economic changes took place. In April 1994 the Polish government submitted a formal application for admission to the European Union. And as a result of long negotiations and ratification process Poland joined EU on the 1st of May 2004. After joining the EU, our borders opened up and

tourists no longer needed visas or passports to travel. In the immediate vicinity of our cross-border region there are attractive regions with well-developed tourism and accommodation facilities: the Czech Republic (Counties of Liberec, Hradec, Pardubice, Olomouc) and Germany (Saxony).

According to Polish Economic Institute (PIE) joining the European Union in 2004 gave Poland an unprecedented growth impetus. The country's accession to the EU and, by extension, to the European Single Market allowed for a huge economic leap driving up Poland's exports to 216bn euros, a value five times higher than that of 2004. The agency further stressed that more than 25% of Poland's GDP is directly or indirectly based on EU trade.

Thanks to European Union integration, tourism in Poland and other post-communist countries has been a key factor in the economic contribution (Sabić, Pavlović, 2007; Hołowiecka, Grzelak-Kostulska, 2013). Possibilities of using EU funds by Poland helped in tourism development a lot (Batyk, Smoczyński, 2010). The authors point to the role of tourism projects co-financed by the European Social Fund and the Polish government, where one of the objectives was to increase the competitiveness of the tourism industry in Poland and to create regional tourist offer using a network formula (Batyk, Smoczyński, 2010). Quite a lot of attention has been paid to the harmonization of EU law with Polish law in the field of tourism (Jarmul et al, 2003). According to Izabela Kapera (2013) entry into Schengen zone and expansion of low-cost airlines influenced Polish tourism industry as well.

Lower Silesia region, Poland

Lower Silesia, one of the 16 administrative regions in Poland. Located in southern- eastern Poland, it borders Germany and the Czech Republic. The region is located between three important European capitals, which dynamically influence the surrounding area: Berlin, Prague and Warsaw. The third biggest city in Poland – Wrocław – is the capital of Lower Silesia. The most important factors for the economic development are its natural resources (coal, mineral resources) and very well-developed transport network (the A4 highway which goes through the region connects Western and Eastern Europe, and the planned A3 road will connect Scandinavia and Southern Europe). Highly developed sectors in Lower Silesia, among others are the: automotive, electro machinery and high-tech sectors. Also, a high level of education of its citizens (Wrocław has 22 universities) is an asset of the city. Dynamic regional development attracts young people from other regions (Statistics Poland).

The region has varied and attractive landscapes. Lower Silesia (especially its southern part) is one of the most important tourist areas in Poland (Potocki, 2008) boasting beautiful mountains and their foothills. The Sudetes mountains play the most important role in the Lower Silesian tourism and make the region highly attractive for international tourists. The areas of highest tourist appeal are the Karkonosze National Park and the Table Mountains National Park, of high appeal – the Ślęza Massif Landscape Park, the Sowie Mountains Landscape Park and the Śnieżnik Landscape Park (Lijewski, 2008). The region is abundant with surface waters, underground waters (including spa water) and water reservoirs. Odra river, which is the second biggest river in Poland, goes through the region.

The sightseeing potential of the region is illustrated by Table 1. Comparing to the rest of Poland, Lower Silesia excels at the number of national parks, landscape parks, UNESCO World Heritage sites, Polish monuments of history, museums and museum branches.

Table 1: Sightseeing potential of Lower Silesia

No.	Features of potential	Poland	Lower Silesia
1.	Number of national parks	23	2
2.	Number of landscape parks	125	12
3.	Number of nature reserves	1501	67
4.	Number of UNESCO World Heritage Sites	17	3
5.	Number of Polish monuments of history	123	12
7.	Number of museums and museum branches	939	59

Source: Own elaboration based on Statistics Poland.

Tourism base in Lower Silesia

Tourism base is a set of facilities and institutions constituting the material and organizational base for the development of tourism. It includes four basic elements: accommodation base, gastronomy base, accompanying base and transport base (Kowalczyk, 2017). One of the most important components of tourism base is accommodation base (Kowalczyk, 2002). According to Szostak (2009, p. 29) “*hospitality and gastronomy are one of the most important components of the tourism sector in the national economy*”. The accommodation base is developed where there are tourist attractions and access to them is ensured (Tokarz, 2007). Accommodation base includes hotels, motels, boarding houses, campsites, tourist houses, youth hostels, youth school hostels, campsites and the so-called other facilities providing hotel services, which include guest rooms and agritourism lodgings (Act 1997).

Jacek Potocki (2008) divided accommodation base in Lower Silesia region into three zones based on the characteristics of the environment and the nature of the landscape:

- the southern one, covering the mountain area of the Sudetes;
- the middle zone of the foothills and foothills of the Sudetes;
- a zone covering the area of the Silesian Lowland with a flat landscape, in the northern part slightly diversified by the Trzebnickie Hills of post-glacial origin.

The influence of mega-events on tourism accommodation facilities

The organization of the UEFA EURO 2021 FIFA World Cup had an undoubted impact on the accommodation base of the region, especially in its capital city (Cieplik, Gruszka, Smolarski, 2012, p. 317). This is related to the development of tourist (including accommodation), sports and communication infrastructure, which is particularly important in the case of countries that are less developed in this respect. Increased tourist demand for accommodation facilities is recorded not only during the mega-event. It is also an opportunity to change the image of a given tourist destination and an opportunity to attract tourists who came to a given place as sports tourists but can also take advantage of the offer of other types of tourism (e.g., sightseeing, cultural, natural). Before the organization of EURO 2012, Wrocław had a much more modest accommodation base compared to other Polish cities of the same size group and similar tourist values.

Literature review

The issue of the use of accommodation facilities appears in the literature in various contexts. Based on the analysis of the Scopus, Web of Sciences and Google Scholar databases, several approaches to the issue can be identified. Two dominant approaches concern the analysis of the use of accommodation facilities in microeconomic terms (Truchet, Callois, Aubert and Piguet 2011) (a specific tourist enterprise), macroeconomic (in relation to the country's tourism economy; Salin, Vakhrameeva, Narbut, 2021) and mesoeconomic (in the context of a tourist destination). In the micro approach, works covering financial analyses, including operational analyses, analyses of hotels and other facilities dominate (Derkach, Mylashko 2020). Key financial ratios are analysed, such as: occupancy rates, average daily rate, profit margin. Such analysis allows accommodation providers to identify areas of cost savings and revenue growth (Pietrobelli 2022). Analyses based on guest reviews, e.g., on OTA-s (Online Travel Agencies), Trip Advisor, Booking.com services, which allows accommodation providers to identify strengths and weaknesses and improve the quality of services, are also popular (Banerjee, Snehasish, Alton Y. K. Chua (2016). Another group of studies are works based on customer surveys, which are collected directly from guests of accommodation facilities and on their basis, changes are made in the functioning of services in order to improve the occupancy rates of accommodation facilities (Petaković, Vrtodušić Hrgović, Milohnić, 2022). Works in micro and macro terms are mainly the domain of researchers from the disciplines of Hospitality, Leisure and Tourism, Economics, Management, Business. In macro terms, the analyses concern mainly national analyses of the occupancy of accommodation places (Pop, Coros, Balint, 2017, Provotorina et al. 2020).

Few studies analyse the spatial dimension of the use of accommodation facilities (*meso* context) (Matczak, Szkup, 2020), as well as their structural changes (Semenko 2021). This is mainly the domain of geographers. Here, the analyses are based primarily on public statistics in dynamic terms (long-term perspective) describing the issue in various aspects. Thematically, there are works on the importance of accommodation as a factor in the development of tourism in the region, as a factor in the competitiveness of tourism in intra- and interregional terms (Attila 2016). The impact of megatrends, especially sustainable development (climate change, inclusiveness) on the functioning and use of accommodation facilities in the region is also a recent research direction (Prandecki, Nawrot, Fronia, Wawrzyński 2013). Moreover, issues of accommodation facilities security (also in terms of anti-COVID measures) are of interest to many scholars (Nagaj, Žuromskaitė 2020; Dušek, Sagapova 2021).

Research methods

Researchers use several of the most commonly used methods to analyse the spatial aspects of the use of accommodation. Most research focuses on classical statistical methods, such as descriptive statistics, time series, regressions analysis (Aktaş, Yüncü, Kantar, 2017). Examples of applications in spatial analyses have also found Moran's I and LISA spatial autocorrelation and bivariate methods (Aktaş et al., 2017), which allow the study of spatial correlation between the analysed variables. Among the studies in which the authors analyse descriptive statistics, statistical data from the National Statistical Agencies are most often used.

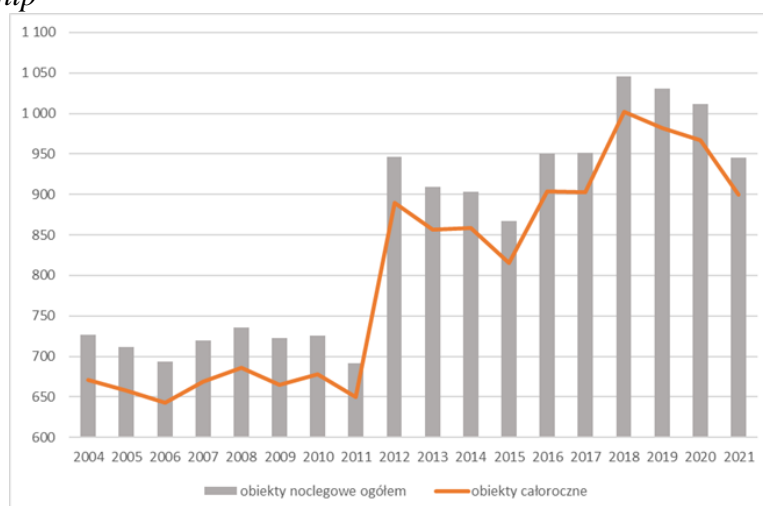
In the paper, a time sequence analysis was carried out, in which statistical data from the resources of the Central Statistical Office were used, based on reports on the use of tourist collective accommodation facilities KT-1 and KT-1a in individual months of the year (form KT-1a for July). The analysed time series covers the period 2002-2021, which allows to capture

the most important changes after Poland's accession to the European Union. The most frequently used measures of accommodation facilities were analysed, i.e.: total number of accommodation facilities (July) in the years 2004-2021, the number of collective accommodation facilities by their type, the number of overnight stays provided, bed places per 1000 capita in Lower Silesia, occupancy rate of bed places (in %), the number of overnight stays provided to domestic and foreign tourist per 10k inhabitants. Also, the number of foreign tourists by selected country of origin was used for analytical purposes.

Analysis

The number of accommodation facilities is a basic characteristic of the tourist accommodation infrastructure in the region. Poland's accession to the European Union has sent a strong signal to investors by bringing about political and economic stabilisation in the country. The tourism economy, especially the accommodation infrastructure of the Lower Silesian Region, has experienced significant changes. These are evident in the number of accommodation facilities, their use and their structure.

Figure 1: Total number of accommodation facilities (July) in the years 2004-2021 in the Lower Silesian voivodship



Source: own elaboration based on Statistics Poland data.

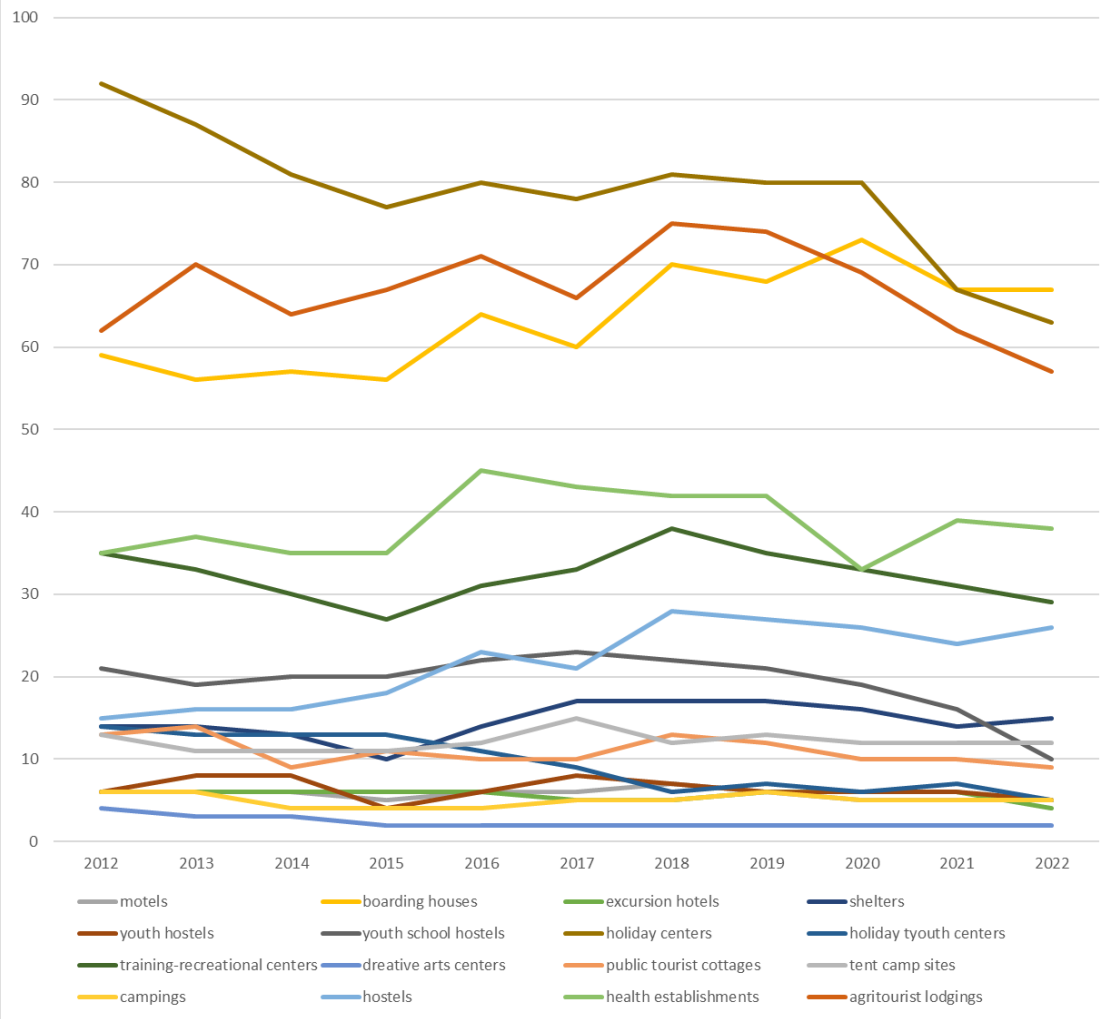
Analysing the number of accommodation facilities, an upward trend is visible, which is corrected in economic cycles as a reaction to more or less predictable factors. In the time of Poland's accession to the European Union (2004), Lower Silesia had more than 10% of all collective accommodation facilities in the country (727), of which 92% were year-round facilities (671 facilities). The largest increase in accommodation was seen at the turn of 2011/2012, with a year-on-year dynamic of 37%. The maximum number of accommodation facilities after EU accession was in 2018 (1046 facilities). From 2019 to 2021 a 10% -decrease in the number of accommodation facilities in Lower Silesia was visible (Figure 1).

The majority of the collective accommodation facilities in the Lower Silesian Voivodship are year-round (the multi-year average is 94%), which is much better than the Polish average (the multi-year average is 69%). Over the analysed 18-year period, the number of all-year-round accommodation facilities changed in the same way as the total number of facilities (Fig. 1).

Apart from the changes in the number of accommodation facilities in the 2012-2022 period, there were also changes in the individual types of facilities: there was an increase in the number of some types of facilities alongside with the decrease in the other types (Figure 2). For the sake of clarity, Figure 3 excludes two categories: hotels and other similar establishments.

There was a noticeable increase in the number of hotels (60 more in 2022 compared to 2012), as well as hostels (11 more; increase by 73%) and boarding houses (8 more). On the other hand, facilities such as excursion hotels (29 less than in 2012), youth school hostels (11 less), holiday centres (29 less), holiday youth centres (9 less), training-recreational centres (6 less) and public tourist cottages (4 less) were steadily decreasing in number. This is the result of a general change in tourist demand and supply. The accommodation facilities that decreased in number were the remnants of communist recreation model and the so-called social tourism: the state subsidized such collective accommodation facilities as well as holidays in such facilities for employees of state-owned companies. After the fall of communism, they steadily fell into disrepair and lost their customers (Figure 2).

Figure 2: The number of collective accommodation facilities by their type in Lower Silesia in the 2012-2022 period

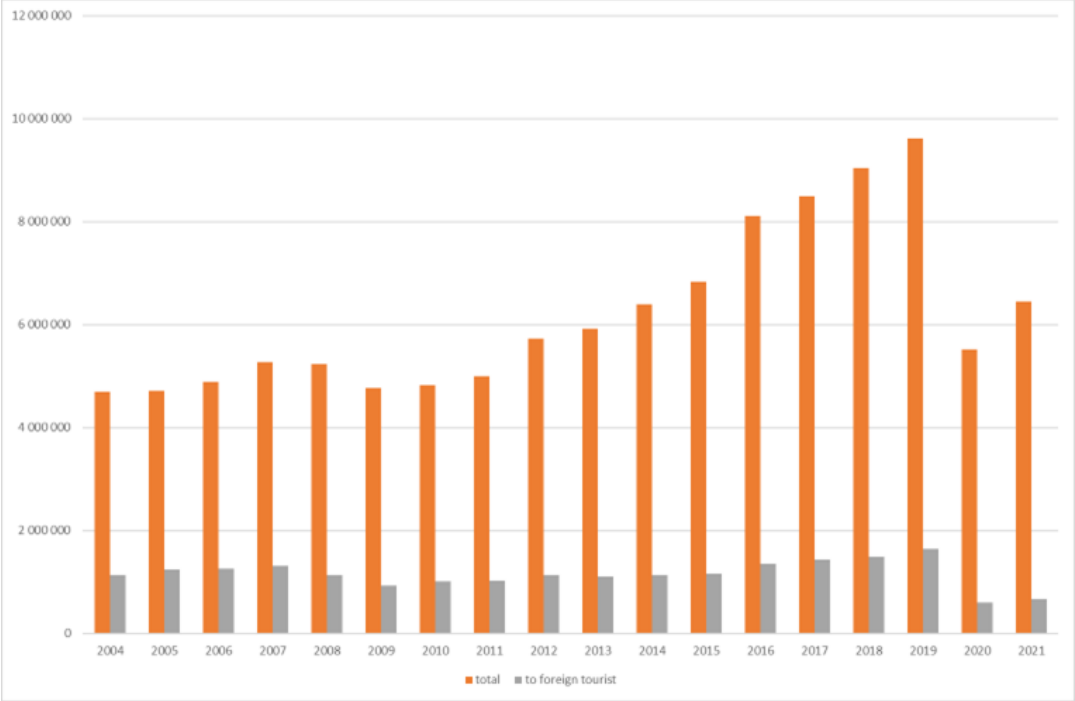


Source: own elaboration based on Statistics Poland data.

Another indicator of the change in tourism in the region is the number of overnight stays. Between 2004 and 2019, an upward trend in the number of tourist overnight stays was evident. In 2019, the number of tourist overnight stays doubled compared to 2004 and the total number

was more than 9.6 million for domestic and international tourists. In 2020, there was a significant decrease in the number of tourist overnight stays by 33% compared to the record-breaking year of 2019, caused by the COVID-19 pandemics (Figure 3).

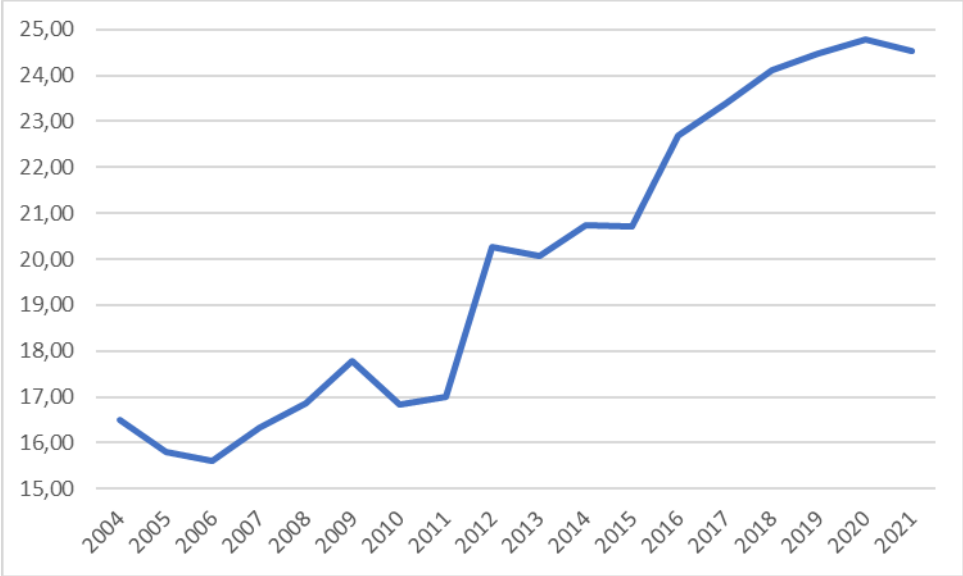
Figure 3: The number of overnight stays provided in the Lower Silesian Voivodship in the years 2004-2021



Source: own elaboration based on Statistics Poland data.

The number of bed places per capita is an indicator of the general availability of bed places in collective accommodation facilities in a given area, referred to the number of inhabitants (Figure. 4).

Figure 4: Bed places per 1000 capita in Lower Silesia in the 2004-2021 period

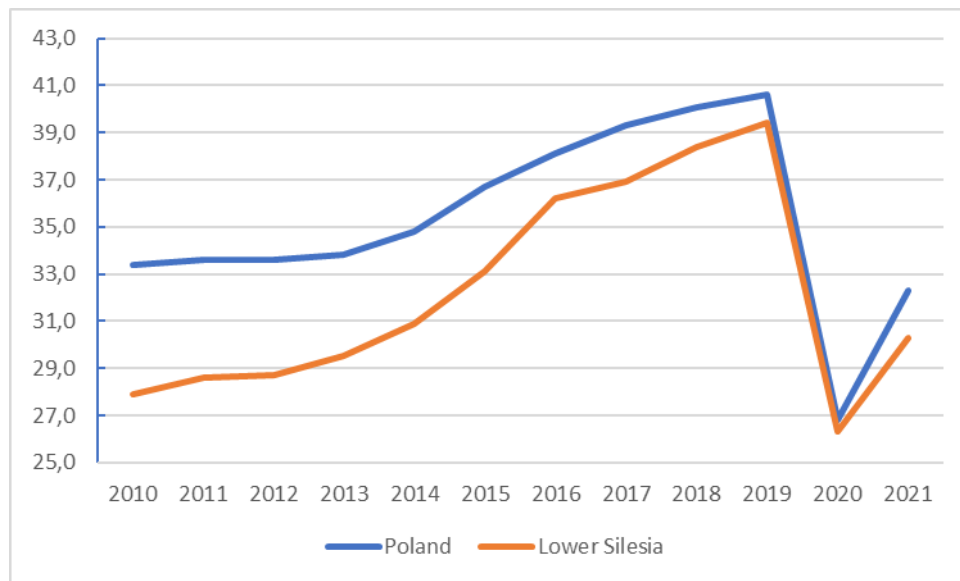


Source: own elaboration based on Statistics Poland data.

After Poland's accession to the EU an almost steady growth in the index is visible (Figure 4) which proves that the general availability of accommodation facilities for the inhabitants has grown in the region, reaching an unprecedented 24,79 beds per 1000 inhabitants in 2021.

In the period of 2010-2021 also the occupancy rate of collective accommodation facilities (Figure 5) grew steadily in Lower Silesia and reached its peak (39%) in 2019. After COVID-19 the occupancy fell sharply to the lowest level of 26,3% and started to rebound in 2021. Compared to Poland, occupancy rate in Lower Silesia was lower throughout the period in question, however with years the discrepancy between average occupancy of bed places was less visible and in 2019 it was only 1,2%.

Figure 5: Occupancy rate of bed places (in %) in Lower Silesia and Poland in the 2010-2021 period

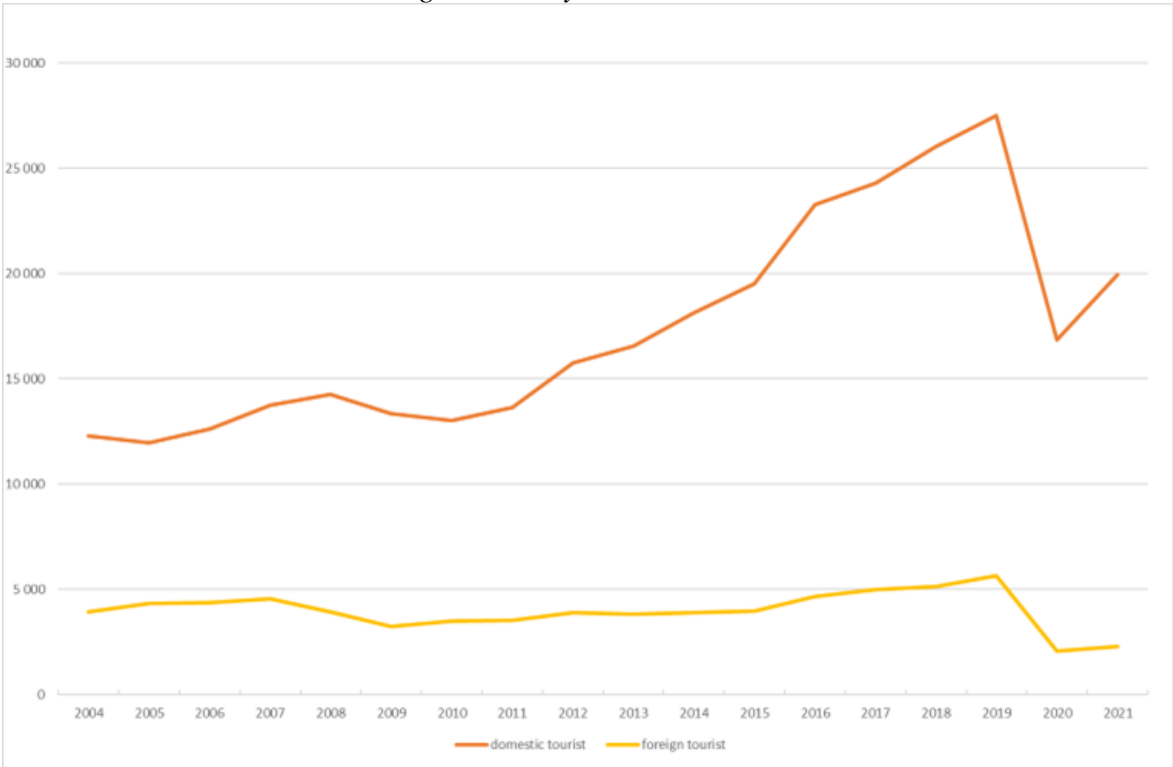


Source: own elaboration based on Statistics Poland data.

Between 2004 and 2021, an average of 19% of overnight stays were provided to foreign tourists and more than 80% to domestic tourists. There is a clear upward trend in the number of overnight stays provided to domestic tourists per 10,000 inhabitants. From 2004 to 2019 the rate doubled to 27,500 per 10,000 inhabitants. One year later, there was a 28% decrease in overnight stays provided to domestic tourists, resulting in almost 20 000 per 10 000 inhabitants (Figure 6).

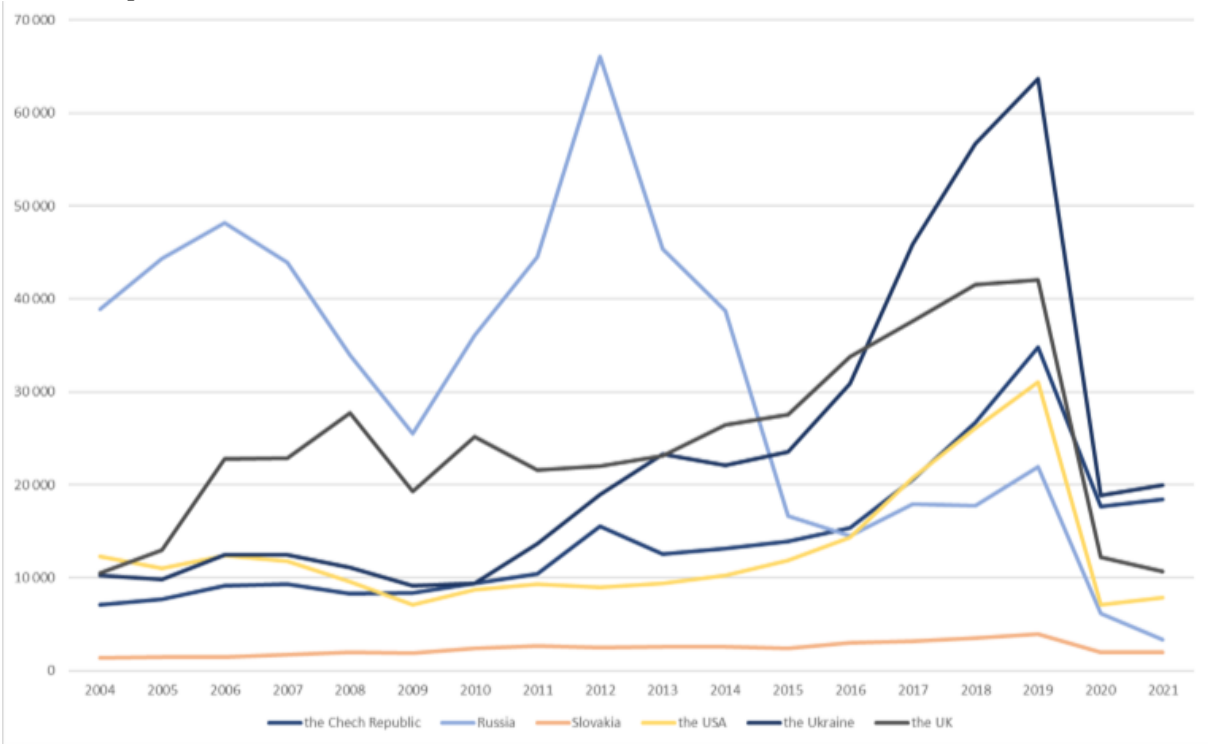
There has not been such a large change in the number of overnight stays provided to foreign tourists per 10 thousand inhabitants, which remained more or less at the same level over the whole analysed period. Downward fluctuations were evident in 2009, 2015 and to the greatest extent in 2020. The decrease in the number of overnight stays provided to foreign tourists in 2020 was 37% compared to 2019 (Figure 6).

Figure 6: The number of overnight stays provided to domestic and foreign tourist per 10k inhabitants in the Lower Silesia Region in the years 2004-2021



Source: own elaboration based on Statistics Poland data.

Figure 7: The number of foreign tourists by selected country of origin in the Lower Silesian Voivodship in 2004-2021.



Source: own elaboration based on Statistics Poland data.

Between 2004 and 2021, there were partial changes in the structure of foreign tourists by country of origin. The undisputed leader in this aspect is Germany, from which an average of 43% of all foreign tourists came to Lower Silesia in the analysed period, with a share of 50% in 2004 and only 36% in 2019. The position of the other countries has fluctuated over time. An interesting example is the decrease in the number of tourists from Russia, which, after a peak in 2012 (66.1 thousand), decreased by 75% in 2015 (16.6 thousand) and more or less remained at this level until 2019. The number of tourists from countries such as the Ukraine and the United Kingdom also changed, generating more and more tourist traffic to the Lower Silesian region. An upward trend can be seen here practically from 2004 to 2019, with Ukrainian tourists becoming the second, and tourists from the UK the third group of foreign tourists arriving in Lower Silesia after the Germans. Growth was also recorded from destinations of overseas countries such as the USA and Japan. The year 2020 has brought a significant decrease in foreign tourists from all directions (Figure 7).

Discussion

The posed research questions allowed for several conclusions: firstly, there are visible changes over time regarding the number and structure of collective accommodation facilities in Lower Silesia after joining the EU (in the years 2004-2021). After joining the EU, a general long-term upward trend is visible in Lower Silesia in terms of the number of collective accommodation facilities. However, there are also periodic decreases in the number of facilities that coincide with events in the macroeconomic environment in Europe and Poland (2008 economic crisis, organization of EURO 2012 in Poland and Ukraine, annexation of Crimea by Russia, COVID-19 pandemic). These are events whose impact is noted in many tourist regions (Borowski 2010) and are reflected in the functioning of the accommodation base. Similar analyses on the changing nature of accommodation facilities were carried out in other post-communist countries, for instance Ukraine, Belarus and Romania (Pavlovska, Onishuk 2015; Buslaeva 2016; Nicula, Neagu 2013; Rashetnikau 2017), which proves that the phenomenon is somewhat universal and is an expression of free market mechanisms, especially demand mechanisms, released after the period of the communist economy.

There are visible changes in the use of collective accommodation facilities in Lower Silesia after joining the EU (in the years 2004-2021) and the period of accession to the EU caused changes in the increase in the number of foreign tourists using collective accommodation facilities in Lower Silesia. After joining the EU, Lower Silesia has seen a slight increase in the number of foreign tourists using accommodation facilities. It seems that accession to the EU itself has not changed the fact that Lower Silesia is visited mainly by domestic tourists. However, when analysing the structure of the use of accommodation places by nationality according to foreign tourists, several changes in the years 2004-2021 can be indicated. The entry into the EU of and the Schengen Area, which resulted in the opening of borders and the simplification of procedures, did not result in a significantly greater influx of tourists from neighbouring countries. The shares of the use of bed places in the analysed facilities by Czechs and Slovaks remain at a stable, quite low level. In the analysed period, there was even a decrease in the share of Germans using collective accommodation facilities in Lower Silesia in the total number of foreign tourists, while maintaining the leading position among foreign tourists.

There were several factors affecting changes in the number and structure of collective accommodation facilities in Lower Silesia after joining the EU (in the years 2004-2021): the very fact of joining the EU and the Schengen area and the aforementioned macroeconomic factors.

Practical implication of the study is following: the conducted analyses can be a starting point for possible further in-depth analyses of tourist traffic and planning further quantitative and qualitative research on the accommodation base in the Lower Silesian region. Also, it would be advisable to conduct a study on the travel motivation of foreign tourists coming to Lower Silesia. This is justified by the fact that after 2004 the number of foreign tourist arrivals is more or less the same while the country of their origin is changing.

Limitation of the research is that this is a preliminary analysis showing general trends, but there is a need to refine the research and extend it to smaller facilities (up to 10 bed places). The analysis can be extended to include a spatial aspect. It may be cognitively interesting to analyse intra-regional differences and find spatial correlations using more advanced statistical methods (e.g. spatial autocorrelation and Moran statistics).

Conclusion

There are several conclusions from the study regarding the changes in the usage of accommodation facilities in Lower Silesia in the 2004-2021 period. After joining the European Union, new opportunities, including financial and organizational ones, appeared for the development of the tourist accommodation base in Poland and Lower Silesia. The use of these opportunities can be seen in both the increase in the number of accommodation facilities and the structure of accommodation facilities. Changes in numbers are related to large-scale economic and political events: the economic crisis of 2008, the annexation of Crimea by Russia in 2014 and the Covid pandemic in the 2019-2020 period. In addition to hotels, private accommodation, guest rooms and guest houses play a significant role in the structure of facilities of Lower Silesia. The study showed that the number of facilities associated with the social tourism of the communist regime, in which supply and demand were shaped by the state, has dropped significantly. Moreover, the use of accommodation facilities in Lower Silesia increased during the period in question and approached the average for Poland. Also, between 2004 and 2021, there were changes in the structure of foreign tourists by country of arrival. The undisputed leader in this aspect is and has been Germany, from which an average of 43% of all foreign tourists came to Lower Silesia in the analysed period, with a share of 50% in 2004 and only 36% in 2019. The position of the other countries has fluctuated over time, reflecting some general changes in tourism demand. An interesting example is the decrease in the number of tourists from Russia, which, after a peak in 2012 (66.1 thousand), decreased by 75% in 2015 (16.6 thousand) and remained at this level until 2019. The number of tourists from countries such as the Ukraine and the United Kingdom also changed, generating more and more tourist traffic to the Lower Silesian region.

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KEY ASPECTS OF IMPLEMENTING ISO 56002:2019 INNOVATION MANAGEMENT STANDARD IN CROATIAN MANUFACTURING INDUSTRY

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Abstract

The role of innovations for developing competitiveness of companies has been heavily emphasized in both theory and practice. This trend has also been recognized by the ISO (International Standards Organization) organization, and therefore ISO 56002, a standard for innovation management systems, has been added to the portfolio of their products in 2019. The format of the standard has many similarities with the most famous ISO standard, ISO 9001:2015, which is currently being used by over a million organizations worldwide. Although from the standpoint of ISO, implementing quality and innovation systems deserve similar treatment, combining these two strategic areas represents a challenging task. Literature deals with the question of combining quality and innovation for a long time, and this topic is especially covered by the research of organizational ambidexterity. Organizational ambidexterity can be defined as the capacity of the organization to balance and integrate two seemingly contradictory goals: the need to explore new ideas, technologies, and markets and the need to exploit existing resources, processes, and capabilities. The main research question discussed in this paper is how successful was ISO in trying to accomplish innovation development through its standardized approach. A review of the standard requirements together with steps needed for implementing ISO 56002:2019 is presented. The question of implementation was addressed both theoretically and empirically. In the theoretical contribution, the paper compared main prerequisites needed for delivering quality and innovation. The primary research for this paper has been done through a series of interviews with the management of a large Croatian manufacturing company that is considering the adoption of the ISO 56002 standard. Results show that accomplishing the requirements of the standard is fairly easy for a company that has long-term experience with many other ISO standards, but when it comes to actually delivering innovation outputs, many sceptics exist.

Keywords: ISO 56002:2019, innovation management system, organizational ambidexterity, manufacturing industry

JEL classification: M00, O32

Introduction

In recent years, the importance of innovation for developing the competitiveness of companies in all industries has been heavily emphasized both in theory and practice. This has led to the recognition of the need for a standard to guide companies in implementing effective innovation

management systems. In response to this need, the ISO organization introduced the ISO 56002 standard in 2019, which is aimed at helping organizations develop and implement effective innovation management systems.

The ISO 56002 standard has many similarities with the well-known ISO 9001:2015 standard, which is currently being used by over a million organizations worldwide to implement quality management systems. However, implementing innovation and quality systems together can be a challenging task, and the literature has addressed this question for a long time, primarily through the concept of organizational ambidexterity.

Organizational ambidexterity refers to the ability of an organization to balance and integrate two seemingly contradictory goals: the need to explore new ideas, technologies, and markets to stay ahead of the competition, and the need to exploit existing resources, processes, and capabilities to maximize efficiency and profitability. The first goal can be linked to innovation's role while the second one to quality. The key question was often what is the best way an organization can achieve both these goals since some of the values in their culture differ significantly.

The main research question addressed in this paper is how successful the ISO 56002 standard has been in helping organizations achieve innovation development through its standardized approach. To answer this question, the paper reviews the standard requirements and the steps needed for implementing the ISO 56002:2019 standard. The question of implementation is addressed both theoretically and empirically in the paper. In the theoretical contribution, the paper analyzes some of the key values needed for delivering quality and innovation. The primary research for the paper was conducted through a series of interviews with the management of a large Croatian manufacturing company that is considering the adoption of the ISO 56002 standard and has many experiences with other management standards.

The results of the study show that accomplishing the requirements of the ISO 56002 standard is relatively easy for companies that have long-term experience with other ISO standards. However, when it comes to delivering actual innovation outputs, many organizations have reservations or skepticism about the efficacy of the standard. This suggests that while the ISO 56002 standard may be useful in guiding companies towards better innovation management, it may not be sufficient in itself to drive real innovation outcomes. Companies must also foster a culture of innovation and invest in the necessary resources and capabilities to succeed in today's highly competitive environment.

The origins of ISO 56002:2019 innovation management standard

The origins of innovation management can be traced back to the early 20th century, when the first large corporations began to emerge and the need to systematically manage innovation became apparent. Many concepts have emerged in this area, such as "creative destruction," which argues that innovation is a key driver of economic growth and that successful companies are those that can continually introduce new products, services, and production methods (Schumpeter 1924). Innovation can be defined as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations" (OECD 2005).

One of the concepts developed through the evolution of innovation was the standardized innovation process. At this point, the field of innovation intersects with quality management in two main forms. The first one was that different forms of quality management systems, such as Total Quality Management or Six Sigma, represented the first forms of standardizing innovations. The second emerged in the form of standardized management systems mostly developed by the International Organization for Standardization, and all of these standards were developed for different areas (quality came among the first, innovation among the last) followed the process-based view from the Plan-Do-Check-Action (PDCA) cycle (ISO 2015). Since quality management methodologies were a bit too rigid for innovation purposes, the area further evolved in more flexible forms. Today, the development of innovation process standardization is driven by the need for increased agility, speed, and flexibility in the innovation process.

To better understand the relationship between innovation and quality, a short review of innovation classifications needs to be presented. In general, innovations can be divided by (Hernaes & Marić, 2023):

1. Object: There are product and process innovations. In this case, business model innovation can be considered as one of the forms.
2. Nature: There are technological and non-technological innovations. Non-technological innovations can typically be found in areas of organization and marketing.
3. Intensity: There are radical and incremental innovations. These types of innovations are especially important for distinguishing between quality and innovation since they define the level of novelty from innovations. It is important to emphasize that dividing innovations by the object is usually supplemented by the level of their radicalness from mild to high. For example, a product innovation can be either incremental or radical.

The rise in the importance of the term and field of innovations many times makes it really hard to distinguish between quality and innovations both in practices and results. One significant finding related to how firms interact with customers can be used as a criterion – firms focused on innovation proactively seek to identify and meet customers' needs, whereas quality-focused firms primarily emphasize reacting to customer complaints (Leavengood, Anderson & Daim, 2014).

The innovation capacity in the largest measures is determined by (Koc & Ceylan, 2007):

- Technology strategy: connects business strategy with resources and technology companies.
- Quality of ideas: radical ideas have been shown to have greater motivational power from incremental ones.
- External networks of the organization with universities, customers, suppliers and competitors consider them an important source of ideas.
- Idea generation: companies should emphasize reward systems. In order to achieve creativity and innovation, it is necessary to set up creative goals as well as global rewarding.
- Technological acquisition and exploitation: implies supervision, monitoring, selection and technology acquisition or development of new technologies through own R&D.

An organization's ability to innovate is recognized as a key factor for sustained growth, economic viability, increased well-being, and the development of society (ISO 2019). The idea of standardizing innovation process has been present for a long time and can be found among many innovation scholars but at the same time most of them warned on the difficulty of this process (Tidd, Bessant & Pavitt, 1997; Mir, Casadesus & Petnji, 2016). ISO 56002 is a standard that provides guidelines for implementing innovation management systems. The standard emphasizes the importance of creating an innovation management system that is tailored to the

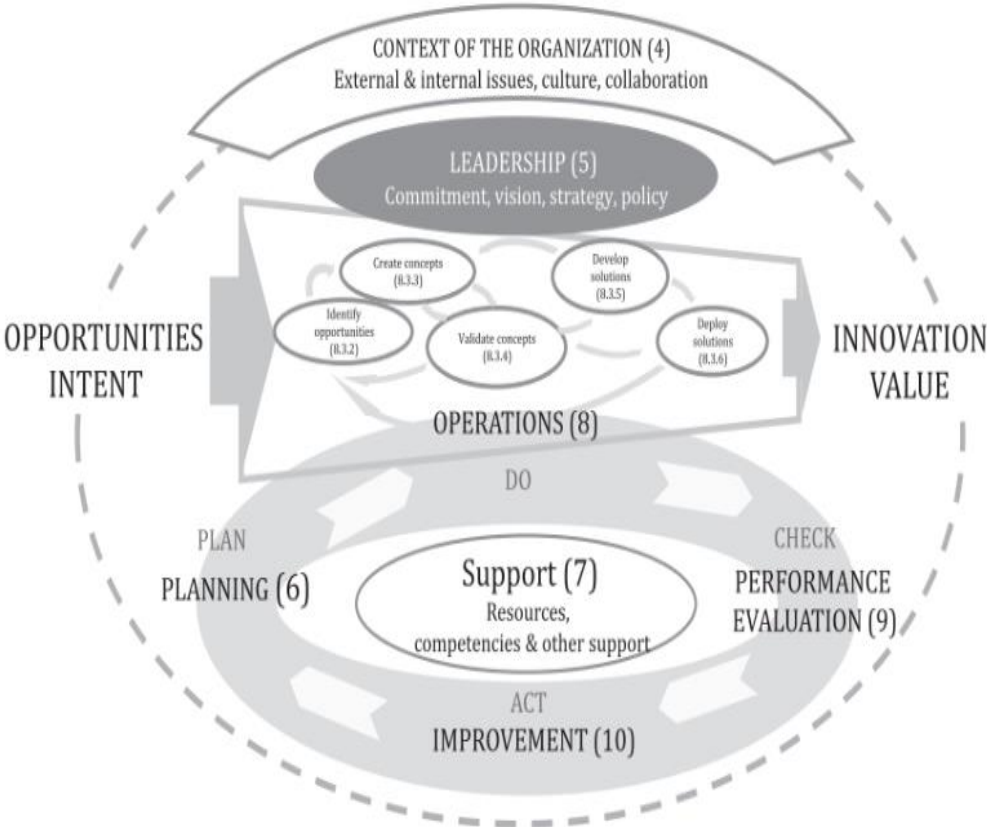
needs and objectives of the organization, as well as the importance of having a systematic approach to innovation. As usual with other ISO standards this can also be certified since it offers a list of clear requirements for organizations.

The following principles are the foundation of the innovation management system (ISO 2019):

- realization of value
- future-focused leaders
- strategic direction
- culture
- exploiting insights
- managing uncertainty
- adaptability
- systems approach.

It is counter-intuitive to imagine that a dynamic process like innovation could be standardized and carried out like any other organizational process but there is some evidence from literature this can be done (Silva 2021). All of ISO management systems follow a similar structure and are implemented according to Deming PDCA cycle with the idea of easier integration. The Plan-Do-Check-Act (PDCA) cycle enables continual improvement of the innovation management system to ensure that the innovation initiatives and processes are adequately supported, resourced, and managed, and that opportunities and risks are identified and addressed by the organization.

Figure 1: PDCA Cycle representation of the framework of the innovation management system with references to the clauses of the standard



Source: ISO 56002:2019.

In order of better understanding the innovation management standard it needs to be compared to quality management standard namely ISO 9001. ISO 9001 and ISO 56002 are both international standards that aim to improve organizational performance, but they differ in their focus and approach to innovation. ISO 9001 is a standard for quality management systems that focuses on continuous improvement of existing processes, products, and services. It aims to ensure that an organization's products and services consistently meet customer and regulatory requirements, and that the organization continuously improves its quality management system. ISO 9001 emphasizes the importance of establishing and maintaining processes for continuous improvement, including identifying and addressing nonconformities, monitoring customer satisfaction, and implementing corrective and preventive actions.

ISO 56002, on the other hand, is a standard for innovation management that focuses on the systematic management of the innovation process, from ideation to commercialization. It aims to help organizations develop and implement strategies for innovation that will enable them to create and capture value from new products, services, or processes. ISO 56002 emphasizes the importance of identifying and prioritizing opportunities for innovation, developing and testing new ideas, and commercializing successful innovations.

One key difference between the two standards is their focus on different types of innovation. ISO 9001 is primarily focused on continuous improvement of existing products, processes, and services, while ISO 56002 is focused on developing and implementing strategies for radical or breakthrough innovation. Another key difference is the approach to innovation. ISO 9001 emphasizes the use of data and measurement to drive continuous improvement, while ISO 56002 emphasizes the use of creativity, experimentation, and collaboration to drive innovation. In conclusion, while both ISO 9001 and ISO 56002 aim to improve organizational performance, they differ in their focus and approach to innovation. ISO 9001 is focused on continuous improvement of existing products, processes, and services, while ISO 56002 is focused on developing and implementing strategies for radical or breakthrough innovation.

Combining innovation and quality: ambidextrous organization

Rapprochement and alignment between the areas of quality and innovation is evident through the changing role of employees in organizations. The search for improving the quality of products and services at the end of the twentieth century led to the search for systematic ways of improvement which go beyond the application of advanced statistical quality control techniques, and enter the area of managing the contribution of individual workers as well as designing organizations that make such a thing possible. In organizations, there is no longer a division into "thinkers" and "doers", the difference is manifested through the level of novelty as well as influence that individual projects can achieve. Specialists perform creative and demanding jobs, while others are asked to contribute with small improvements (Bessant, 2003).

The positive impact of quality management on innovation performance has been confirmed by many authors (Peković & Galia, 2009; Schniederjans & Schniederjans, 2015; Gonzalez-Cruz 2018). However, under the surface of positive impact there are many nuances. Schniederjans & Schniederjans (2015) find social quality management practices, not technical quality management practices, are positively associated with innovation. Peković & Galia (2009) conclude that for top quality level firms, quality systems have a positive impact on product innovation, process innovation and innovation activities (total innovation expenditure).

Also there are many papers that connect quality and innovation in a negative way (Palm et al. 2016; Wang 2014). Palm, Lilja & Wiklund (2016) show that the current quality management practice is perceived as being related to standardization, leading to a decrease in the space for innovation. Wang (2014) found that when R&D expenses become relatively high, increases in R&D expenses may diminish quality management in high-tech firms.

An ambidextrous organization is one that has the ability to be efficient in its management of today's business while being adaptable for coping with the changing demand of tomorrow (Nielsen, Baer & Lindquist, 2019). In other words, an ambidextrous organization has the ability to maintain its core business while simultaneously developing new products or services that can help it adapt to changes in the market, technology, or customer needs. This approach allows the organization to pursue short-term goals while also investing in long-term growth and sustainability (Baković 2021).

It was traditionally considered that creating breakthrough innovations requires organizations to have completely separate business units at the operational level but integrated at senior executive level (ORiley & Tushman 2004). There are also ideas this parallel search can be separated not only in space (different units) but also in time this strategy is known as punctuated equilibrium (Kim et al. 2009)

The role of innovations for manufacturing: implementing ISO 56002:2019

Many studies suggest that innovations in the manufacturing industry play a role in increasing novelty and quality of goods, reducing costs, enabling intelligent upgrading in response to environmental regulations, and boosting industrial production and employment (Baković, Lazibat & Sutić, 2013; Baković 2010; Wang, Xiao & Savin, 2020; Meng, Xu, & Zhao, 2020; Lampon & Gonzalez-Benito 202; Opazo-Basaez 2021).

When it comes to difficulties studies suggest that key challenges for innovation management in manufacturing include creating a conceptual model for managing technological and organizational innovation, reviewing innovation policies for the Fourth Industrial Revolution, and emphasizing human resource management practices for product and process innovations (Brito Viñas, Bessant, Hernández Pérez & Alvarez González, 2001; Li et al. 2020; Gloet & Terziowski 2004).

Implementing ISO 56002 can be a challenging process for manufacturing companies, and there are several obstacles that may hinder its successful implementation. These obstacles can vary depending on the maturity of the industry, the number of employees, and the organizational culture of the company. One of the main obstacles to implementing ISO 56002 is the maturity of the industry. In mature industries, there may be established ways of doing things that are resistant to change. This can make it difficult to introduce new innovation management practices and processes. For example, a manufacturing company in a mature industry may be used to a top-down management style, which can be incompatible with the collaborative and decentralized approach recommended by ISO 56002. To overcome this obstacle, it is important to create awareness of the benefits of the standard and involve key stakeholders in the implementation process.

The number of employees can also be an obstacle to implementing ISO 56002. In larger companies, there may be more resistance to change due to the sheer size and complexity of the organization. It may be difficult to get buy-in from all employees and ensure that the standard is being implemented consistently across all departments. To overcome this obstacle, it is important to establish a clear implementation plan and involve employees at all levels of the organization in the process. This can help to build a sense of ownership and engagement among employees, which can increase the likelihood of success.

Implementing ISO 56002 can be a challenging process for manufacturing companies. The main obstacles to implementation include the maturity of the industry, the number of employees, and organizational culture. To overcome these obstacles, it is important to create awareness of the benefits of the standard, involve employees at all levels of the organization, and create a culture that values innovation and change. With these strategies in place, manufacturing companies can successfully implement ISO 56002 and reap the benefits of improved innovation management.

Implementing ISO 56002 in a manufacturing company can have several contributions, including:

- **Improved innovation management:** ISO 56002 provides a framework for managing innovation activities within an organization, which can help a manufacturing company to become more innovative and efficient in its processes. By implementing this standard, the company can improve its innovation management capabilities and increase its ability to develop new products and services.
- **Increased competitiveness:** A manufacturing company that implements ISO 56002 can become more competitive by improving its ability to identify and respond to new opportunities in the market. The standard provides a systematic approach to innovation management that can help the company to stay ahead of its competitors.
- **Better risk management:** Innovation can be a risky business, and ISO 56002 can help a manufacturing company to manage those risks more effectively. By providing a structured approach to innovation management, the standard can help the company to identify potential risks and take appropriate measures to mitigate them.
- **Improved collaboration:** ISO 56002 emphasizes the importance of collaboration in innovation management, which can help a manufacturing company to bring together different stakeholders and expertise to create more innovative products and services. The standard provides guidelines for creating an innovation culture that encourages collaboration and knowledge sharing.
- **Enhanced customer satisfaction:** Innovation is often driven by customer needs and preferences. By implementing ISO 56002, a manufacturing company can improve its ability to understand and meet customer needs, leading to greater customer satisfaction and loyalty.

The role of organizational culture in implementing innovation standards

The importance of organizational culture for the creation of innovations and innovation capability has been stressed by many authors (Mir, Casadesus & Petnji, 2016; Černe, Jaklič, Škerlavaj, Aydinlik & Polat, 2012; Wu, Huang, Huang & Du, 2019).

Organizational culture can also be a significant obstacle to implementing ISO 56002. In some companies, there may be a culture that values stability and predictability over innovation and change. This can make it difficult to create a culture of innovation and implement the standard

effectively. To overcome this obstacle, it is important to create a culture that values innovation and encourages experimentation and risk-taking. This can involve creating incentives and rewards for innovation, fostering a culture of open communication and collaboration, and providing training and support for employees.

Organizations can establish unified or separate structures, to implement innovation activities. These may require different leadership styles, competencies, and cultures. Implementing an innovation management system can encourage the organization to challenge the status quo and established organizational assumptions and structures. This can help the organization to manage uncertainties and risks more effectively (ISO 56002:2019). Organizational culture is a key factor in the successful implementation of ISO 56002 in manufacturing companies. Innovation is driven by a culture that values creativity, risk-taking, and experimentation. To foster this culture, it is important to understand the key values behind innovation.

- The first key value is creativity. Creativity is the ability to generate new and original ideas that can be turned into innovative products, services, or processes. To encourage creativity, it is important to create an environment that supports and nurtures it. This can involve providing employees with the freedom to experiment and explore new ideas, as well as giving them the resources and support they need to pursue their ideas.
- The second key value is risk-taking. Innovation involves taking risks and trying new things. To encourage risk-taking, it is important to create a culture that accepts and even celebrates failure. This can involve creating a safe space for employees to take risks, recognizing and rewarding employees who take calculated risks, and learning from failures to improve future innovation efforts.
- The third key value is collaboration. Innovation is rarely the work of a single person or department. Instead, it often involves bringing together people from different disciplines and backgrounds to work together towards a common goal. To foster collaboration, it is important to create a culture that values teamwork, open communication, and knowledge sharing. This can involve creating cross-functional teams, encouraging collaboration across departments, and providing opportunities for employees to learn from each other.
- The fourth key value is customer-centricity. Innovation is driven by customer needs and preferences. To create innovative products and services that meet customer needs, it is important to understand those needs and preferences. In this case sometimes it is expected from companies to create those needs or understand them better than the customer itself.

The case of implementing ISO 56002 in Croatian manufacturing industry

In a series of interviews conducted for this paper we chose qualitative research approaches to exploring the potential effect of implementing ISO 56002 in a large Croatian manufacturing company. Our aim is to provide a deeper understanding of the complexities and nuances of the innovation process itself with special emphasis on standardizing it. Our methodology recognizes the importance of context, interpretation, and meaning-making, with a focus on the subjective experiences and perspectives of participants. By engaging with practitioners in their respective fields, we hope to contribute to the ongoing theoretical debate about standardizing innovation process especially through ISO 56002:2019 standard.

The interviews were conducted in March of 2023. with three senior executives in a manufacturing company that employs 900 people and generates most of its income through exports of metal constructions. Companies core business is a production of modular buildings,

accommodation and sanitary containers made of steel and timber structure. Due to the industry specifics special emphasis is given to certification and therefore many standards are applied, some of them are: ISO 9001, ISO 14001, ISO 45001, RAL 613, RAL 619, RAL 422 and EN 1090.

In the following paragraphs a summary of conducted interviews is presented according to the main topics discussed:

- *Motivation for certification according to ISO 56002:* From this point of view there are many potential benefits and some of the most important would be improved sustainability and resilience, increased competitiveness and engaged and empowered people in the organization. In the last few years manufacturing companies in Europe and in Croatia have faced several problems connected to the pandemic of Covid-19, increased energy cost and raw material shortage due to war in Ukraine and lack of personnel due to demographic situation in Europe. Sustainability and resilience is the key factor for modern manufacturing companies in Europe that want to stay competitive to manufacturing companies from outside Europe. Engagement and empowering people in the organization is a way to encounter the lack of personnel and to motivate employees to stay in the company and to recruit new employees.

As a manufacturing company they are aware that innovations could be very expensive and the organization may not achieve the goals that were planned with the implementation of the innovation. We have conducted preliminary assessments to determine our organizations readiness for ISO 56002 implementation. The conclusion is that ISO 56002 implementation will bring more benefits to our company than the cost of implementation and organization is ready for such implementation due to successful implementation of other standards in the past 10 years.

- *Potential problems with ISO 56002 implementation:* As a manufacturing company they are aware that innovations could be very expensive and the organization may not achieve the goals that were planned with the implementation of the innovation standard. According to some preliminary assessments of organizations readiness for ISO 56002 implementation the requirements do not seem so difficult for obtainment but certain aspects are not understandable and would require further clarification. For example, if an organization chose to implement innovation process within existing units how that affects current organizational culture and expectations from employees is not so clear.

Primary innovation challenges that the company is currently facing are: uncertain cost and availability of materials and products that are required, lack of skilled workers in Croatia and inflation in European countries. These challenges can have a very negative influence on innovation capability because if the cost and availability of required materials is not stable it is hard to be innovative, because of the daily struggle to organize profitable and uninterrupted production. Lack of skilled workers is another challenge, because skilled and experienced workers are from our point of view crucial for successful innovation, because it is very often not possible to determine all the steps of innovation, it is required that workers try something, do tests and recognize possible problems or potential improvements. Inflation in Europe has not been an issue for many years and now manufacturing companies are facing this problem. Most of manufacturing companies have fixed process for their products and due to inflation the money they receive is not worth the same as on the day of signing the contract. Innovation normally costs and in such circumstances of inflation is very hard to decide to invest in innovation due to lack of funds.

Senior leadership is crucial in every manufacturing company, because production companies require specific knowledge, experience and leadership to face challenges that are present on the market. In this case senior management has more than 30 years of experience in this company and is interested in implementing state of the art standards, processes and norms to stay competitive. Senior management encourages and supports junior management and employees to be proactive, creative and confident in their capabilities and what they are doing. Without senior leadership and activity, creativity, confidence of junior management an implementation of ISO 56002 would not be possible.

One of the necessary requirements for the successful implementation of this standard is the assistance of consultants. The company is constantly in contact with external experts and consultants from Croatian and German universities, independent auditors and experienced individuals in order to manage requirements of the customers and standards that they have implemented or intend to implement in the future. The same situation is in the case of implementation of ISO 56002. From their point of view, it is good to learn from own experience, but it is much better to learn from experienced people. In this case the learning process is much more efficient.

On the side of potential problems there are some concerns on how implementing some of the values required by the standard like managing uncertainty and experimentation could be implemented on the factory floor. Many of these aspects that are critical for impacting results are only superficially described by the standard itself and additional clarifications are required.

- *Current innovation practices:* In the last ten years the company has successfully implemented several incremental and radical product innovations. They are a traditional metal processing company that has started with production of accommodation modules made of timber structures. This innovation is successful because their customers require sustainable and environmentally friendly buildings. Implementation of ISO 56002 is from their point of view a normal next step for the organization. This step should upgrade: innovation capabilities, standardize innovation process and make it more efficient.

Conclusion

The relationship between quality and innovation in organizations is complex and nuanced. While there is evidence of a positive impact of quality management on innovation performance, the specific practices and approaches used can vary in their effectiveness. Additionally, there are some concerns that overly rigid quality management practices can stifle innovation. To address these challenges, many organizations are adopting an ambidextrous approach that allows them to simultaneously focus on both the short-term and long-term goals, including both improving quality and pursuing innovation. This approach requires balancing the need for efficiency in the current business with the need to adapt to changing market conditions and customer needs. Traditionally, breakthrough innovations were thought to require separate business units, but more recent research suggests that parallel search strategies can also be effective.

Implementing ISO 56002 can provide significant benefits for manufacturing companies, including increased innovation performance and improved competitiveness. However, there are

also obstacles that need to be overcome, such as resistance to change, limited resources, and organizational culture. By addressing these obstacles and involving key stakeholders in the implementation process, manufacturing companies can successfully adopt innovation management practices that support long-term growth and sustainability. In conclusion, creating a culture of innovation is critical to the successful implementation of ISO 56002 in manufacturing companies. To foster this culture, it is important to understand the key values behind innovation, including creativity, risk-taking, collaboration, and customer-centricity. By promoting these values and creating a supportive environment for innovation, manufacturing companies can successfully implement ISO 56002 and achieve their innovation goals.

What was evident from conducted interviews is that managers consider ISO 56002 as just another ISO standard that can be implemented like ISO 9001 or some other management standards. They are aware of the importance of innovations and mainly connect it to new technologies. They mainly remain unaware of the difficulties associated with building an innovation management system and potential problems at the culture level. In our opinion the ISO standard for innovations itself does not do a good job at explaining these risks. On the other hand, as all generic ISO standards it does require additional explanations from innovation experts and context specifics. As a conclusion we have to emphasize that unfortunately as with many other ISO standards the key of successful implementation is companies purpose itself. If the intentions are good and experts are available innovation outcomes could be improved.

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COMPARATIVE ANALYSIS OF FORMAL EDUCATION IN FORENSIC ACCOUNTING

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Abstract

Forensic accounting as a young discipline has gained a lot of attention due to frauds that have been discovered in the early 2000s and the fact that no organization is immune to business frauds. In the last few years, companies are operating in turbulent environment which negatively impacts fraud and tendency to commit fraud. All of this indicated need for stronger fight against fraud and joining forces of all participants in the fight against fraud. In this sense, the role of educational institutions is indispensable, as they should be the initiator of changes and provide answers to environmental challenges. Through this paper authors analysed the level of development of forensic accounting in selected countries by focusing on the level of formal education in this area. To detect achieved level of development of forensic accounting, authors analysed formal education in forensic accounting in four selected countries: Slovenia, Croatia, Bosnia and Herzegovina and Montenegro. Comparative analysis of study programs and courses in which competencies in the area of forensic accounting are acquired was performed.

Research results indicate that there are significant differences in the inclusion of forensic accounting courses in study programs depending on the level of the study. Namely, the analysis showed that subjects from forensic accounting are much more integrated into programs at the 7th level of the European Qualification Framework than at the 6th level. Also, research results showed there are differences in the observed level of development of forensic accounting profession among analysed countries. The conclusion that emerges is that the development of the forensic accounting profession in the observed countries is rather slow and that joint, synergic action of all participants in this area is needed in order to encourage stronger development and affirmation of this profession.

Keywords: forensic accounting, education, comparative analysis

JEL classification: M41, M42

Introduction

Forensic accounting is a relatively young discipline whose development was stimulated by global accounting scandals that took place in the early 2000s like Enron, WorldCom etc. The corporate scandals that have occurred highlighted the importance of developing forensic accounting as a separate part of the accounting profession whose primary goal is to prevent and detect business frauds. According to the Association of Certified Fraud Examiners (ACFE),

which has been conducting research on business frauds since 1996, "business fraud is probably the most expensive and most common form of financial crime in the world" (ACFE, 2022, p. 6). The harmful effects of business frauds are also highlighted by Amiram et al. who state that "financial reporting fraud and other forms of financial misconduct are a significant threat to the existence and efficiency of capital markets" (Amiram, Bozanic, Cox, Dupont, Karpoff & Sloan, 2018, p. 2). Forensic accounting can be defined as "the application of investigative and analytical skills to detect fraud and manipulation in financial statements that deviate from professional rules, accounting standards, tax laws and other legal provisions" (Belak, 2011, p. 1). Different authors point out that "forensic accounting is an expanding field" (Fajardo, 2014) and "it will certainly be one of the most popular subfields of accounting and auditing in the coming period" (Bašić, Veledar & Čolpa, 2022, p. 68). The recent health and economic crisis gave a new "driving wheel" to development and affirmation of this discipline of accounting, since experts predict that in the coming period there will be an increase in fraud and fraudulent reporting and consequently an increase in the demand for the services of forensic accountants.

In this context, the American Institute of Certified Public Accountants (AICPA) recognized the importance of this profession and they state that forensic accountants can be seen as key stakeholders in the fight against fraud (AICPA, 2004, p. 6). Oh (2017) also states how in the United States the demand for services of experts in the field of forensic accounting is constantly growing. Also, ACFE states in their 2021 research, that in the coming period, it is expected that there will be an increase in fraud and in the risk of fraud as a result of the COVID-19 pandemic, which will result with increased demand for experts in the area of forensic accounting (ACFE, 2021). Same was detected also by Karpoff (2021, p. 1) who points out that increased probability of fraud can be expected due to the COVID-19 pandemic and subsequent business and economic crises. Such trends put the focus again on the profession of forensic accountants as the main actors in the fight against fraud.

In the context of the profession of a forensic accountant, the topic of formal education of these experts is unavoidable, and the question that arises is where candidates interested in this specific area of accounting can acquire formal education. A forensic accountant is a person who, in addition to experience in the field of accounting, also possesses specific interdisciplinary knowledge acquired through the system of formal education. In this sense, the role of educational or higher education institutions that provide formal education in this specific area of accounting is indispensable. It has already been pointed out that this is a relatively young discipline for which the demand in the world is constantly growing, and the question is how quickly educational programs respond to the needs of the labor market and whether they follow the requirements of the accounting profession in terms of providing formal education in the field of forensic accounting. Namely, study programs should be continuously updated and adjusted to new trends and requirements of the labor market, where there is certainly a need for the services of forensic accountants. The authors point out that there is a gap between formal education in the field of accounting and the needs of the labor market, and that accounting programs need to be continuously adjusted to the needs of the labor market.

Kavanagh & Drennan (2008) point out that recommendations that strive to reduce the gap always ask accounting educators to recognize the needs of the accounting profession and include these requirements in accounting education and accounting curricula (Kavanagh & Drennan, 2008, as cited in Novak, Barišić & Mamić Sačer, 2021). Bašić et al. (2022, p. 56) point out that "a prerequisite for quality education of a person who will deal with fraud investigations is a curriculum with clearly defined professional subjects, harmonized with world standards in this field". Joseph & George (2003, p. 24) point out how "weakness in

accounting education has a direct impact on the skills and knowledge acquired by accounting graduates". Programs designed for acquiring competences in the field of forensic accounting should emphasize interdisciplinary of this field and enable acquiring knowledge and skills related primarily to the prevention and detection of frauds.

Courses that enable acquiring competences in forensic accounting can be included in study programs at different study levels: from undergraduate to graduate and postgraduate study levels. The aim of this work is to provide an insight into the possibilities of formal education at university undergraduate, graduate and postgraduate levels of study, i.e. at level 6 and 7 of the European Qualifications Framework, through a comparative analysis of study programs and courses in which forensic accounting competencies are acquired on a sample of selected countries. In order to achieve data comparability between countries, all programs are categorized into two groups in accordance with the European Qualifications Framework:

- undergraduate level (level 6 of the European qualification framework – EQF 6) where students gain a bachelor's degree
- graduate level (level 7 of the European qualification framework – EQF 7) where all graduate, postgraduate specialist and master programs are included.

By studying previous research in this area, a lack of comparative research was noticed, especially in the countries of Southeastern Europe. As part of the research, the courses from the field of forensic accounting in the following countries were analyzed: Croatia, Slovenia, Bosnia and Herzegovina and Montenegro. The research aimed to achieve the following goals:

- to determine the occurrence of courses which provide formal competences, i.e. knowledge and skills in the field of forensic accounting;
- analyze the differences in formal education in the field of forensic accounting between the countries involved in the research;
- determine whether there are differences in the inclusion of forensic accounting courses in study programs depending on the level of study: undergraduate or graduate/postgraduate level.

The research carried out in the framework of this paper enables the deepening of knowledge about formal education in the field of forensic accounting and gives impetus to the development of this specific area within the accounting profession. An insight into the level of development and compliance of formal education in forensic accounting in selected countries is provided. Also, the authors point out the necessity of further development of this profession and implementation of courses related to forensic accounting at different study levels. Novak et al. (2021, p. 246) state how "accounting education should constantly follow changes in the accounting profession in order to successfully respond to market needs". Furthermore, they state how "in that sense the role of higher education institutions that provide formal education is significant" (Novak et al., 2021, p. 246) and in order to follow and respond to the labor market need accounting curricula should be adjusted and changed.

The paper is structured as follows. After the introductory part, an overview of papers relevant in the context of processing the topic and conducting research is given. Furthermore, the research methodology and research results are presented. In the last part of the paper, concluding considerations and suggestions for future research are presented.

Literature review

Education, academic as well as professional, is one of the essential prerequisites for development of every profession, including forensic accounting. “A university education should lay the foundations for a lifelong commitment by graduates to learning and professional development (West, 1998, as cited in Kavanagh & Drennan, 2008, p. 2). Though this part of research authors present some of the main papers that were the guiding thread for research conducted within this paper. Fajardo (2014) performed interesting research where he analyzed why forensic accounting is expanding. He states how “with the growing complexity of the business environment and the growing number of business related investigations, forensic accounting professionals are increasingly asked to assist in the investigation of financial and business related issues” (Fajardo, 2014, p. 16).

Bartulović (2021) analyzed state and development of forensic accounting in Croatia. Author presents, among other, occupational standard and qualification standard that were developed for the profession of forensic accountant in Croatia as well as possibilities for higher education in this area. She concludes how “significant steps have been taken in the affirmation of this field of accounting in the last decade” (Bartulović, 2021, p. 50) but “there is additional space for the creation of new educational programs in this area” (Bartulović, 2021, p. 60). Development of forensic accounting profession in Bosnia and Herzegovina was analyzed by Veledar, Bašić & Čolpa (2022). In their work authors tried to determine the state and perspectives of forensic accounting in Bosnia and Herzegovina. According to research results there is a lack of formal education in forensic accounting and authors suggest including courses from forensic accounting in higher education but also propose teaching forensic accounting on final grades of secondary schools. Author state how “the main thing in the development of forensic accounting in Bosnia and Herzegovina would be establishment of study programs in forensic accounting” (Veledar et al., 2022, p. 14).

Bašić et al. (2022) performed comparative analysis of education of forensic accountants in Bosnia and Herzegovina and surrounding countries. They analyzed ten elements that represent preconditions for the development of forensic accounting profession. Among these elements were also data related to academic education at first level of higher education and on second and third level of higher education. Their results indicate how Croatia has the highest level of development of profession while the lowest level of development was detected for the Republic of Serbia. Authors conclude how “obvious slow development of this profession in the region, primarily due to the lack of support through certain legal solutions, indicates resistance to the development of this profession” (Bašić et al., 2022, p. 68).

Research methodology and data

In order to analyze the inclusion of content from forensic accounting in study programs at higher education institutions, study programs at selected faculties and business schools in the following countries were analyzed: Slovenia, Croatia, Bosnia and Herzegovina and Montenegro. In the first part of the research, the authors analyzed the websites and study programs of economic faculties and related institutions (such as University departments) in which courses related to forensic accounting and fraud detection were found. Therefore, the population of the research consisted of the programs of higher education institutions from which it was possible to determine that they provide education in the field of forensic accounting, and the sampling frame itself consisted of the websites of those colleges and business schools that

were found to offer a complete program or course related to forensic accounting. After the faculties and business schools that provide education and forensic accounting were determined, a content analysis of the programs and course syllabi that are the subject of this research was performed.

The main goal of the research was to determine whether formal education in the field of forensic accounting is provided, whether there are differences in the occurrence of courses between the observed countries, and whether there are differences in the representation of courses in the field of forensic accounting at the undergraduate and graduate/postgraduate level of study. As already mentioned the method of content analysis of web pages was used. Authors used this method in order to analyze publicly available study programs of the faculties and the syllabi of the courses which enable acquiring knowledge and skills in the field of forensic accounting. The number of analyzed faculties and business schools by country is shown in table 1.

Table 1: Analysed faculties and business schools

No.	Country	Number of analysed faculties and business schools
1.	Slovenia	2
2.	Croatia	5
3.	Bosnia and Herzegovina	3
4.	Montenegro	1
Total		11

Source: authors' work.

From the above table, it can be concluded that the largest number of higher education institutions where forensic accounting courses were found is in the Republic of Croatia where 5 institutions were detected. Afterwards follows Bosnia and Herzegovina with 3 institutions that provide formal education in this area and in Slovenia programs were found at two higher education institutions. In Montenegro, only one higher education institution that provides education in the field of forensic accounting was found through this research. When the institutions where formal education in the area of forensic accounting is provided were determined, further information that were collected were related to the name of the faculty/business school, the level of study at which the course is provided and the name of the course. When analyzing programs at different higher institutions, courses named Forensic Accounting, Fraud Detection, Fraud and their Prevention, Forensic Investigations in Accounting and similar titles covering the acquisition of competencies in the field of forensic accounting were searched. Courses through which forensic accounting is studied are analyzed at undergraduate (level 6), graduate and postgraduate levels (level 7). The results of conducted analysis are presented below.

Research results

A total of 24 different courses related to forensic accounting were found within the analyzed study programs. Of the total number of courses included in this research, four courses are taught at the undergraduate level of study, that is, at level 6 of the European Qualifications Framework. The other 20 courses are taught at level 7, where it should be noted that 14 subjects were developed within the framework of the graduate level study programs and six subjects were integrated within the postgraduate specialist studies program.

Table 2: Analysed courses according to the study level

Study level	Number of analysed courses
Undergraduate programs – level 6	4
Graduate/postgraduate programs - level 7	20
Total	24

Source: authors' work.

Based on the above mentioned, it can be concluded that there are significant differences in the inclusion of forensic accounting courses in study programs depending on the level of study. Namely, the performed analysis showed that courses from forensic accounting are much more integrated into programs at the 7th level of the European Qualification Framework than at the 6th level. These results are in line with expectations since these are extremely demanding subjects that require a whole range of different prior knowledge and are more often included in study programs at higher study levels. Table 3 shows the names of the courses offered at the undergraduate level of the study.

Table 3: Course titles at undergraduate level of study (level 6)

Country	Institution	Course title
Slovenia	Collage of Accounting	Introduction to forensic accounting
Croatia	University Department of Forensic Sciences	Corporate frauds
Bosnia and Herzegovina	School of Economics and Business Sarajevo	Forensic accounting
Montenegro	Faculty of Economics Podgorica	Forensic accounting

Source: authors' work.

Table 4 lists the names of courses provided at level 7 of the European qualification framework. In a large number of cases, the course is called Forensic Accounting (11 courses under this title were found), and the other courses are: Frauds and Fraud prevention, Forensic investigation methods, Corporate frauds: prevention and detection, Forensic accounting and investigations, frauds and computer crime, Forensic accounting: professional and practical challenges and Fraud prevention, risk assessment and investigation, data analysis and protection. It should be noted how some courses are incorporated twice due to the fact that they are included in the study program as an elective or mandatory course or they are part of a different study program at the same institution.

Table 4: Course titles at graduate/specialist level of study (level 7)

Country	Institution	Course title
Slovenia	Collage of Accounting	Frauds and fraud prevention
Slovenia	Collage of Accounting	Forensic accounting
Slovenia	Collage of Accounting	Forensic investigation methods
Slovenia	Faculty of Economics and Business, University if Maribor	Forensic accounting
Croatia	University Department of Forensic Sciences	Corporate frauds: prevention and detection
Croatia	University Department of Forensic Sciences	Forensic accounting 1
Croatia	University Department of Forensic Sciences	Forensic accounting 2
Croatia	University Department of Professional Studies	Forensic accounting
Croatia	Faculty of Economics and business, University of Rijeka	Forensic accounting

Country	Institution	Course title
Croatia	Faculty of Economics and Business, University of Osijek	Forensic accounting
Croatia	Faculty of Economics and Tourism “Dr. Mijo Mirković”	Forensic accounting (mandatory course)
Croatia	Faculty of Economics and Tourism “Dr. Mijo Mirković”	Forensic accounting (elective course)
Bosnia and Herzegovina	Faculty of Economics, University of Mostar	Forensic accounting
Bosnia and Herzegovina	School of Economics and Business Sarajevo	Forensic accounting and investigations, frauds and computer crime (on master study)
Bosnia and Herzegovina	School of Economics and Business Sarajevo	Forensic accounting: professional and practical challenges (on master study)
Bosnia and Herzegovina	School of Economics and Business Sarajevo	Fraud prevention, risk assessment and investigation, data analysis and protection (on master study)
Bosnia and Herzegovina	School of Economics and Business Sarajevo	Forensic accounting and investigations, frauds and computer crime (on specialist study)
Bosnia and Herzegovina	School of Economics and Business Sarajevo	Forensic accounting: professional and practical challenges (on specialist study)
Bosnia and Herzegovina	School of Economics and Business Sarajevo	Fraud prevention, risk assessment and investigation, data analysis and protection (on specialist study)
Bosnia and Herzegovina	Faculty of Economics, University of Banja Luka	Forensic accounting

Source: authors' work.

From data presented in the above table it can be noted how through this research no courses related to forensic accounting on master or specialist level (level 7) were found in Montenegro. Also, on undergraduate level only one course was detected for this country. So it can be concluded that based on including courses from the area of forensic accounting in study programs at Universities, Montenegro has the lowest level on education on this issue and there is area for significant improvement in this area. When observing both analyzed levels of studies five courses were found in Slovenia and nine courses in Croatia and in Bosnia and Herzegovina.

Table 5: Representation of courses from the field of Forensic Accounting by countries

No.	Country	Number of courses
1	Slovenia	5
2	Croatia	9
3	Bosnia and Herzegovina	9
4	Montenegro	1
	Total	24

Source: authors' work.

Based on all above-mentioned it can be concluded that there are differences in the observed level of development of forensic accounting profession among analyzed countries. Results are in line with those presented by Bašić et al (2022) who also detected differences in the level of development of forensic accounting among countries analyzed in their research paper. They analyzed academic and professional education of forensic accountant in following countries: Croatia, Montenegro, Bosnia and Herzegovina and Republic of Serbia. They pointed out how “the obvious slow development of this profession in the region, primarily due to the lack of support through certain legal solutions, indicates resistance to the development of this

profession” (Bašić et al, 2022, p. 68). Also Veleđar et al. (2022) as a result of analysis of state and perspective of forensic accounting in Bosnia and Herzegovina concluded how there exist a lack of formal education in the area of forensic accounting and highlight the need for inclusion courses related to forensic accounting in programs at higher levels of education and also in final grades of secondary schools.

Conclusion

As a response to distrust in the system of financial reporting and auditing after the corporate scandals that occurred in the early 2000s, regulation in the field of accounting and auditing professions was tightened. At the same time, there was also an increase in demand for new services in the area of the accounting profession. Namely, corporate failures gave impetus to the development of the profession of forensic accountants as specialists trained to detect and prevent fraud. The market needs experts who can provide a wide range of different services in the field of forensic accounting, and to provide these complex services, they need specific and interdisciplinary knowledge and skills. Stronger education of financial accounting forensics and development of this profession was therefore stimulated by corporate scandals from the beginning of the 2000s, but recent events in which corporations are not deprived and protected from fraud additionally confirm the need for training experts in the field of forensic accounting. Development of this profession is of exceptional importance for developing countries, given the fact that these countries are characterized by greater exposure to the phenomenon of the gray economy, corruption and other forms of business fraud.

Forensic accounting, as a relatively young discipline that is in the phase of development and affirmation in all the countries analyzed in this paper, certainly represents one of the main mechanisms in preventing and detecting fraud, fighting corruption and other forms of white-collar crime. The formal education of experts in a certain field certainly represents one of the fundamental indicators of the development of a certain profession. Within research conducted in this paper, the authors emphasized the analysis of formal education in the field of forensic accounting in four countries: Slovenia, Croatia, Bosnia and Herzegovina, and Montenegro. The research results show that formal education in the field of forensic accounting in the observed countries is still at a relatively low levels and there is additional space for the development and affirmation of this profession. Namely, although courses taught at higher education institutions were found in all four countries, their representation is still relatively small and it can be concluded that the programs are slowly adapting to the demands of the labor market and changes in the accounting profession. Thus, for example, in Montenegro, only one course was registered in which knowledge and skills from the area of forensic accounting are studied. Of course, when interpreting the research results, it is necessary to take into account the limitations of the research and the issue of the up-dating the websites of the higher education institutions that were reviewed and the availability of content in English. Certainly, the conclusion that emerges is that the development of the profession of forensic accountants in the observed countries is quite slow and that joint, synergic action of all actors in this area is needed in order to encourage a stronger development and affirmation of this profession. Joint action of all interested parties, combination of practical experience and theoretical knowledge as well as mutual communication and exchanging best practices can contribute to rising level of fraud awareness and finally affect the reduction of business frauds, corruption and all other types of white collar crime in the observed countries.

The research carried out in the framework of this paper enables the deepening of knowledge about formal education in the field of forensic accounting and gives impetus to the development of this specific area within the accounting profession. It provides an insight into the level of compliance of formal education in forensic accounting in selected countries and into the possibilities for further development and implementation of courses related to forensic accounting at different levels of study. Given that the research results show that there are differences in the development of formal education at the academic level, future research can be focused on determining the causes of these differences, as well as on a more detailed analysis of the course contents themselves and the learning outcomes that are acquired in individual countries, all with the aim of affirming and further development of forensic accounting education in the observed countries.

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WORK ORIENTATION OF HOSPITALITY EMPLOYEES AND ITS IMPLICATIONS FOR WORK ENGAGEMENT: CASE OF DUBROVNIK

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Abstract

The purpose of this exploratory research is to investigate the applicability of conceptual distinction between perceptions of work as a job, a career, or a calling in the hospitality sector, and its implications for work engagement. Previous research conducted in terms of relation to work appears to be focused on exploring one dimension effect of calling on various other attributes of work, and the same appears to be true of studies conducted in the service sector, broadly understood, which deal with work engagement. This study, by contrast, investigates the tripartite conception, offering broader insight into complexities of the meaningfulness of work in hospitality. Survey was administered in a paper/pencil format, obtaining data on participants' work orientation, and self-reported work engagement. Participants were individuals actively employed in the hospitality industry. The results suggest that the conceptual distinction between job, career and calling is adequate for representation of perceptions of work by employees in the hospitality industry, among operational level and executive and administrative level employees alike. Career appears to have no effect or relation to work engagement, or its specific components. Calling, expectedly, has a positive effect on work engagement and is positively related to all the elements associated with it, while job relation negatively affects work engagement. The findings of this study suggest that there are individuals in hospitality who recognize that this set of services, contributes in, to quote descriptors from this study, "making the world a better place", and who would continue to do the work "if they were no longer paid". This is an important finding for a sector which is associated with record turnover rates, and problems with employee retention. Especially since more than 30% of work engagement scores in the sample surveyed appear to be accounted for by these attitudes associated with the calling orientation.

Keywords: work orientation, calling, work engagement, hospitality

JEL classification: M12, M54, J24, L83

Introduction

The role of work in our lives is to satisfy our social and personal needs that we as humans have (Górny, 2018). The importance of work derives not only from the fulfillment of those needs, but it contributes to personal development and the well-being of societies too. As such, work has a defining impact on one's identity (Dik, Duffy & Eldridge, 2009; Dobrow & Tosti-Kharas, 2011), therefore it is a rational act for a person to aspire to a particular work and work orientation that is related to it. The underlying idea behind work orientation is that employees perceive their work differently and that these distinctive relations to their work do have the capacity to influence employees' overall performance. Put together, these three concepts (*job*, *career*, *calling*) deserve a closer look when related to *work engagement* as one of the key predictors of employees' performance (Bakker & Albrecht, 2018). Theoretically, work orientation or identity gives sense of direction, increases handling capabilities when dealing with stress, and permits employees to seek for work that mirrors their personal goals, strengths and inclinations (Skorikov & Vondracek, 2011). That is exactly why organizations should care for how their employees experience and relate to their work as they play a great role in achieving the company's success.

Research gap

Several research papers examined the relation of calling to work-orientation, namely the relations of calling to work engagement, career satisfaction, and career adaptability (Lee, 2016; Xie, Xia, Xin & Zhou, 2016). Even though progress has been made, our understanding of the employees' work identification to work engagement is still incomplete and limited. Research was primarily focused on exploring the one-dimension effect of *calling* on various other attributes of work. Particularly, not enough studies look into work orientation in the hospitality industry, and the rare ones that do, lack the tripartite dimension (cf. Lee, 2016; Kang, Cain, Busser, 2021; Karatepe, Rezapouraghdam, Hassannia, 2021; Han, Hwang, 2021; Lee, Ponting, Ghosh, Min, 2022). Present study attempts to extend prior research by investigating the tripartite conception, offering broader insight into complexities of the meaningfulness of work in hospitality.

Job, career, or calling

Concepts of *job*, *career* and *calling* may provide a sense of direction and can increase handling capabilities when dealing with stress and permits employees to seek for work that mirrors their personal goals, strengths and inclinations (Skorikov & Vondracek, 2011). That is exactly why organizations should care for how their employees experience and relate to their work as they play a great role in achieving the company's success.

Relations to the work among people can fall under either a *job*, a *career*, or a *calling* distinction (Wrzesniewski, McCauley, Rozin & Schwartz, 1997). Individuals who perceive their work as just a *job* have no other than monetary factors as a motivation to do it. When hypothetically asked whether what they do for a living is what they would do if they were financially secured, the ones with a *job* would answer negatively. If an individual no longer perceives her/his work as a place where they learn, gain experience, or increase their network, this may be an indication that one experiences a *job* orientation towards work (Wrzesniewski *et al.*, 1997). A *career* is a second relation to work which is essentially structured as a success path that offers a set of

opportunities for an individual's advancement within a specific occupation (Rothman, 1997), often one's *career* within a specific occupation is formed by social background obtained such as; gender, social class, etc. Likewise, it may be formed by education and experience gained throughout life. There is an abundance of evidence confirming employers' capacity to build and maintain employees' motivation for work by properly directing career paths within employees' occupation. Career development is likely to positively affect organizations in numerous ways, for example, in terms of increased job satisfaction or organizational commitment (Rodrigues, Butler & Guest, 2020). Consequently, organizations should, ideally, invest in their career-oriented employees' training, testing, and evaluation to create or maintain a productive relationship.

Calling in a modern notion (Bunderson & Thompson, 2009) is defined as consuming and inherent passion toward work, an inner drive that an individual has for a certain work that presents a source of personal fulfillment (Dobrow & Tosti-Kharas, 2011). However, it is important to consider that there is a crucial difference between *perceiving a calling* and *living a calling*. According to Hirschi (2012) the perception of a *calling* refers to the person's awareness and cognition of such, but it does not imply this person is able to live his or her life purpose. Hence, the inability for individuals to live their *calling* affects negatively their life meaning and reduces their career commitment, work meaning, and job satisfaction, while people living a *calling* are committed to their work, have established work identity and report higher levels of work engagement, indicating positive outcomes on the personal and organizational level (Hirschi, 2012). Perceiving work as a *calling* means that one feels that it is what they were meant to do, serving oneself or others to the degree of willingness to sacrifice other roles in life (Michaelson & Tosti-Kharas, 2019). A person having a *calling* has an important effect on life and work satisfaction, and a person with a *calling* is self-motivated in "mastery of work knowledge" and in transferring it to others (Lee, 2016). The career-oriented stood apart from the others as a function of shorter job tenure, greater turnover. Additionally, in a study conducted by Park, Choi, Chao, Beejinkhuu & Sohn (2022), authors examined the relationship between individualism-collectivism and the three work orientations. In their study they also found that those with a calling orientation expressed higher level job satisfaction, more work meaningfulness, and less turnover intention than those viewing work as a job or a career.

Work engagement

Within this study, we focus on work engagement that is defined as a positive work-related state of fulfillment (Bakker, Schaufeli, Leiter & Taris, 2008). Often there is a misconception that employee job satisfaction and work engagement mean the same thing. Both stand for the employee's mental state related to their work, but the difference is that engagement implies a strong and genuine dedication of workers to give their best to achieve their company's goals whilst satisfaction is merely worker's happiness with a position. A satisfied worker is not necessarily engaged while on the other hand, an engaged worker implies positive job satisfaction.

Work engagement is relatedly defined as a person's motivation and willingness for physical, cognitive, and emotional energy investments into their work (Babcock-Roberson & Strickland, 2010). In addition to organization-led, top-down strategies to enhance work engagement, recent research has shown that employees may also influence their own levels of engagement (Bakker & Albrecht, 2018). One of the typical bottom-up methods to work engagement is *job crafting*.

Wrzesniewski and Dutton (2001) have defined job crafting as the physical and cognitive modifications people make in their task or relational boundaries. Clearly, relational boundaries may also include individuals' work identification such as *calling*, *career* or *job* contextualization. In Mantler, Campbell & Dupré (2022) results indicated that those who perceived their work as a *calling* were more engaged in work compared to those that approach work as a job.

Methods

Instrument

To measure the extent in which the surveyed hospitality employees perceive their work as a *job*, *career* or *calling*, the study utilizes two sets of items from the 'University of Pennsylvania Work-Life Questionnaire' (Wrzesniewski *et al.*, 1997). Specifically, in the first set of items the participants were asked to rate three distinct paragraphs, each outlining one of the relations to work, i.e., a paragraph depicting a 'job' relation to work, a paragraph outlining the 'career' relation, and lastly, a paragraph which outlines the 'calling' attitude (cf. *ibid.*, p.24). In the second set of items from the noted questionnaire, the participants were required to report their attitude on a set of 18 binary (true/false) items reiterating the tripartite distinctions (cf. *ibid.*, p. 25, and Table 6 in the present study), with 15 items measuring the presence of inversely related job and calling attitudes, and three independent items recording the presence of career attitudes. One additional item reused from the noted questionnaire was a self-rating job-satisfaction item (Wrzesniewski *et al.*, 1997; taken from Campbell *et al.*, 1976, cf. *ibid.* p. 24)

As a measure of work engagement, the present study utilizes a shortened version of the Utrecht Work Engagement Scale [UWES] constructed by Schaufeli, Bakker & Salanova (2006). The shorter UWES scale utilizes 9 items with a 7-point frequency scale response. The Short Version of the UWES reduced the original summative scales to 3 items for each dimension, i.e., vigor [VI], dedication [DE], and absorption [AB], with work engagement [WE] variable calculated as the sum of all nine items. Scale data is presented in Table 1.

Table 1: UWES dimensions and overall measure of work engagement (sample)

<i>(n=58)</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	<i>Cronbach α</i>
VI	13.06	3.92	3	21	.78
DE	14.09	4.19	3	21	.86
AB	15.17	3.62	6	21	.75
WE (overall)	42.33	10.45	19	63	.91

Source: authors' work.

Participants

Total number of questionnaires distributed was 217, to employees of hotels, restaurants, and café bars in Dubrovnik area. Dubrovnik area is renowned for seasonality issues, crowding, and chronic shortage of labor, making it an interesting arena to explore these variables. The participation requirement was that they were actively employed and working in the pre-season for the duration of the third set of the Covid-19 related restrictions, i.e., during the time the present study was conducted. Though this might appear to be quite a stringent and limiting requirement, it ensures that the results reflect the 'actively employed and currently working' mindset of individuals who appear to be regarded as valuable (or at least valuable enough) by

their employers even in times when business is facing difficulties. The surveys of participants who failed to meet this requirement were excluded from data analysis, as were the incomplete or faulty surveys. Ultimately, there were 58 valid questionnaires used in analysis. Neither name of participants nor the name of the companies in which they were employed were recorded, and participants' informed consent was acquired through additional cover letter materials. Sociodemographic characteristics of the participants are provided in Table 2.

Table 2: Respondent's socio-demographic and professional characteristics

	N	%
GENDER		
Male	39	67.2
Female	19	32.8
AGE		
Less than 29	31	53.4
30 and older	27	46.6
COMPLETED EDUCATION LEVEL		
High school	28	48.3
Undergraduate study	21	36.2
Postgraduate study	5	8.6
Professional study	4	6.9
Experience in the hospitality industry (in years)		
Up to 5 years	10	17.2
6 -9 years	20	34.5
10 – 17	13	22.4
18 and more	15	25.9
Current level of responsibility in the company		
Operational level (staff and support staff)	39	67.2
Executive level (assistant manager/manager) and Administrative Level (director)	19	32.8
Monthly net wage		
7,000.00 HRK or less	47	81
7,001.00 HRK or more	11	19
	M	SD
Length of employment in the current work position in months	59.19	71.73
	Min	Max
	4	360

Note: Some categories are suppressed for presentation and analysis purposes.

Source: authors' work.

Results

Participants' ratings of work orientation paragraphs were highest for *career* paragraph ($M=2.60$, $SD=.93$), followed by *job* paragraph ($M=2.41$, $SD=.97$), and lastly, *calling* ($M=2.10$, $SD=1.00$). The noted work orientation of the sample is reflected in the findings for specific descriptors (true/false items), as the item with highest (70%) percentage of 'true' responses is a *career* item 'I expect to be in a higher-level job in five years,' closely followed by a *job* descriptor 'My primary reason for working is financial – to support my family and lifestyle' (for additional data see Table 6 below).

The effect of specific demographic variables on paragraph ratings was detected. Specifically, *job* paragraph ratings were significantly lower for women ($Md=2.00$, $n=16$), than for men ($Md=3.00$, $n=33$), $U = 172.00$, $z = -2.05$, $p = .041$, with a small effect size $r = .29$). In terms of age, expectedly, a significant difference is detected for the *career* paragraph, with lower ratings

by individuals above 30 years of age ($Md=2.00$, $n=21$) than the ratings of individuals in their twenties ($Md=3.00$, $n=30$), $U=269.50$, $z=-2.63$, $p=.009$, with moderate effect size, $r=.36$. Interestingly, no significant effect was detected for current level of responsibility, salary, or years of experience in hospitality, nor was there a significant association detected between years of experience in the current job position and the work orientation ratings.

To test the effect of the self-reported work orientation on work engagement scores in detail, a twofold approach was used. In the first part of analysis, the effect of participants' self-reported work orientation (the best-fit category) on work engagement scores was tested. In the second part, association between work orientation scores generally and work engagement scores were investigated, i.e., not taking into account the specified best-fit description to account for the complexities of the assigned ratings per each category of work orientation. This includes investigation of associations between specific attitudes representing work orientation and work engagement scores, to investigate the specific aspects of a relation to work which may have a stronger association with work orientation, be it of a positive or a negative kind, followed by investigation of the manner and magnitude in which the work engagement attitudes were under the impact of the work orientation attitudes (specifically, *calling* orientation).

The effect of self-reported work orientation on work engagement

Participants were assigned to a category based on the ratings assigned to paragraphs with descriptions of relations to work, i.e. each participant was assigned to a category with highest rating in the respective questionnaire [JCC categorical variable was created and used in further analysis, Table 3]. Much like in the original study utilizing the same descriptions (cf. Wrzesniewski *et al.*, 1997), there were participants who misunderstood the instructions and assigned equal values to multiple paragraphs. These participants ($n=14$) were excluded from the analysis based on the categorization of participants (treated as system-missing data), but their scores and ratings were preserved in further analysis of associations of paragraph scores with the variables of interest in this study.

Table 3: Means of characteristics categorized in terms of their relation to work

	Job (n=14)	Career (n=19)	Calling (n=11)
Paragraph ratings	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
JOB	3.43 (.51)	1.91 (.70)	1.09 (.30)
CAREER	2.00 (.58)	3.32 (.67)	1.77 (.83)
CALLING	1.50 (.54)	1.88 (.64)	3.27 (.47)
UWES scales	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
VI	10.93 ^a (4.41)	13.53 ^{ab} (2.72)	15.18 ^b (3.63)
DE	13.36 (4.34)	14.16 (3.52)	16.27 (3.64)
AB	14.29 (3.09)	15.74 (3.02)	16.91 (3.24)
WE	38.57 ^a (9.83)	43.42 ^{ab} (8.17)	48.36 ^b (9.84)
Job satisfaction	5.21 (1.12)	5.32 (.89)	5.64 (1.29)

Note: Table includes exclusively the data for those participants who rated one of the paragraphs as being most like them. Significant effect of relation to work was detected for 'vigor', $F(2,41)=4.64$, $p=.015$, and WE overall, $F(2,41)=3.55$, $p=.038$. Means in the same row with different superscript (a, b) are significantly different at $<.05$ level.

Source: authors' work.

Participants' choice of the 'best-fit' relation to work was apparently clear-cut, as the lower mean relevance ratings of the remaining two paragraphs for each category suggest. For scrutiny, Kruskal-Wallis tests were run with post hoc tests to check pairwise comparisons for the new

JCC categorical variable and all the paragraph ratings, suggesting that the differences between categories was significant, for the *job* rating ($\chi^2 = 25.23, p < .001$), *career* rating ($\chi^2 = 20.91, p < .001$), and *calling* rating alike ($\chi^2 = 23.68, p < .001$). In all instances, post hoc pairwise comparisons revealed differences between the ‘best-fit’ rating and the ratings of the remaining two paragraphs at $p < .005$.

Most participants (43.2%) reported being in a *career*, followed by those who vied their work as merely a *job* (31.8%), and least participants reported their work was a *calling* (25%). Significant association between age and work orientation category was detected, $\chi^2 (2, N=43) = 9.52, p = .009$, Cramer’s $V=.47$. An examination of adjusted residuals revealed that the younger individuals are more likely to categorize themselves as being in a *career* work relation (64%, as expected). Post hoc comparison of adjusted residuals (with Bonferroni correction) revealed this to be the significant difference ($p < .05/6 = 0.008$). No effect was detected for any of the remaining demographic variables on work orientation choice.

As visible in Table 3, lowest UWES scales scores were from those participants who perceived themselves as having a ‘job’, slightly higher reported scores from those in a ‘career’ track, and highest scores from participants who viewed their work as a ‘calling’. An analysis of variance revealed a significant effect of the self-attributed best-fit category on WE score overall, $F(2,41)=3.55, p=.038$, and specifically on the VI dimension, $F(2,41)=4.64, p=.015$. Tukey’s HSD test found that the mean value for *calling* category in scores for VI ($M= 15.18, SD=3.63$) significantly differed from the *job* category scores ($M= 10.93, SD=4.41, p=.013$).

The VI scores for the career category did not differ significantly from the *job* category ($p=.11$) or *calling* category ($p=.44$). The same pattern is recorded for WE score, with significant difference extant between *job* ($M= 38.57, SD=9.83$) and *calling* categories ($M= 48.36, SD=9.84, p=.029$), and the category of career again did not differ significantly from the ‘job’ category ($p=.29$) or ‘calling’ category ($p=.33$).

To summarize, this first step in analysis, i.e., observing the participants through their self-reported work orientation, revealed the effect of such self-categorization in terms of vigor displayed and overall work engagement reported. No effect was detected for other work engagement dimensions, or for job satisfaction of the participants. To delve into complexities of attitudes of individuals when it comes to assessment of their work, further analyses were conducted.

The relations between work orientation, its specific descriptors and UWES scales

One of the complexities revealed itself in the attitudes of participants who rated multiple paragraphs (i.e., different orientations to work) as equally describing how they feel with regards to the work that they do. To account for such choices, and to account for the differences in the strength assigned to each paragraph rating, regardless of the best-fit choice ($n=58$), correlation coefficient was used to assess the relationship between individual paragraph ratings and UWES dimensions (Table 4).

Table 4: Correlation matrix for relation to work paragraph scores and UWES dimensions

	Job rating	Career rating	Calling rating	VI	DE	AB	WE
Job rating	1	-,010	-,458**	-,278*	-,209	-,370**	-,331*
Career rating		1	,128	,038	-,011	-,052	-,021
Calling rating			1	,489**	,404**	,342*	,469**
VI				1	,699**	,698**	,897**
DE					1	,673**	,896**
AB						1	,878**
WE							1

Note: Spearman's rho reported for relations of nonparametric data. Pearson reported for UWES dimensions.

* Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

Source: authors' work.

In terms of associations between work relations and work engagement, the pattern revealed through previous analyses is repeated in the findings, as significant positive associations were detected between *calling* ratings and UWES scores and adverse effects (i.e., negative associations) were detected between the scores for *job* ratings and work engagement components. Interestingly, again, no association between career ratings and any of the WE dimensions was detected.

To answer the question of whether the relevant relations to work do a good job at predicting the work engagement scores (at least at the sample level), and in which manner and magnitude the work engagement scores were under the impact of work relations, the original plan was to (conservatively) use staircase coding for 4-point paragraph data. Given the nature of the sample and the data collected, this plan was abandoned. Instead, the 15 *job-calling* items were treated as a scale (Kuder Richardson coefficient =.75, $M=6.95$, $SD =3.40$) for the purpose of attempting to answer the noted questions.

Expectedly, the *calling* scale scores were positively correlated to work engagement ($r=.610$, $p<.001$). Simple linear regression was conducted to assess whether participants' relation to calling predicts their work engagement score. A significant regression equation was found ($F(1,56) =33.150$, $p<.001$), with R^2 of .372, as calling orientation significantly predicted work engagement $\beta=1.87$, $t=5.76$, $p<.001$. In terms of specific dimensions of work engagement, further data is available in Table 5.

Table 5: Regression analyses summary for calling orientation predicting WE dimensions

Variable	B	SEB	β	R^2	F
WE	1.87	.325	.610	.372 (.361)	33.15*
VI	.66	.13	.57	.329 (.317)	27.43*
DE	.68	.137	.556	.309 (.296)	25.01*
AB	.53	.12	.49	.246 (.233)	18.30*

* $p<.001$

Source: authors' work.

To understand these associations further, associations between specific descriptors (i.e., 18 true/false items) of different work orientations and work engagement scale were investigated

(specific information about the items, coding, and results of Point-Biserial correlations visible in Table 6).

Table 6: Eighteen true-false items from 'University of Pennsylvania Work-Life Questionnaire with percent answering 'True' and relations to UWES dimensions and overall work engagement (n=58)

Items [dimensions from the source study] ¹	% of True	Correlations with UWES scales			
		VI	DE	AB	WE
I find my work rewarding. [CALLING]	58.6	,276*	,363**	,197	,317*
I am eager to retire. [JOB]	41.4	-,483**	-,304*	-,304*	-,408**
My work makes the world a better place. [CALLING]	46.6	,268*	,247	,341**	,317*
I am very conscious of what day of the week it is and I greatly anticipate weekends. [JOB]	41.4	,012	-,043	-,089	-,043
I tend to take my work with me on vacations. [CALLING]	27.6	,416**	,173	,293*	,327*
I expect to be in a higher-level job in five years. [CAREER]	70.7	-,028	,132	,020	,050
I would choose my current work life again if I had the opportunity. [CALLING]	50	,417**	,510**	,308*	,468**
I feel in control of my work life. [CALLING]	63.8	,300*	,352**	,106	,290*
I enjoy talking about my work to others. [CALLING]	39.7	,285*	,305*	,275*	,325*
I view my job primarily as a steppingstone to other jobs. [CAREER]	58.6	,114	,009	,021	,054
My primary reason for working is financial-to support my family and lifestyle. [JOB]	69	-,276*	-,291*	-,186	-,285*
I expect to be doing the same work in five years. [CAREER]	32.8	,111	,198	,151	,173
If I was financially secure, I would continue with my current line of work even if I was no longer paid. [CALLING]	19	,308*	,328*	,197	,316*
When I am not at work, I do not think much about my work. [JOB]	46.6	-,292*	-,219	-,411**	-,340**
I view my job as just a necessity of life, much like breathing or sleeping. [JOB]	55.2	,123	,044	,159	,119
I never take work home with me. [JOB]	46.6	-,168	-,086	-,132	-,143
My work is one of the most important things in my life. [CALLING]	25.9	,557**	,575**	,499**	,612**
I would not encourage young people to pursue my kind of work. [JOB]	36.2	-,198	-,223	-,356**	-,287*

¹ As noted, Calling and Job items were found to be inversely related, and Career items were independent. Following the source study Job-Calling items were coded 1 for responses indicating Calling, 0 in other instances. Career items were coded 1 for responses indicating Career.

*Correlation is significant at the 0.05 level.

** Correlation is significant at the 0.01 level.

Source: authors' work.

It is revealing that the strongest positive associations for all UWES dimensions were detected for calling item 'My work is one of the most important things in my life', and 'I would choose my current work life again if I had the opportunity', while the strongest (though moderate) negative associations were detected for job item 'I am eager to retire'. Namely, these relations suggest that it is the intrinsic value associated with work, in enriching individuals' lives, as something they would choose over again, that relates to enhanced work engagement. The

adverse effect of eagerness to retire underlines this, as it is the people who cannot wait to leave their current work – and who would not encourage others to pursue it, who are failing in terms of work engagement. While this may not seem like a surprising result, the results for *career* items, i.e., the lack of any significant association with UWES dimension, complements the detected associations - no significant association is detected for attitudes of those who see their current work as a transitory state.

Discussion

The main objective of this study was to assess applicability of the conceptual distinction between *jobs*, *careers*, and *callings* as distinct relations to work in the hospitality sector, and to examine the implications work orientation conceived in such a manner has for work engagement. Given the sample size, local focus and the specific pandemic-related context, as well as the fact that respondents come from different hospitality objects/facilities, results of this study cannot be generalized, yet outline an extensive area for further research and unveil patterns that have practical implications for management practice and education in the hospitality industry.

Relations and inclinations identified in this study should be of use to practitioners within the hospitality industry seeking to increase engagement and decrease turnover in the industry at hand. The new knowledge may improve practices related to recruitment, selection, and HR development.

Most of the participants in the present study reported their work as being best described by just one of the categories, and specifically, *career* was the most popular choice, followed by *job*, and lastly – *calling*. This was an expected result – when it comes to various services, it is much more common to hear mention of a *calling* in terms of education or health, i.e., services that are long respected for their profound impact on the development, wellbeing, growth, and life of an individual. Yet, the findings of this study suggest that there are individuals in hospitality who recognize that this set of services, in its own, more modest ways, contributes in, to quote descriptors from this study, “making the world a better place”, and who would continue to do the work “if they were no longer paid”. This is an important finding for a sector which is associated with record turnover rates, and problems with employee retention. Especially since more than 30% of work engagement scores in the sample surveyed appear to be accounted for by these attitudes associated with the *calling* orientation.

These *calling* oriented employees are not just eager to continue with their work, which they find meaning in, they are also vigorous and engaged (cf. Hirschi, 2012) in providing a service to customers. A more extensive study of these relations in hospitality is called for, as the findings reveal relevant implications for recruiting practices, on-the-job socialization, training, and further management decisions in sustaining an engaged workforce.

While it may seem, especially in terms of specific job positions, that an ambitious recruit is the best choice, driven by the desire to climb the company ladder – the present study does not provide support for such an approach. Namely, no effect was detected for *career* orientation on work engagement, no associations discovered in the sample between *career* attitudes of individuals who viewed their work as a stepping stone to other jobs with their vigor, dedication, absorption, or work engagement overall. This pattern (or lack thereof) needs to be investigated further, through a more extensive and even a longitudinal study, given that *career* relation to

work apparently fades with age (Wrzesniewski, McCauley, Rozin, & Schwartz, 1997; cf. Moen, 2005), which was further corroborated by the present study. Namely, even if a subsequent study reveals the desirable associations to work engagement, the potential of it fading away alongside *career* aspirations needs to be considered.

As for the individuals who perceive their work as just a *job*, something that they need to do for financial reasons, but do not enjoy and cannot wait to leave from, expectedly, the present study detected a negative relation of such attitudes to work engagement scores. An interesting finding from this exploratory research is that no significant effect was detected for current level of responsibility, salary, or years of experience in hospitality, or years of experience in the current job position on the work orientation ratings.

What this suggests is that, on sample level, the *job*-minded individuals were not necessarily individuals in low level positions, with lesser salaries, in a first job, perceived as a non-job, nor worn out by years of work-related stress, or by waiting for their career to unravel. At least as far as the sample is concerned, they do not fit some common stereotype of an ‘extrinsically’ dissatisfied employee. This finding further suggests that, even with the *calling* hype luring researchers to a focused approach to discover its specific benefits, the other relations to work need to be brought into focus as well.

An extensive study with a strong qualitative component regarding the *job* relation in hospitality is invited by these results, as an attempt to move past stereotypes and investigate further sources of *job*-mindset is the alternative route to employee development and retention.

Conclusion

Future research should investigate the sources of *calling* orientation in the hospitality industry. Recent studies (Jaffery & Abid, 2020) either use heterogeneous samples in trying to understand antecedents of calling while we recommend focusing on the hospitality sector exclusively in order to account for particularities of this type of services. Studies related to hospitality industry mostly focus exclusively on the calling dimension as a cause, or moderator of other work-related aspects (cf. Lee, 2016; Kang *et al.*, 2021; Karatepe, *et al.*, 2021; Han, Hwang, 2021; Lee *et al.*, 2022), whereas looking into sources of such an orientation might offer new insights on how to tap into its potential. While some recent studies seem to suggest (cf. Lee, *et al.*, 2022) that *calling* in itself might not impact retention, yet further research contrasting *calling* with other work orientation approaches, (*job*, *career*), of the kind offered in the present study, might provide a more comprehensive understanding of its comparative advantages. Furthermore, authors suggest that future research looking into *calling*, *career* and *job* orientation, should, in terms of sampling, include a sufficient number of participants across different hospitality objects, levels of responsibilities, and other sociodemographic categories, as this may result in more precise recommendations related to work orientation of employees based on their profile.

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ARTIFICIAL INTELLIGENCE AND EMPLOYMENT: LESS NEED FOR BLUE-COLLAR OR WHITE-COLLAR JOBS?

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Abstract

This paper discusses the impact of artificial intelligence on employment because of the development of artificial intelligence and its greater usage in the everyday life. The research is based on secondary data related to artificial intelligence, human capital, and jobs that will be in demand. The paper will answer the following questions: What jobs and skills will be in demand in the future as a consequence of artificial intelligence and what will happen to human capital due to the development of artificial intelligence? The main focus of this paper is on the jobs and the human capital that will be in the demand. This paper also addresses the types of new jobs that are and will be created in the fourth industrial revolution as a consequence of artificial intelligence. This paper gives the direction to the main skills and knowledge that people should acquire for their future jobs in order to be aligned with artificial intelligence. It also discusses which workers will have the advantage of working in a new environment with artificial intelligence as well as the changes that should be done in the education system in order to provide people with a required set of skills needed to adapt to and use artificial intelligence in daily work. Moreover, this paper points out that lifelong learning, on-job-training, and the constant renewal of skills will be in even higher demand. The paper concludes that the impact of artificial intelligence is immense because it is reshaping the future labor structure, meaning that there is a shift in skills and knowledge that people need to acquire now. It also concludes that people will have to learn how to work as a team with artificial intelligence to boost overall performance.

Keywords: artificial intelligence, employment, new jobs, human capital, skills

JEL classification: B22, E24, J21, J24

Introduction

Artificial intelligence is quickly developing every day and becoming more and more involved in people's life. According to Kok et al. (2009), "Artificial intelligence is concerned with the development of computers able to engage in human-like thought processes such as learning, reasoning, and self-correction." It is already widely used in production, shops, schools, etc.

According to Purcărea et al. (2021), consumers have positive emotions and attitudes, and fears and negative feelings about the use of artificial intelligence. Artificial intelligence can reshape skill demands, career opportunities, and the distribution of workers among industries (Frank et al., 2019). There are concerns among the pessimist that artificial intelligence machines could

become smarter than humans and perform not only some simple tasks such as ordering food but performing complex tasks such as driving cars (Makridakis, 2017). The others see benefits of self-driving safety, less congestion, opportunities to work while commuting and also a solution for drunk driving (defensivedriving.org, 2021). There are growing appeals for artificial intelligence and its impact on employment. The extensive use of artificial intelligent systems boosts productivity and has a net positive impact on employment. (Petropoulos, 2018. p.121).

Moreover, Wang et. al. 2020 suggest that besides the substitution effect between artificial intelligence and traditional jobs also high-end employment opportunities created by artificial intelligence. Although artificial intelligence can do tasks that are difficult for workers and make their life easier, it can also do tasks and solve problems that are not so hard. According to Liang and Lee (2017) Many people are worried that artificial intelligence and robots will take their jobs. The conclusions of empirical research that examined a specific form of sociological fear, a fear of autonomous robots and artificial intelligence (FARAI) revealed that approximately 26% of participants reported experiencing a heightened level of FARAI and correlational results indicate that FARAI is associated with other types of fear, including loneliness, becoming unemployed, and drone use.

Furthermore, every industrial revolution so far has caused unemployment but also, after some time it has created new jobs. One primary problem with artificial intelligence is the speed of development. That means that this industrial revolution with artificial intelligence is different from previous ones. Because of the fourth industrial revolution, higher education will have to modify in order to educate people and enable them to perform in a new environment (Cox, 2021). Moreover, the role of teachers and researchers and education itself will change.

Artificial intelligence can already do a large number of routine tasks and also in recent times non-routine tasks. There is a difference in accepting new changes in the labor market. According to Georgieff and Hye (2021), lower-skilled workers need more time to adjust to new technologies such as artificial intelligence, but high-skilled workers are on the other hand more in touch with technology and can easily adjust to new technologies. Artificial intelligence has a lot of impact on lower-skilled workers who do not work in an environment that is subject to technological change. They do not have the skills needed to adapt to new changes. That does not mean that adapting to new changes will be easy for high-skilled workers. If artificial intelligence continues to develop fast, there may also be a need for them to invest more in human capital.

There are already a lot of people that lost jobs because of artificial intelligence. That means that they will need to find another job and probably acquire new skills that are required. If all non-routine tasks will be taken by artificial intelligence, workers that used to work in those areas will have to invest more in human capital.

One also important factor is new jobs that will be created. As mentioned before, every industrial revolution has caused unemployment but has also created many new jobs. Those jobs were always connected to innovations, so this time it should be similar too. There will for sure be demand for people who will work in control, support, and maintenance of new devices and robots that will be created. Therefore, they will have to acquire new skills and knowledge in schools or on-the-job training.

This paper focuses on skills that people would need to acquire for future jobs because of the development of artificial intelligence. Furthermore, jobs that will be in demand as artificial

intelligence is becoming more involved in everyday life. This paper will also review what could happen with human capital, additionally, will people need to invest more in their education or on-the-job training. There will be a need for every worker to constantly invest in human capital in order to be able to complete the job.

Data and methodology

Data collection

This research was based on secondary data. For the collection of the data in the field of artificial intelligence and employment, the following search string was used:

(“artificial intelligence”) AND (“artificial intelligence and employment”) AND (“artificial intelligence and human capital”) AND (“artificial intelligence and education”) AND (“fourth industrial revolution and human capita”) AND (“fourth industrial revolution”).

Articles were filtered based on these criteria: Scholarly & Peer-Reviewed, related to the discipline of economics and business, and from 2000 onwards.

Table 1: Overview of the most relevant articles that were used and conclusions

Source	Name of the Article	Conclusion
Huang et al.	The feeling economy: Managing in the next generation of artificial intelligence (AI)	People will perform more feeling jobs instead of thinking and mechanical jobs
Wilson et al.	The Jobs That Artificial Intelligence Will Create	Three new categories of jobs will be created: trainers, explainers, sustainers
World Economic Forum	The ten skills you will need to thrive in the Fourth Industrial Revolution	Skills demanded for the fourth industrial revolution: complex problem solving, critical thinking, creativity, people management, coordinating with others, emotional intelligence, judgment and decision making, service orientation, negotiation, and cognitive flexibility
Sima et al.	Influences of the Industry 4.0 Revolution on Human Capital Development and Consumer Behavior: A Systematic Review	To keep workers up-to-date with the new information, people should obtain training every few years
Ponce	Artificial intelligence: A game changer for the world of work	People need to become artificial intelligence literate

Source: authors, based on the most relevant articles used.

Table 2: Overview of the most relevant databases and keywords that were used

Data Base	Keywords
Google Scholar	“artificial intelligence and employment”
Scopus	“artificial intelligence and human capital”
Web of Science	“artificial intelligence and jobs”
ACM Digital Library	“artificial intelligence and skills”
Science Direct	“fourth industrial revolution”

Source: authors, based on the most relevant databases and keywords used.

Results and discussion

Data collection

As of March 2023, 4260 articles were identified, and 33 were used to write this paper. Each article contains jobs that will be in demand or refer to skills that people will need to acquire. The attached table provides the most relevant papers related to the topic of impact of the artificial intelligence on employment.

Discussion

As artificial intelligence develops, machines are capable of doing a lot more thinking jobs. This means that there are fewer jobs available for workers. According to Huang et al. (2019), artificial intelligence is able to do much more tasks than before, meaning that workers are focusing on tasks that artificial intelligence cannot do better.

It is important to distinguish between three types of jobs: mechanical, thinking, and feeling jobs. Each of the three mentioned jobs has its own characteristics. The first one requires mechanical intelligence which is according to Huang et al., (2019) “the capability to do mechanical and repetitive tasks with relatively limited amounts of learning or adaptation”. The second one requires thinking intelligence, “the capability to analyze and make decisions rationally (or boundedly rationally) and involves learning and adapting systematically from data autonomously” (Huang et al., 2019). The last type of job requires feeling intelligence, “the capability to recognize, emulate, and respond appropriately to human emotions” (Huang et al., 2019).

When artificial intelligence was taking over mechanical jobs, people were focusing more on thinking jobs. Now when artificial intelligence is taking over thinking jobs very successfully, people tend to find feeling jobs as artificial intelligence is still not developed enough to complete these. Prior research has shown that jobs would focus on feelings and workers would be people-oriented and less data-oriented (Huang et al., 2019). Shift to the feeling jobs will present a change for workers, but it is something that has already happened and it just shows that history is repeating in a new unique way. Jobs that people will need to focus more on should be related to processing, analyzing, and interpreting information; planning and prioritizing work; making decisions; solving problems (Huang et al., 2019). Mentioned tasks do not require a high level of thinking as they require the ability to work with feelings. According to Huang, et al. (2019), during the period between 2006 and 2016, the demand for feeling jobs increased by 5,1%, while thinking jobs have not changed much and mechanical jobs have witnessed a decrease in demand. A particular job does not require just one type of the three jobs. It is usually a combination of two or all three jobs. As we are witnessing the fast development of artificial intelligence there will be a need for workers to adapt to changes. Workers will need to learn to work with artificial intelligence as a team because as mentioned before, artificial intelligence has already taken mechanical and thinking jobs but feeling jobs are still done by humans.

As the demand for jobs is changing, the demand for particular skills is changing too. According to Huang et al., (2019), people management, coordination with others, emotional intelligence, and negotiation are the most important skills for working in feeling and people-oriented jobs. The focus in school is still mostly on thinking skills rather than feeling skills. As the labor

market is already changing, the curriculum in schools will also have to change. The emphasis should be on interpersonal feelings and skills devoted to jobs in demand (Huang et al., 2019). Artificial intelligence is displacing workers and there is a fear that people will be unemployed. It is necessary to see the bigger picture. As many jobs are taken by artificial intelligence, many new jobs are created too. According to research conducted by Wilson et al., (2017), there are three new categories of AI-driven business and technology jobs. The first category refers to trainers whose role would be to show artificial intelligence systems how to complete tasks (Wilson et al., 2017). Some digital assistants such as Apple's Siri and Amazon's Alexa need to be trained to respond more empathetically, otherwise, customers will not be satisfied with their answers. The next category is explainers, whose role would be to assist technologists and business leaders (Wilson et al., 2017). They would interpret the complex algorithms for those who do not understand them. The last category of new jobs is sustainers whose job would be to make sure that artificial intelligence systems are performing as intended (Wilson et al., 2017). To conclude some of the new jobs as trainers would be customer-language tone and meaning trainers or smart-machine interaction modelers. Explainers would include jobs such as artificial intelligence usefulness strategist and context designer, and sustainers' jobs would be machine relations manager and automation economist (Wilson et al., 2017).

The rapid development of artificial intelligence has an effect on human capital. Workers need to be up-to-date with the skills that are needed to complete their tasks on the job. According to Zhu (2021), there are two options for intermediate skills workers. They can choose jobs that are more human or they can get a promotion to higher positions that are difficult to replace. If they want to keep their jobs or continue working in a certain industry, they need to constantly update their knowledge and skills.

According to Samek et al., (2019), Python and machine learning are skills that are recognized as top competences for artificial intelligence-related workers. These two are some of the skills that are and will be in demand in the future as the fourth industrial revolution is rapidly evolving. Fear of being replaced by robots is present among production workers, who are concerned about becoming unemployed because of robots (Yang, 2022).

There have been a lot of concerns about the impact of artificial intelligence on employment. Some people are worried that artificial intelligence will take their job, while others think that artificial intelligence will create new jobs. Nonroutine tasks and jobs have the advantage because artificial intelligence is mostly replacing routine jobs (Tshang & Almirall, 2021). Due to the increasing use of artificial intelligence, there is a higher chance of job polarization between high- and low-skilled workers, indicating the loss of middle-skilled workers (Tshang & Almirall, 2021). According to Tshang and Almirall (2021), it is important to change the way of educating, because people do not know how to promote sustainable forms of work using new technologies.

Daugherty et al. stated that STEM skills are not the most important ones that enable working with artificial intelligence (Daugherty et al., 2019). After their research, they concluded that complex reasoning, creativity, social and emotional intelligence, and sensory perception are the most relevant ones. They also indicated that experiential learning through hands-on apprenticeships and using technology to advance skills in new jobs is crucial (Daugherty et al., 2019).

According to World Economic Forum (2020), the top ten skills demanded fourth industrial revolution are: complex problem solving, critical thinking, creativity, people management,

coordinating with others, emotional intelligence, judgment and decision making, service orientation, negotiation, and cognitive flexibility. Among all stated skills, creativity will be the most crucial one, as robots cannot be as creative as humans, so humans should take the advantage of it.

In order to be up-to-date with artificial intelligence, some changes should be done to the education system. Courses that students will not benefit from in four years should not be taught (Bottrill, 2022). Thinking, interacting with others, and communicating should be more emphasized in education so that these skills can be applied to differing and dynamic skill sets. It is crucial to learn to apply robotic and artificial intelligence technologies proactively (Bottrill, 2022).

According to Balog and Demidova (2021), there are new requirements for creativity, self-control, and critical thinking of individuals as artificial intelligence is becoming an important part of human life. Furthermore, if a worker wants to continue to be a part of a competitive environment, lifelong learning should become an important part of their life.

Human capital is an important factor in the fourth industrial revolution. Sima et al. (2020) stated that in order to be up-to-date with artificial intelligence people should obtain periodic training once every few years. Moreover, traditional jobs in production, agriculture, and utilities will disappear and new ones in health, education, and service delivery will be created. Employees would need to learn new skills with an emphasis on digital skills. Regarding educational programs, Sima et al. (2020) indicate that in order to meet the needs of the economy, there is a four-dimensional perspective from which education must be viewed. These are vocational education, entrepreneurial education, financial education, and digital education.

According to Cribb and Glover (2018), in order to meet the demand of the market, the workers of the future should be agile and flexible. It is known that technical skills have been very important for a large number of workers, but this is not the case anymore as artificial intelligence has taken many jobs. Hence, the workers will need to spend more time on solving problems; critical thinking and judgment; using science and math skills; and using communication and interpersonal skills (Cribb & Glover, 2018).

There are nine critical skills, according to Miller (2019; 2018), that are the key to working in the human resource artificial intelligence future. The nine skills include a good working knowledge of artificial intelligence, understanding basic algorithms, business awareness, problem-solving, creativity, HR-specific professional skills, forward planning, professionally qualified, and project manager (Miller, 2019; 2018).

Verma et al. (2022) conducted research on key skill categories required for artificial intelligence and machine learning positions in the USA. Occupational skills such as decision-making and data mining are the most sought-after. In the employee category skills, the most important ones are attitude and time management. The next important skill category for artificial intelligence positions is communication. The major skills for artificial intelligence positions are also organizational skills like interpersonal skills. Decision-making skills are also skills important for artificial intelligence positions.

Petropoulos (2018) stated that human capital has an important part in the digital age. Workers need to acquire specific digital skills for the technological advances in their work life.

Additionally, people working in manufacturing occupations will need to learn new skills. Those skills would be data analysis; network management and security (Petropoulos, 2018).

According to McKinsey Global Institute, workers will set more time on tasks that they are more capable of than machines, such as managing people, applying expertise, and communicating with others (Manyika et al., 2017). Furthermore, there will be more focus on social and emotional skills and more progressive cognitive capabilities like creativity and logical reasoning. The problem arises when it comes to the process of acquiring new skills. The critical thing will be mid-career retraining to enable workers to have successful careers and there will be many on-job-trainings and other opportunities to gain new skills (Manyika et al., 2017).

With the development of artificial intelligence, the demand for the number of jobs will increase. Some of the jobs that will be in demand are Digital Transformation Specialists, Human-Machine Interaction Designers, Robotics Engineers, Blockchain specialists, Data Analysts and Scientists, Software and Applications Developers, and E-commerce and Social Media Specialists. (Ionescu & Andronie, 2019).

People will need to adapt and gain new skills in order to work with artificial intelligence. There are a few specific characteristics and skills that a worker in the future should have. The ability to work in strategic and complex areas will be significant as well as being flexible in terms of working hours (Wisskirchen et al., 2017). Additionally, skills such as creativity, flexibility, and critical and problem-oriented thinking will be sought-after. The worker in the future should also be able to work in a team, as well as to work independently and build networks (Wisskirchen et al., 2017).

In a world where artificial intelligence will be used more and more, it is necessary for workers to acquire certain skills and competencies. Some of the most important according to Agolla (2018) are personal flexibility with respect to work time, work contents, workplace, and mindsets. Moreover, future managers will need to change their management and leadership styles from power-driven to value-driven. To make sure that people have the right skills it is crucial to have an educational system that will provide students from an early age. Thus, according to Agolla (2018), classrooms should be designed in a way that students are able to develop creative thinking and divergent views. The focus in schools should be on technology literacy, information literacy, media creativity, social competence, and responsibility, workplace skills, and civic engagement (Agolla, 2018). It is important that the education system provides its students with the three components of creativity; creative-thinking skills, expertise, and cognitive. Furthermore, students should be able to question things in order to develop their skills. It is obvious that not all countries will be able to transform their education in a way that is up-to-date with the development of artificial intelligence. According to Agolla (2018), developing countries should focus on the development of basic analytical and problem-solving skills, creativity, imagination, resourcefulness, and flexibility of their people.

In these new times, where artificial intelligence has a lot of impact, people should work on their social and interpersonal skills (Ernst et al., 2019). As already mentioned, social and emotional skills will be in demand (Bughin et al., 2018). These are the skills that are hard to perform with artificial intelligence. Therefore, people should take advantage of and work on developing and improving these skills (Bughin et al., 2018). They should focus on skills such as empathy and advanced communication. The need for higher cognitive skills will also grow. These skills include creativity, critical thinking, decision-making, and complex information processing (Bughin et al., 2018). According to Ponce (2018), people will need to become artificial

intelligence literate. There are several skills that refer to artificial intelligence literacy. A few of them are computer literacy, understanding, processing, and manipulating data, identifying and solving AI-related problems, logical and computational thinking, and the ability to live and develop with artificial intelligence. De Stefano (2019) stated that high technical skills will also be needed for future jobs.

European Commission launched a plan to help people acquire new skills. The plan is called “New Skills Agenda for Europe” and helps people to improve their basic literacy, numeracy, and digital skills (Plan, 2011). Also, empirical research was conducted by Chen et al., (2022) and it was found that digital skills will be important for workers. To perform their jobs better, workers should acquire digital skills. Because of the fast development of artificial intelligence, according to primary research, high-skilled (graduate-educated) workers tend to have an advantage over lower-skilled ones (Yang, 2022). The research conducted in China showed that if productivity in factors wants to be improved, it is crucial to invest in human capital so that people have the required skills to work with artificial intelligence (Wang et al., 2022).

Table 3: Overview of the most articles based on empirical evidence that were used and conclusions

Source	Name of the Article	Conclusion
Chen et al.	Can digital skill protect against job displacement risk caused by artificial intelligence? empirical evidence from 701 detailed occupations	Digital skill are skills that workers should acquire in order to work with artificial intelligence
Yang	How artificial intelligence technology affects productivity and employment: Firm-level evidence from taiwan	High-skilled workers have an advantage with working with artificial intelligence
Wang et. al	The impact of artificial intelligence on total factor productivity: empirical evidence from China’s manufacturing enterprises	Investing in human capital to get skills for working with artificial intelligence will be crucial to achieving productivity

Source: authors, based on the previously conducted empirical evidence.

Limitations and future research

This research was limited to human capital and jobs in demand in general. It would be intriguing to compare artificial intelligence and its impact on employment in different geopolitical regions, as well as to track the shift to demanded skills in different countries. Also, the research on the ChatGPT pros and cons will also be interesting as it has an impact on the development of human capital. Additionally, it will be interesting to find out how countries will adjust their curriculum and education system to newly demanded skills and knowledge.

Conclusion

Artificial intelligence is impacting people's everyday life and is in a way forcing people to change some aspects of their life such as human capital. Based on all the collected data, people will for sure have to focus on emotional, interpersonal, thinking, problem-solving, and critical-thinking skills. These are the skills that artificial intelligence cannot yet perform, and therefore people have to take the advantage of them. Creativity will, according to World Economic Forum

(2020), be the most important skill for people to acquire. Nevertheless, people should become artificial intelligence literate, and that would enable them to be even more qualified to work with artificial intelligence.

Education has an important role in preparing people for future work and because of that it is necessary to put focus on schools and colleges on the demanded skills. Education is still focusing on thinking skills even when it is widely known that many people are losing jobs because they do not have enough skills to complete them. Education should not teach subjects and courses that students will not benefit from. One additional thing that will become more common is lifelong learning. Artificial intelligence is developing fast, and to make sure that people have the required skills, lifelong learning including continuous on-job-trainings is a must. In every industrial revolution so far, there are a number of lost jobs.

The loss of blue-collar jobs has already happened due to the automation of manufacturing processes, but the increasing usage of artificial intelligence is also causing less need for white-collar jobs. For example, image recognition tools can detect skin cancer and replace physicians. Moreover, e-discovery technology has decreased the need for lawyers and paralegals to check a large number of documents (Haenlein & Kaplan, 2019). On the other hand, many new jobs were created. There are three new categories of jobs sustainers, trainers, and explainers, for the maintenance and support of artificial intelligence. Moreover, the new jobs created because of artificial intelligence are Digital Transformation Specialists, Human-Machine Interaction Designers, Data Analysts and Scientists, and Software and Applications Developers and this list will expand further.

To conclude with the skills that labor should possess will change and people will need to adapt and acquire new skills in order to be employed. Artificial intelligence is taking over a number of jobs but is also creating a lot of new ones.

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ECONOMIC FLUCTUATION AND GLOBAL RECESSION: TRENDS FOR ECONOMIES, MARKETS AND BUSINESS IN TIMES OF GLOBALIZATION

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Abstract

Globalization has interconnected markets, businesses and economies. Recessions are economic phenomena that may affect the economic growth, and occur from time to time. The global economy goes through various economic fluctuations that represent the ups and downs of the economic cycle. This paper investigates and presents the entitled research “Economic fluctuations, global recession and the trends for economies, businesses and markets in times of globalization”. As a methodology of research, authors focused on literature review and a descriptive quantitative and qualitative data analysis. The research questions are “What are the trends of the economic fluctuation and recession for business, markets and economies?” and “has there been a possibility of recession recently?”. The results showed that economies in times of globalization could face the risk of recession that remains a phase of the economic cycle and appears with a decrease of the economic activity and real GDP. Generally, inflation comes out from foreign demand, private consumption and government policies and it hits goods and services, the level of consumption and investments decreases during the period of recession. The increase of inflation could generate difficulties in the purchase power. As a result, companies and businesses should find a way to be resilient during the periods of recession. Advanced economies know better how to survive during the periods of recession, as the analysis showed that globalization transmits the trends between economies, the real GDP in both advanced and developing economies appears in parallel lines of fluctuations. In conclusion, strengthening global cooperation remains the best way to improve the economic prospects. Furthermore, political adjustments, effective negotiations and investments could be useful to survive in times of recession. Due to globalization and internationalization, advanced economies and developing economies are highly connected.

Keywords: global economic recession, economies, business, market, inflation, fluctuation

JEL classification: E31, F44, F51, F63, F64, F66

Introduction

Globalization and internationalization lead the global society to the occurrence of various economic and social trends, occurring from time to time. The economic fluctuation is a set of successive and constant changes in prices or economic ratios. According to Sullivan and Sheffrin (2006), fluctuations occur around a long term by involving shifts between periods of

economic growth and periods of relative decline or stagnation (Sullivan and Sheffrin, 2006). Recessions are economic phenomena that temporarily hit the growth, jobs and wealth or profit but they are usually followed by periods of growth. Meanwhile, inflation hits and destroys the wealth that has been achieved and the value of money especially for low income countries, emerging and developing countries, and it can lead to a crisis with a permanent damage. Since inflation is one of the possible indicators of an economic and global recession, the increase in the price levels in a determined period may have impacts on business and the purchase power. Inflation is a general and continuous increase in prices. Recessions remain phases in the economic cycle in which the economic activity falls and the level of consumption and investment decreases with a possible unemployment raise. High costs of living may lead to more social difficulties. Companies and business have to deal with the new criteria of both recession and new costs. Inflation generally comes out from foreign demand, private consumption and government policies, although, it hits goods and services that are available or in progress. The global economic recession is reflected in various economies as well as on people's lives and it may provoke high unemployment rates especially for low income countries with low levels of economic activity. The pandemic and the Russian-Ukrainian geopolitical conflict provoked many challenges to economies at the global level since they both appeared in an unanticipated way. Both risks could generate changes in the economic area of both advanced and developing in economies. As the business cycle has got four main phases and the economic fluctuation globally may be transmitted between economies, globalization could push economies to go through various risks such as the risk of the pandemic and Russian-Ukrainian conflict that could have an impact on the global economic stability.

Literature review

According to Sullivan and Sheffrin (2006), the term business cycle (economic cycle) refers to the economic activity during several months or years, or in other words, the economic fluctuation in production. Fluctuations occur around a long time by involving shifts between periods of economic growth and periods of relative decline (Sullivan and Sheffrin, 2006). According to Investopedia (2002), an economic cycle or a business cycle occurs when there are economic fluctuations between periods of recession (contraction) and recovery (expansion). (Investopedia, 2022). There are indicators and factors such as gross domestic product (GDP) total employment, and interest rate that help to determine and analyze the economic cycle (Investopedia, 2022). Businesses and investors may consider the fact that understating the economic period may be an important key to know the best time for investments since there is a possible impact somehow on corporate earnings and profits (Investopedia, 2022). The business cycle refers to the whole state of economy in periods when it goes through a cyclical pattern of four stages: recovery (expansion), boom (peak), recession (contraction) and depression (Investopedia, 2022). The economic cycle refers to the move from expansion to contraction and back again (Investopedia, 2022). According to Atkinson (1998), inflation is a general and continuous increase in prices. On the one hand, it is about a general increase in prices; in other words, an increase in the price of one or two goods is not inflation since most goods are a tiny part of total spending. But if it is a matter of a few goods, that increase can affect relative prices and could have implications for the allocation of resources but it does not affect the price level as a whole, unless these goods are extremely important commodities. For example, in the past, an increase in the price of oil in 1973 had a knock-on effect that put up prices as a whole. However, increases in the price of a few goods do not constitute inflation. On the other hand, as a second point, inflation is a process that continues over a period of time, but a one-off increase in prices does not mean inflation (Atkinson, 1998). In high-income

countries there is a deeper financial development, lower inflation volatility, higher GDP per capita, lower average inflation, and more transparent monetary policy that explain a greater role for global inflation factors (Parker, 2018).

Research method and research question

The research questions set for this paper are “*What are the trends of the economic fluctuation and recession for business, markets and economies?*” and “*Has there been a possibility of recession recently?*”. As a methodology of research, we focused on literature review and data analysis following a quantitative and qualitative way by considering and analyzing the recent real GDP, inflation rates and prices change of commodities in advanced economies, the emerging market and developing economies. The interval of the used available data is until the first quarter or 2023 and time.

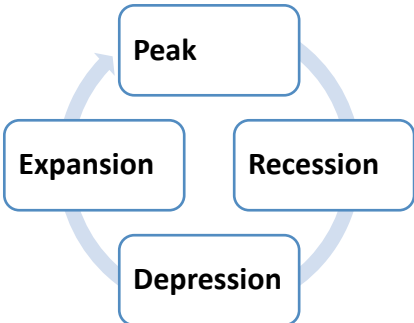
Results, analysis and discussion

Recessions are part of the economic cycle or business cycle that represents the fluctuations of a market-based economy. Due to globalization, if there is an impact of a business cycle in one country, it automatically affects other countries. With globalization and its challenges there are a lot of transmissions. The economic cycles are recurrent and alternate. Since economy is based on the degree of production and consumption activities that show and determine in general the allocation of resources. Inflation rates, exchange rates, global economic conditions, trade balances, interest rates and the degree of production are various variables that influence the economy and more exactly the levels of supply and demand.

The main phases of business cycles (Economic cycles)

The 4 main phases of the economic cycle are expansion, peak, recession (contraction) and depression (trough). There is no rule that points out how long each phase lasts, expansions usually last many years before reaching or hitting the peak (boom) period, taking the example of advanced economies for example. Once in a while a healthy economy goes through a recession (a contraction phase) (See figure 1).

Figure 1: The 4 main phases of the business cycle (economic stages)



Source: created by author, 2023.



Source: adapted from “theintacone” 2023(Q1).

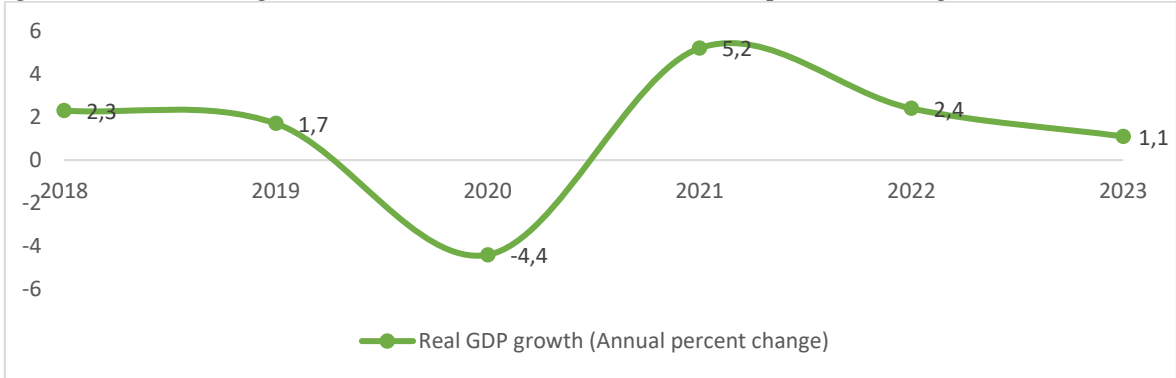
Indeed, the business cycle refers to the cyclical status of the real gross domestic product (GDP). It identifies the ups and downs in macro-economy. A recession usually is shown between the

top and the bottom of the business cycle. The expansion period (recovery) usually takes a long time to happen especially in the emerging market and advanced economies. Consequently, the period of recovery relies on how fast and good the volume of goods and services, employment, income will increase with a decrease of inflation rates that impact the economy, more investments and political adjustment, effective negotiations can help leave the recession period safely before entering an economic crisis since long recessions can weaken the economy and turn to crisis (See figures 1-6). During a depression that is a long recession for example, international trade decreases with raise of unemployment levels and inflation. Whereas the stagflation is a recession combined with inflation and that could be shown when people are unable to find work or make higher wages while prices continue to steadily rise.

Fluctuation and recession in advanced economies and developing economies

By analysing the real GDP growth of advanced economies we observe that it shows the ups and downs of the economic cycle. The real GDP growth for advanced economies was negative in 2020 with -4.4% after the outbreak of the pandemic, there was a decrease from 2.9% in 2018 and 1.7% in 2019 to a negative GDP in 2020 with -4.4% that could be considered as a period of depression, the recovery period started to appear in 2021 by reaching the peak or the top with 5.2%, then the recession period started again in 2022 with a decrease from 5.2% to 3.4% to reach 1.1% in 2023 (first quarter) (See figure 2).

Figure 2: Real GDP growth in advanced economies (annual percent change)



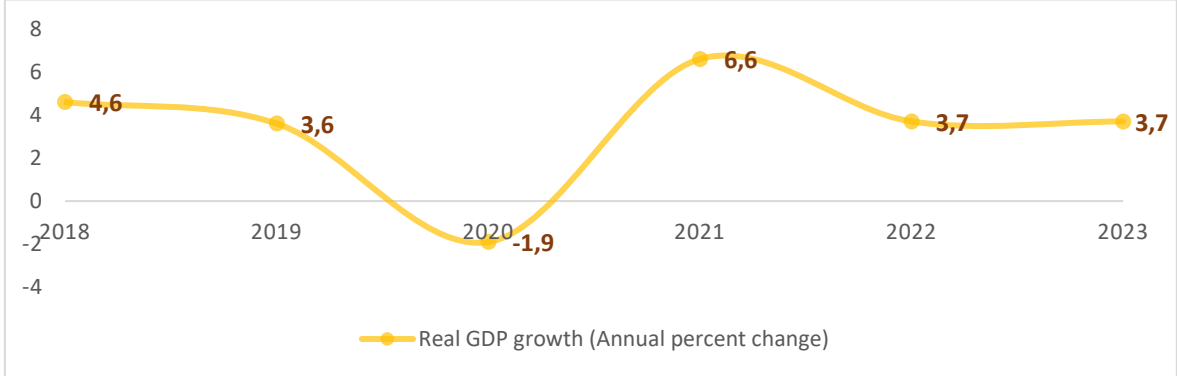
Source: authors’ contribution and research 2023, IMF data 2018-2023(Q1).

In figure 2 the analysed period and data were taken from 2018 to the first quarter of 2023, the ups and downs (fluctuation) in real GDP in advanced economies is something usual but the periods of recessions could provoke obstacles for companies or they could be the results of the fact that the economic level and activity for economies, markets and business had known or gone through some risks or unpredictable trends, such as the risk of the pandemic and the outbreak of the Russian-Ukrainian geopolitical conflict that could possibly impact the level of imports and exports, movements of merchandise, negotiations, transportations and shipping of goods between markets.

Regarding the emerging market and developing countries, the fluctuation is similar by looking at the graphic below in figure 3, the real GDP growth appears in ups and downs in the chosen period to analyse the economic cycle (Business cycle). In figure 3, we may notice that the real GDP decreased slightly from 4.6% in 2018 to 3.6% in 2019, from then the recession period started to reach a negative GDP in 2020 with -1.9% that could be considered as a depression period in the economic cycle, this decline could show the effect of pandemic outbreak Covid-

19 on the economic level of developing countries that started first in one of the main economic engines in the world (China) to its spread to various economies in the world including the emerging market. We observe that the period of recovery and reaching the peak is shown in the GDP growth in 2021 that reached 6.6% but it started to decrease to reach 3.7 %; approximately a half percent decrease in 2022 to stay to stay stable with approximately 3.7% in the first quarter of 2023 (See figure 3).

Figure 3: Real GDP growth in the emerging market and developing economies



Source: authors’ contribution and research 2023, IMF data 2018-2023(Q1).

The decline of real GDP that reached -1.9% in 2020 was negatively higher compared to 3.7% in 2022, but the annual percentage change shows that the decrease of real GDP in advanced economies was higher than developing economies. (See figure 2 and 3. This could possibly happen because of the decrease of the economic activity in advanced economies and various operations of companies in advanced economies more than the emerging market and developing economies. However, we observe that the fluctuation of real GDP in both advanced and developing economies appears in a parallel position. (See figure 2 and 3). So the fluctuation of GDP is rather similar in developing economies and developed economies, this parallel transmission and result show how globalization affects the global economy. It is rather important for advanced economies to have an economic stability in the emerging market and developing countries (See figure 2 and 3).

A healthy economy has lots of money flowing through it, Companies’ owners put money into their business and hire more people. Whereas, Consumers spend their money on products and services but if businesses and consumers stop spending that money, less money flows through the economy and the growth begins to slow. Furthermore, the shortage of some food, inflation rates, the impact of the war in Ukraine on the world and also the increase in energy prices, the fluctuations that the price of oil for example has had worldwide together with the different challenges that global society is facing. All these challenges could be obstacles to the global economic growth and participants in the Global economic fluctuation.

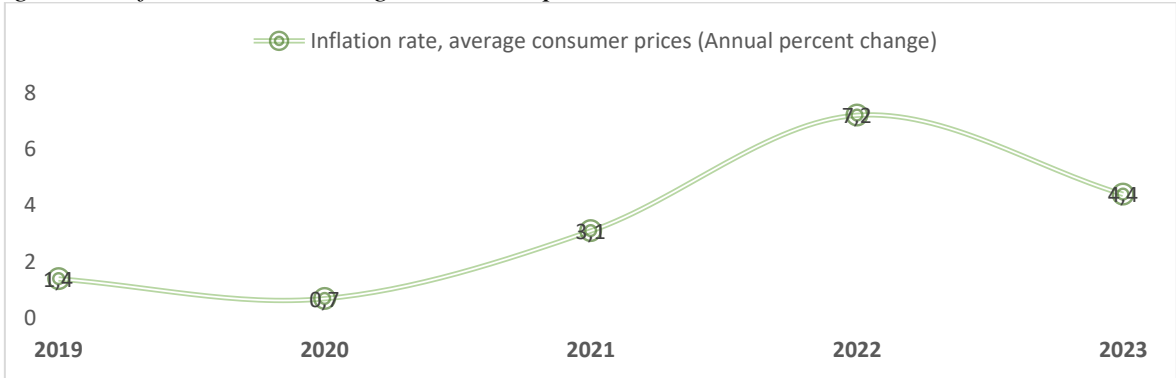
Inflation as a fact between the period of recession and recovery

Inflation may be on the one hand demand-pull inflation which is when the demand for goods and services outpaces supply. This tends to happen when the economy is strong, in other words, if companies are operating at full capacity, they won’t be able to increase their production to keep up with that demand. So, that could also be an inflation. On the other hand, Inflation may be cost-push inflation that occurs when the business expenses increase so the extra costs are passed on to their customers and that might be due to the raise of prices of inputs or raw

materials goes up over time and that could be because of anticipated or unanticipated events or risks such as the Russian-Ukrainian geopolitical conflict, the Covid-19 pandemic and natural disasters.

The World Bank (2022) highlighted that central banks should persist in their efforts to control inflation, the thing that requires a variety of policymakers. In figure 4 we observe the inflation rate and average consumer prices in advanced economies. (See figure 4).

Figure 4: Inflation rate, average consumer prices in advanced economies



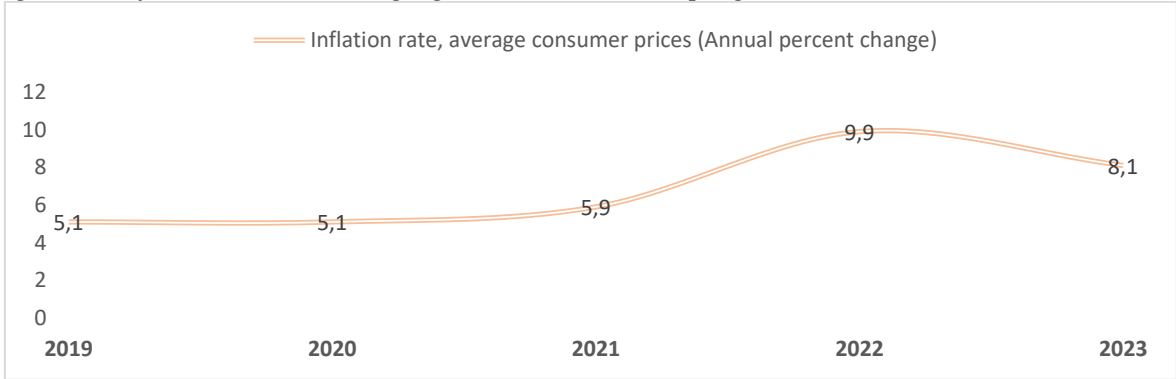
Source: authors' contribution and research 2023, IMF data 2019-2023(Q1).

As inflation could be an indicator of whether there was a recession or not, by analysing its rate and fluctuation in advanced economies in 2019, we may observe that it was 1.4% then it decreased in 2020 to 0.7% then it increased to reach 3.1 % in 2021 after the outbreak of the pandemic and its consequences. The inflation rate continued to increase to reach 7.2 % in 2022 (a high inflation rate) and decrease a bit to 4.4% by the first quarter of 2023. (Figure 4).

The annual percentage of inflation in advanced economies appears in ups and downs in the chosen period (2018-2023(Q1)). From the fluctuation of the inflation rate we may say that advanced economies know well how to deal with inflation by increasing the degree of investments and interest rates to balance the economy, but governments always try to deal with this phenomena to reach an economic recovery (See figure 4).

Many central banks and developed markets try to ensure that that inflation level does not have to exceed or get above a certain level since it is the rate of increase in the prices of goods and services.

Figure 5: Inflation rate in emerging market and developing economies

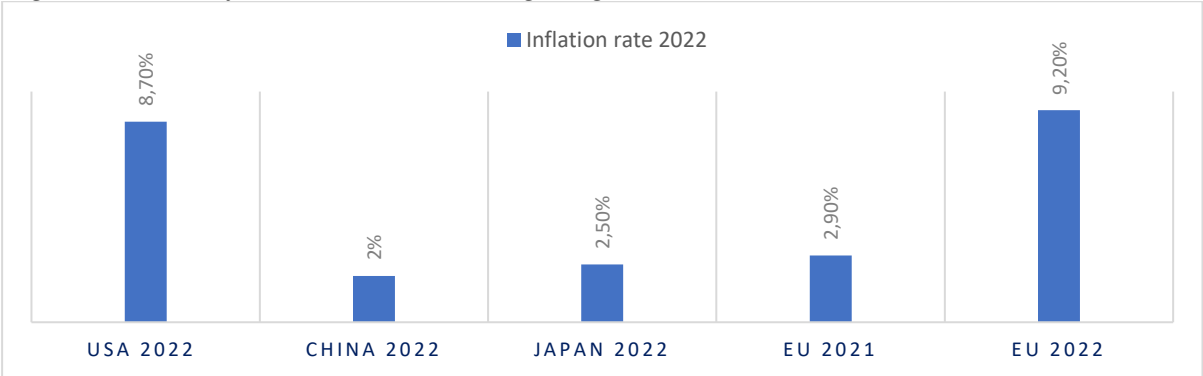


Source: authors' contribution and research 2023, IMF data 2019-2023(Q1).

Regarding the emerging market and advanced economies by analysing the rate inflation in from 2018 to the first quarter of 2023. The rate of 2019 was 5.3% than it decreased in 2020 to 5.1% after that it increased to reach 5.9 % in 2021 after the outbreak of the pandemic that could provoke an economic slowdown and its consequences. The inflation rate continued its raise to reach 9.9 % in 2022 (a high inflation rate) and decrease a bit to 8.1% by the first quarter of 2023, that means that economies are connected. Dealing with inflation is important to balance the economy (See figure 5). We can observe as well that advanced economies and developing economies are highly connected and this is observed in the parallel economic fluctuation in both graphics (See figures 4 and 5).

By analysing the inflation rate of the 4 world large economies, we observe that the highest increase in 2022 was in the EU with 9.2% compared to 2021 when it was 2.9% followed by the US with 8.7% in 2022, Japan’s inflation rate in 2022 reached just 2.5% compared to china in 2022 (2%), the highest inflation in the EU has reasons that due to the outbreak of the Russian-Ukrainian geopolitical war and the big change of relationships and negotiations that were affected by geopolitical tensions and escalations, the same thing for the US but the difference just in territories and distances. Moreover, the US economy seems to be more different and based more on investment facilities (See figure 6).

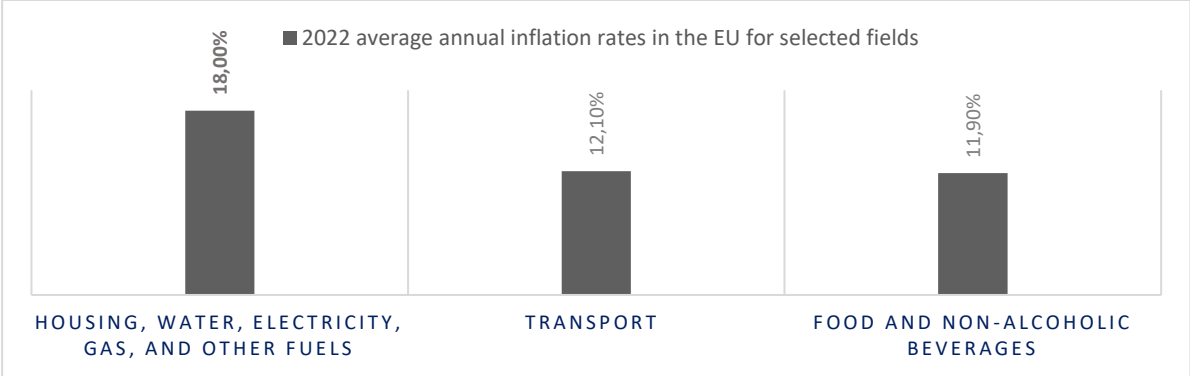
Figure 6: 2022 Inflation rate in the 4 large engines worldwide 2022



Source: authors’ contribution 2023, Eurostat data 2021-2023(Q1).

The annual average inflation rate in the European Union hit more the field of housing water, electricity, gas and other fuels with 18% in 2022 followed by the field of transport with 12% and then food and non-alcoholic beverage with 11.90% (See figure 7).

Figure 7: The average annual inflation rate in the European Union for some selected fields



Source: authors’ contribution 2023, Eurostat data 2022.

The Russia's share in the EU imports and exports has decreased to approximately its half, the share of imports in 2021 was 9.5% and in 2022 it decreased to 4.3%. Whereas the Russia's share in Extra-EU exports decreased from 4% (2021) to 2% (2022) that is due to the outbreak of the geopolitical conflict and the lack of reaching an efficient negotiation but it seems that the EU decided to decrease its independence on Russia (See figure 8), precisely on commodities.

Russia used to be considered an important market for the EU especially from an energy perspective, the geopolitical conflict that occurred and the outbreak of the Russian-Ukrainian conflict affected the international economic relations and negotiations between the EU and Russia. The EU decreased its dependence for example on the Russian commodities to half by seeking another way to restore the energy reserves and imports from other exporters in the energy market and OPEC members at the global level (See figures 8 and 9).

Figure 8: Extra EU imports and exports with Russia (Russia's share)

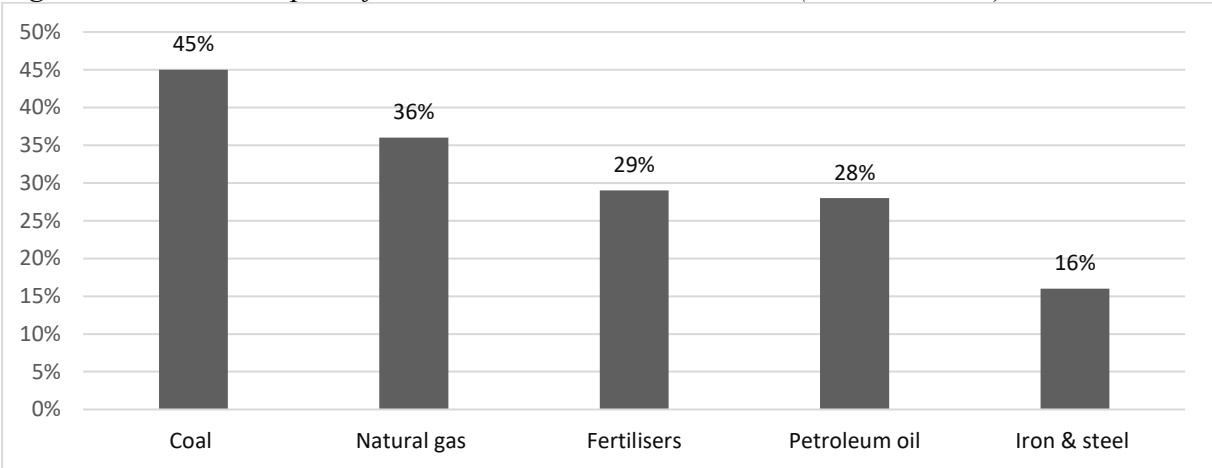
Russia's share in Extra-EU Imports		Russia's share in Extra-EU exports	
2021	2022	2021	2022
9,50%	4,30%	4,00%	2,00%

Source: authors' contribution 2023, Eurostat data 2021-2023(Q1).

The European union extra imports from Russia for selected commodities decreased in 2022 compared to 2021, taking coal for example from 45% in 2021 to 22% in 2022, natural gas from 36% to 21%, fertilizers from 29% in 2021 to 22% in 2022 but petroleum oil from 28% in 2021 to 21% in 2022. Whereas, iron and steel with approximately 6% difference from 16% in 2021 to 10% in 2022 (See figures 9 and 10).

Commodities are very important for the economy such the fluctuation of their prices may be challenging from time to time to industrial economies since they are considered sources to many businesses and economies.

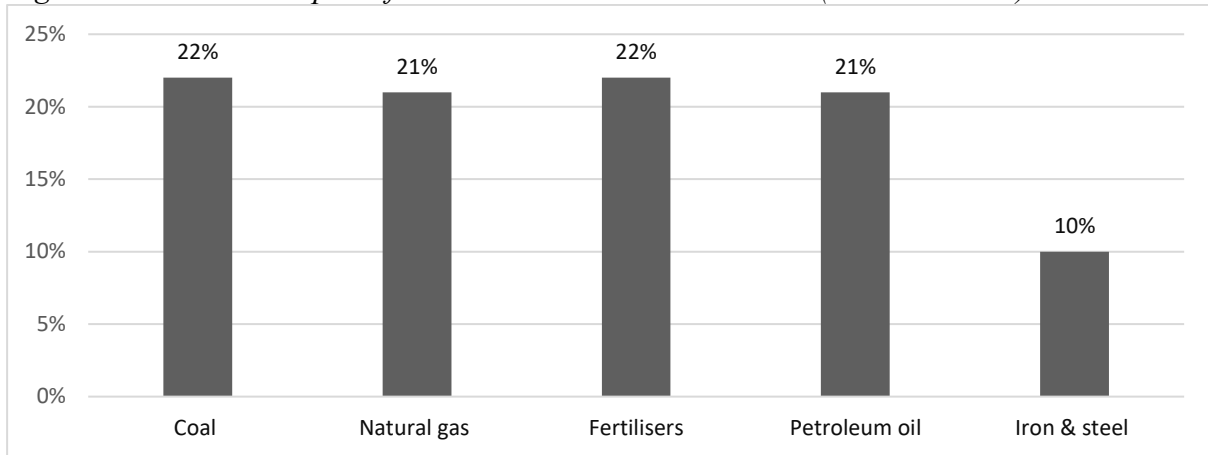
Figure 9: Extra EU imports for selected commodities in 2021 (Russia's share)



Source: authors' contribution 2022, Eurostat data 2022.

The European union extra imports from Russia for selected commodities decreased in 2022 compared to 2021 taking coal from 45% in 2021 to 22% in 2022, natural gas from 36% to 21% fertilizers from 29% in 2021 to 22% in 2022 but petroleum oil from 28% in 2021 to 21% in 2022 but iron and steel with approximately 6% difference from 16% in 2021 to 10% in 2022 (See figures 9 and 10).

Figure 10: Extra EU imports for selected commodities in 2022 (Russia's share)



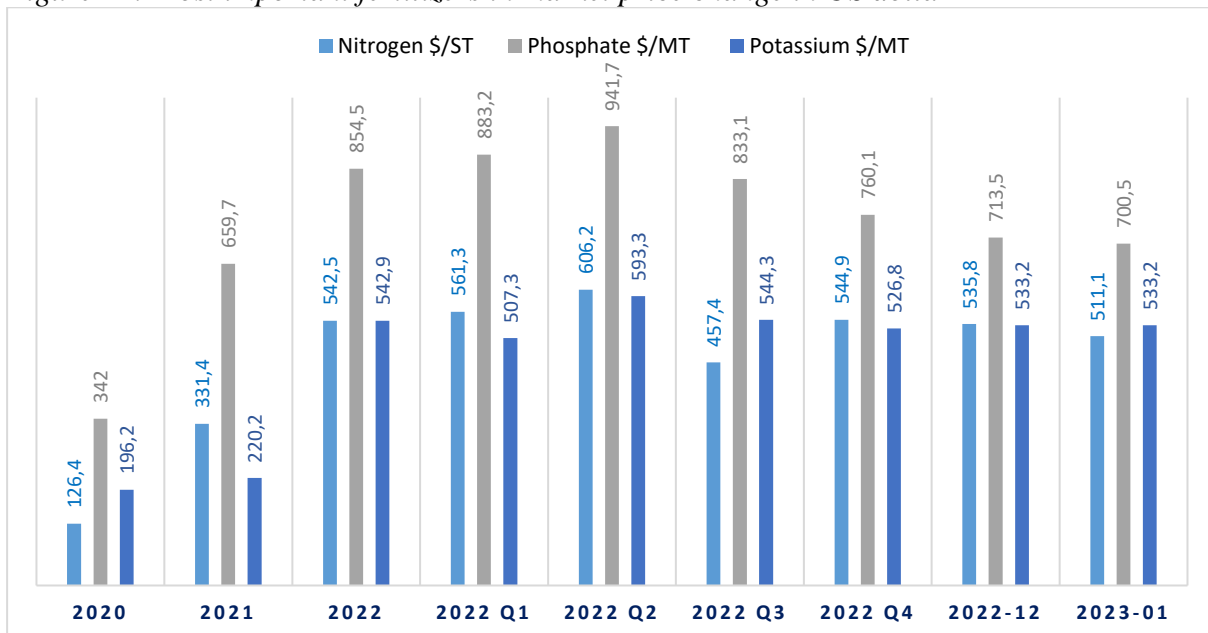
Source: authors' contribution 2022, Eurostat data 2022.

In figure 9 and 10 we may observe even that commodities that are very important for the energy and industry sector since they have been for many years a source of conflicts the thing that may affect from time to time the economic stability and infrastructure. The raise in energy prices may lead to both recession and inflation. That is why negotiations and cooperations remain better options to survive recessions and periods of inflations.

Fluctuation and raise in commodity prices

Fertilizers in market have undergone a price raise and change in the analysed period.

Figure 11: Most important fertilizers in market price change in US dollar



Source: authors' contribution 2023, IMF data 2020-2023(Q1).

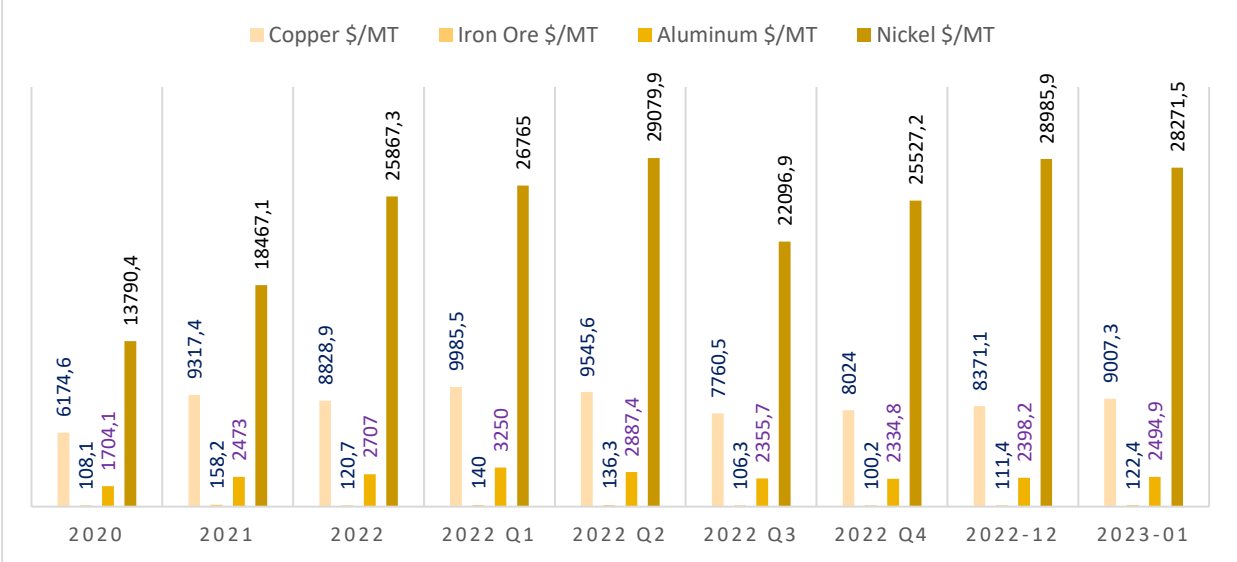
By analysing the period 2020-2023(Q1), Nitrogen has been considered an important fertilizer, and its price had increased from 126.4 \$/MT in 2020 to 331.4 \$/MT in 2021, to a much higher price of 606.2 \$/MT in the second quarter of 2022 to reach 511.1 \$/MT in the first quarter of 2023. On other hand, the price of another important fertilizer Phosphate for instance changed

in price from 342 \$/MT in 2020 to 700.3 \$/MT in the first quarter of 2023 approximately doubled but its highest price was in the second quarter of 2022 941.7 \$/MT. Moreover, Potassium that is one of the most important and necessary fertilizers increased in price from 2020 when the price was 196.2 \$/MT to 220.2 \$/MT in 2021 to a higher price in the second quarter of 2022 with 593.3 \$/MT to constantly stay with same price until the first quarter of 2023 (533.2 \$/MT). So there has been since 2020 a fluctuation in the prices of fertilizers in market size (See figure 11).

From 2020 to the first quarter of 2023 the remarkable change in prices of important fertilizers could be a challenge for some economies and markets, if the prices increase like this constantly that means that they are highly important for the industry and the energy sector.

In figure 12 we may observe that the prices of metals have changed as well and increased in market prices taking Nick for instance from 13790.4 \$/MT in 2020 to 18467.1 \$/MT to 25867.3 \$/MT but its higher price was in the second quarter of 2022 (29079.9 \$/MT) and it remained fluctuated until 28271.5 \$/MT in the first quarter of 2023 (See figure 12).

Figure 12: Important metals in market price change in US dollar



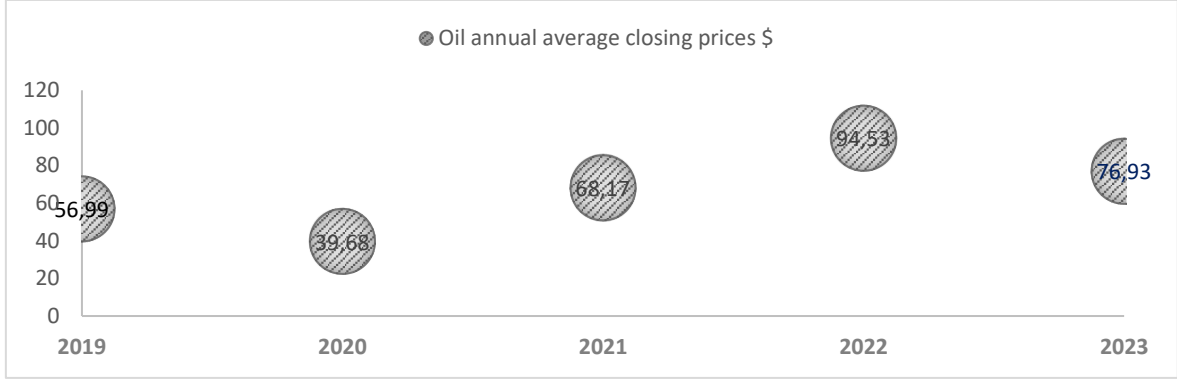
Source: authors' contribution 2023, IMF data 2020-2023(Q1).

The demand for goods and services fell during the restrictions of the pandemic, the lockdown and pandemic restrictions made economies face a crash in markets due to the low demand, the pandemic provoked a low demand for commodities at the global level, the global average oil prices from example reached \$39.68 per barrel in 2020, the same thing for the important metals, they were low in 2020 compared to the following years. The pandemic made economies struggle to contains outbreaks, the thing that that led to an economic recession, later after the global economic recovery in 2021, it stalled again in 2022 after the Russia's invasion of Ukraine in 2022, the thing that affected the global supply chain and increased the prices of food, raw materials, commodities, goods and services by leading to high inflation rates in most economies

In fact, the raise of commodity prices affects the economic balance of importers and lead to inflation in good and services since commodities are the main engines of the global economy. Oil has known various changes in prices since the outbreak of the pandemic in 2020 and the outbreak of the Russian-Ukrainian geopolitical conflict 2022 that affected the economic and geopolitical infrastructure and stability. Oil price knew their high prices in the recent decade in

2022 when the world annual oil average closing prices in US dollar reached 94.53\$ per barrel to decrease in 2023 to 76.93 \$ per barrel. The world annual average price in 2020 was the lowest during the pandemic period in 2020 but it raised in the recovery period in to reach 68.17 \$ per barrel in 2021 (See figure 13).

Figure 13 World oil annual average closing prices in US dollar



Source: authors' contribution 2023, Macrotrends data 2019-2023(Q1).

Therefore, our research questions have been answered and helpful in this research and analysis to go through the trends of the recent global economic fluctuation and recession in the recent global challenges that have impacted business, markets and economies. Commodities and their price fluctuations and change affects the inflation rates since energy is the engine of the world and the rise in prices affects both offer and demand. The pandemic and Russian-Ukrainian geopolitical conflict have impacted the stability of the global economy and has led to an economic slowdown, recessions and increase in inflation rates in both advanced and developing economies.

Conclusions

In conclusion, in this research and analysis we could observe a fluctuation in prices of commodities and some important elements in the studied period. We observed as well a fluctuation in real GDP of both advanced economies and developing economies. We noticed that that there were two remarkable period of recessions and economic slowdown, one after the outbreak the pandemic caused by Covid-19 in 2020 and another in 2022 after the outbreak of the Russian- Ukrainian conflict that could affect the stability of the Global economic as a geopolitical risk for economies, businesses and markets.

Recessions are part of the economic cycle or business cycle that represent the fluctuations of a market-based economy. Due to Globalization if there is an impact of business cycles in one country it automatically affects other countries. With globalization and its challenges there are a lot of transmissions. Therefore, the trends of the recent global economic fluctuation and recession have appeared in the ups and downs of the real GDP that showed that business, markets and economies in both advanced and developing economies could be impacted in times of recession and crisis. Recession were observed during the decline the real GDP in both advanced and developing economies, the thing that confirms the interconnection of countries during Globalization. Recessions are part of the economic cycle or business cycle that represent the fluctuations of a market-based economy. Due to Globalization if there is an impact of business cycles in one country it automatically affects other countries. With globalization and its challenges there are a lot of transmissions.

The global economy has undergone the risk of recession since the outbreak of the pandemic and the Russian-Ukrainian geopolitical conflict that impacted the global economic infrastructure and stability. The probability of a 2023 recession has been increasing since 2022 after the signs of expansion (recovery) in 2021, although a recession can be brief, it cannot be inevitable in the economic cycle. Customers and producers are participants in the markets, the market based economy relies on the level of real production and even consumption that are captured in GDP of economy. The weakness of economic process leads to a recession with a decline in real GDP and appearance of inflation. The recent recession started to appear from approximately the second quarter of 2022 to reach a possible depression in the first quarter of 2023(Q1). A recession usually lasts up to 6 months and if it is more than that it transforms to a depression and mainly it is because of the continuous breakdown of production and the decrease of real GDP (the case of recent recession). A recovery should be expected at least in the second half of 2023 in advanced economies but that depends on negotiations and political adjustments. During periods of recessions most advanced economies raise their interest rates and put a stress more on investments to cope with the recession or a depression. However, the emerging market and developing economies take more time to leave a recession due to the low level of real production, the constant raise of political differences and the high level of consumption that requires more productions and employment possibilities. Some investors look at recessions as opportunities to buy assets that are on sale.

The economic cycles are recurrent and alternate. Inflation rates, exchange rates, global economic conditions, trade balances, interest rates and the degree of production are various variables that influence the economy and more exactly the levels of supply and demand. In fact, recessions are economic facts since they temporarily hit the growth, jobs and the wealth but they are usually followed by periods of growth. Meanwhile, long recessions can lead to an economic crisis, the most harmed economies and societies after the start of recession and depression are low income countries and their crisis lead them even to declare a state of emergency.

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ENGAGEMENT OF NEW DOCTORS/RESIDENTS AND CAUSES OF EMPLOYEE TURNOVER IN THE HOSPITAL IN LATVIA

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Abstract

As technologies have developed and demographic situation has been changing, in recent decades hospitals in Latvia, and health care in general have been undergoing great change – number of hospitals and beds is decreasing, whereas requirements for the quality, intensity and cost-effectiveness of health care is increasing. The long-term need to work more in conditions of inadequate and unfair funding has created a lack of human resources; medical personnel migrate between the private and public sectors on the verge of burnout, and hospitals need to create workplaces where employees see meaningful and emotionally enriching work experience, which will increase and promote employee engagement in the long term. Considering that on average only half of all residents after graduation from residency choose to work in the hospital in Latvia, the aim of the research was to study employee engagement and factors influencing it both among residents and new doctors, and cases of employee turnover, identifying the main reasons of the new doctors not choosing to continue working at the hospital in Latvia after graduating from residency. It was concluded during the research that shortage of human resources in health care is not merely the situation in Latvia, and that the importance and role of employee engagement worldwide has a significant impact on the quality of services provided and the achievement of organizational goals. Two surveys were used for data collection: UWES and the survey developed by authors to measure factors influencing engagement. The results of the study indicate that more than 50% of all residents and new doctors are engaged, although that does not change the fact that the new doctors choose not to continue working at the hospital in Latvia after residency. The main factor influencing the engagement of new doctors is the manager, whereas the main factor for residents are the bonuses (set of offers). The main reason for new doctors not to continue working at the hospital in Latvia after residency is remuneration, whereas the new doctors who have chosen to work at the hospital in Latvia after residency have indicated possibilities for professional growth as the main reason. Managers can use the results of the study in practice introducing measures to increase employee engagement, being aware of their positive contribution to attracting and retaining employees and promoting employee engagement.

Keywords: engagement, employee turnover, new doctors, residents, hospital

JEL classification: M12

Introduction

In Latvia, as in other countries, health care is one of the most important sectors of national economy, the task of which is to provide Latvian society with highly qualified medical care (State Education Development Agency, 2018). The ability of the health care system to successfully function and adequately respond to new challenges is mostly affected by the availability of health care employees in sufficient amount and in the places where they are needed the most, appropriate skills and a motivating work environment. Research in health care shows that managers can improve patient care experience by increasing employee satisfaction and retention (Lowe, 2012). According to an international survey of managers, employee engagement has been shown to be one of the top five challenges that organizations are facing (Schaufeli, 2012). Since the authors did not find any studies conducted in Latvian hospitals on the importance of employee engagement, its impact on the achievement of organizational goals, the quality of patient care and the attraction of new doctors, the authors conducted a study in one of the largest hospitals in Latvia, assessing engagement level of residents and new doctors, the factors affecting engagement and their influence on the choice to work in a hospital in Latvia after residency. Also, the study includes comparison of factors affecting engagement with other hospitals. The research assured that the hospital in Latvia is not an exception, and the new doctors in the hospital in Latvia also indicated that the main factor influencing engagement was the manager, and that bonuses (set of offers) offered to them already during residency will be one of the factors for the new doctors to choose to continue working at the hospital in Latvia after graduating from the residency. Based on the conducted research, the authors have prepared conclusions and proposals for the promotion of employee engagement, including discussion on the necessary in-depth research of this issue.

Employee engagement

The concept of engagement is very relevant among researchers and personnel management professionals who consider it one of the main drivers of the company's success (Ababneh & Macky, 2015). Bakker and Albrecht (2018) describe engagement in work as the employee's attitude and emotional state towards work and the employer. Or emotionally - a motivated state of high energy in combination with a high level of keenness and work focus. There is a definition in literature of engagement as respectful and helpful attitude towards colleagues and the desire to invest and achieve more in work, and to say only good about your job (Konrad, 2016). Saks (2006) describes engagement as a psychological presence and claims that it includes two critical components — attention and keenness. Work, working environment, management and organisational factors affect employee engagement among healthcare employees. A study carried out involving five Jordanian hospitals on the management of operational flexibility in healthcare, especially in hospitals, showed that employee engagement had a positive impact on the functioning of the hospital. Employee engagement is important as a partial intermediary between management capabilities and hospital activities (Alolayyan & Alyahya, 2023). Recent research in healthcare shows that managers can improve their patient care experience by increasing employee satisfaction and retention in the workplace (Lowe, 2012). Schaufeli (2012) in his study on engagement in everyday life, business and academia says that engagement is also viewed as the opposite of burnout (Schaufeli, 2012). The book "Employee engagement in healthcare" describes the profile of an engaged employee as the one who: makes eye contact with patients, genuinely smiles, and welcomes them, escorts patients to where they need to be, or helps family members find their loved ones, truly listens to patients without acting rushed, answers patient questions about medications and discharge orders and

puts their patients first (Christensen, 2017). The impact of an overworked, stressed, and demotivated employee in healthcare is far more serious than in a supermarket or call center. A study by Aston University in 2011 showed that patient mortality rates were approximately 2.5% lower in health trusts with high engagement levels than in those with medium engagement levels (O'Byrne, 2013). So next time you have to choose a hospital for treatment, ask how engaged the staff are, not how experienced the surgeon is. Analyzing the research on employee engagement, the authors did not find any research where the engagement of doctors and residents could be seen in the context of turnover. Although it is possible to measure engagement through employee surveys, it does not help identify areas for improvement within organizations. To purposefully increase employee engagement, it is necessary to identify what promotes engagement. Therefore, the authors created a survey on factors influencing engagement, which were researched.

Employee turnover

Employee turnover represents the unplanned process of employees leaving, which arises from employees' dissatisfaction with the workplace and the company's dissatisfaction with the employees, their lack of discipline, systematic failure to perform work without justifiable reasons, etc. Authors Imam and Shafique (2014) the intention to change work describe as a phenomenon in which work policies are poorly planned and conflict of roles arises, reducing motivation, performance, and concentration in the workplace, disrupting the work structure, and thus encouraging workers to leave the organisation. Armstrong (2013) offers to accept the reality that not the organisation itself, but the market will determine the movement of employees and that it is impossible to "float against the market"; employers cannot protect employees from attractive offers and targeted or even aggressive recruiters. The authors Vlosky and Aguilar (2009), speaking on the model of employee satisfaction, mention that it is very important to engage existing talented workers in higher levels of responsibility and to evaluate them accordingly. Research has empirically confirmed the relationship between job satisfaction and remaining in the workplace (Ayobami, Wallis, & Karodia, 2016). A study on the factors influencing the preservation of doctors in a hospital in Limpopo Province, South Africa, states that attempts to retain employee are the greatest challenge for managers. The disadvantages of employees are also felt in other countries, so China's biggest problem is the shortage of skilled workers, while in Japan it is the second biggest problem, and in India the shortage of medical employee is ranked fourth largest (Ayobami, Wallis, & Karodia, 2016). Latvian companies are also intensively looking for ways to improve the well-being of employees and retain them. As Zandere (2017) mentions, even international competitions are being organised to encourage and inspire those who have neglected this aspect for various reasons. Employee turnover is one of the most frequently used indicators for evaluating the effectiveness of the general management of organizations and, specifically, the management of human resources. Mostly, employee turnover is researched in general, i.e., the entire set of employees, without separately considering turnover among doctors and residents. Therefore, it was not possible to compare the engagement rates of doctors and residents (obtained by the authors) and their impact on the reasons for turnover with engagement rates of doctors and residents and their impact on turnover indicators in other hospitals.

Research

Two different surveys were used to obtain data for the study. For engagement research the authors used UWES (Schaufeli & Bakker, 2004) survey measuring engagement in three scales: vigour, dedication, and keenness. A survey prepared by the authors was used to measure the factors influencing engagement. There were separate surveys for residents and new doctors after residency, combining questions on engagement and factors influencing engagement in one survey so that the questionnaire would be more comprehensible and easier to answer. Respondents of the survey were also asked to indicate their age, gender, residency specialty, whereas, the new doctors were asked to indicate the residency graduation year, as well as the main reasons that were crucial for staying/not staying in the hospital in Latvia with the possibility to mark several reasons. A four-degree Likert rating scale was used in the survey.

The sample size of the survey was 206, of which 156 residents and 50 new doctors, of which 28 new doctors that had chosen to continue working at the hospital in Latvia after residency and 22 new doctors that had chosen not to continue working at the hospital in Latvia after residency, further referred as 'gone' new doctors. As all new doctors do not continue working at the hospital in Latvia after residency, three groups were analysed: residents, working new doctors and 'gone' new doctors. The research was done in one hospital in Latvia. Out of the total number of residents that participated in the survey, 67% were women and 33% were men. 82% of respondents were in the 26-35 age group, 16% between 18-25 and 2% in the 36-45 age group. Most respondents are first- and second-year residents, women aged 26-35.

The following questions were raised in the study:

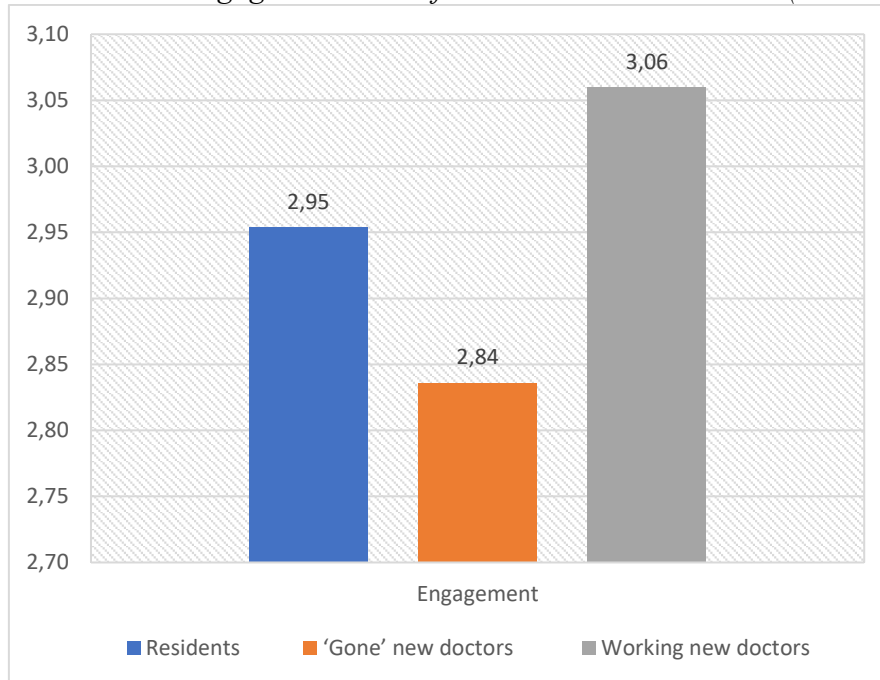
- RQ1. Are the residents and new doctors ('gone' and working) are engaged in their work?
- RQ2. What are the main reasons for the new doctors to choose working or not working at the hospital in Latvia after graduating from residency?
- RQ3. Are there differences between engagement rates of residents and new doctors ('gone' and working)?
- RQ4. Is there a correlation between engagement rates of new doctors working at the hospital in Latvia after residency and factors influencing the engagement?

Results

Answering the first question of the study: Are the residents and new doctors ('gone' and working) are engaged in their work?

Comparison of arithmetic mean engagement rates of residents and new doctors (working and 'gone') can be viewed in Graph 1.

Graph 1: Arithmetic mean engagement rates of residents and new doctors (working and 'gone')



Source: authors.

For working employees (residents and new doctors), the engagement is higher than for 'gone' new doctors (see Graph 1). Comparing the results of working employees, there is a tendency that the level of engagement of new (working) doctor is 4% higher than for residents and ~7% higher than for 'gone' new doctors. Employee engagement according to the arithmetic mean was defined at three levels: low (1-1.99), medium (2-2.99) and high (3-4). Table 1 shows level of employee engagement of residents and new doctors (both working and 'gone').

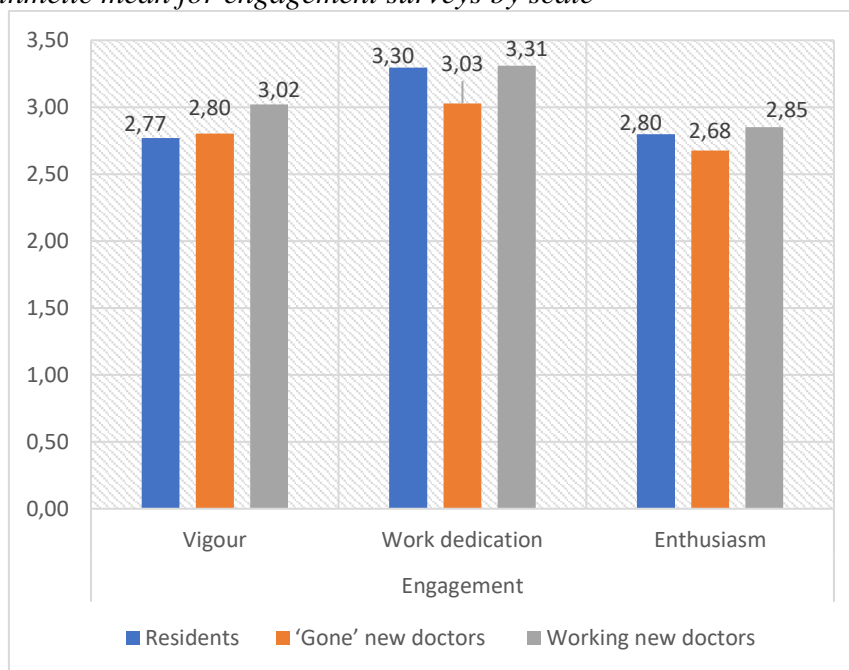
Table 1: Levels of employee engagement

Level	Residents	Working new doctors	'Gone' new doctors
Low			
Medium	2.95		2.84
High		3.06	

Source: authors.

According to the results, the engagement level of residents and 'gone' new doctors is medium, whereas for working new doctors it is high. Comparing engagement rates of residents and working new doctors (see Graph 2), the rates are higher for working new doctors in all scales, and in 'vigour' scale they are comparatively higher than in other scales. This is the only scale, where mean rates of 'gone' new doctors are slightly higher than for residents meaning that vigour of 'gone' new doctors has been high, but it has not been sufficient to continue working at the hospital.

Graph 2: Arithmetic mean for engagement surveys by scale



Source: authors.

Table 2: The number of engaged working new doctors and residents by levels of engagement

Level of engagement	Number of engaged working new doctors (%)	Number of engaged residents (%)
Low	67%	52
Medium	22%	44
High	11%	4

Source: authors.

It can be observed that 52% of residents have a high level of engagement, 44% are partially engaged and 4% are not engaged.

Answering the second question of the study: What are the main reasons for the new doctors to choose working or not working at the hospital in Latvia after graduating from residency?

Respondents were invited to mark main reasons – several reasons could be marked - for new doctors to choose to continue or not continue working at the hospital in Latvia after residency. Table 3 shows main reasons for the new doctors to choose to continue or not continue working at the hospital in Latvia after residency.

Table 3: Main reasons for the new doctors to continue/not continue working at the hospital in Latvia after residency

Main reasons	Working new doctors (number of answers marked)	'Gone' new doctors (number of answers marked)
Microclimate	14	
Working conditions		11
Work content	17	11
Remuneration		15
Professional development	22	

Source: authors.

One of the reasons most often mentioned by ‘gone’ new doctors is remuneration, work content and working conditions, followed by stress, microclimate, and professional development. Whereas new doctors who continue working in the hospital in Latvia after graduating from residency, have indicated professional development, work content and microclimate as the main reasons for their choice to stay.

Answering the third question of the study: Are there differences between engagement rates of residents and new doctors (‘gone’ and working)?

Kolmogorov-Smirnov test was used for data validation. As there is data conformity with reference distribution, thus the T-test as a method of parametric statistics was used to determine whether there were statistically significant differences between the opinions of working new doctors and ‘gone’ new doctors.

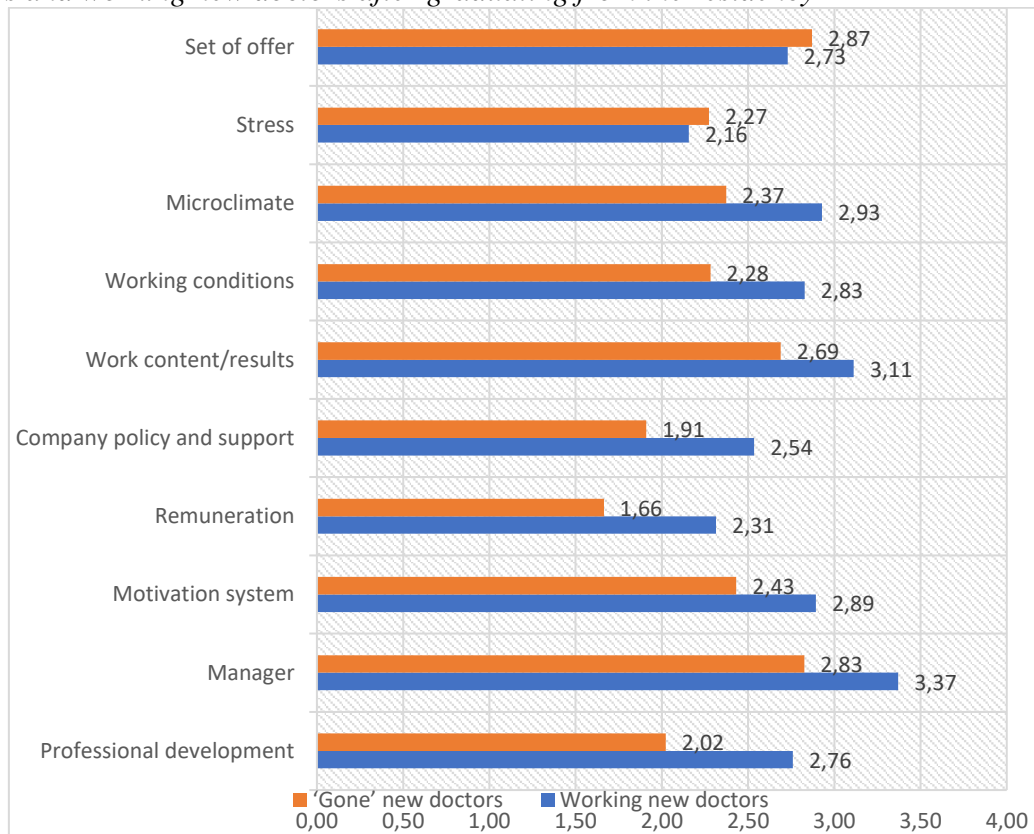
Table 4: T-test for differences in employee engagement and engagement factors for ‘gone’ new doctors and working new doctors after residency

	t	The SIG. (2-tailed)	Working new doctors	“Gone” new doctors
Professional growth	4,559	000	2,76	2,02
Manager	3,217	002	3,37	2,83
Motivation system	2,900	006	2,89	2,43
Remuneration	3,871	000	2,31	1,66
Company policy and support	3,821	000	2,54	1,91
Work results/content	3,432	001	3,11	2,69
Working conditions	3,462	001	2,83	2,28
Microclimate	3,326	002	2,93	2,37
Stress	—,509	613	2,16	2,27
Bonuses (set of offers)	—,739	464	2,73	2,87
Vigour	2,858	006	3,02	2,52
Work dedication	2,907	006	3,31	2,67
Enthusiasm	2,272	028	2,85	2,46

Source: authors.

In all scales, except ‘stress’ scale and the ‘set of offers’ scale, working new doctors have indicated higher scores to the provided statements, which means that they are also more engaged and value their vigour, work dedication, and enthusiasm. ‘Gone’ new doctors have indicated higher values in the “stress” and “set of offers” scales, which means that those might be the main reasons for choosing not to continue working at the hospital in Latvia. To compare more clearly the differences in the factors influencing engagement in the evaluation of the respondents, mean values of the ‘gone’ new doctors and working new doctors after graduation from the residency have been summarised below.

Graph 3: Comparison of arithmetic mean of factors influencing engagement of the ‘gone’ new doctors and working new doctors after graduating from the residency



Source: authors.

The biggest differences can be observed in the ‘professional development’, ‘remuneration’, ‘company policy and support’ and ‘work dedication’ scales, scaling from the largest to the smallest differences. According to respondents’ answers, it can be concluded that the main factor affecting the engagement of working new doctors is the manager, then work content/results and microclimate. The main driver of resident engagement is the ‘set of offers”, followed by manager and working conditions as the next drivers of engagement. According to the results, it can be concluded that there are differences in the factors promoting engagement of residents and working new doctors, and the employer, when thinking about the factors promoting engagement of residents, should take into account that for a very important prerequisite for increasing engagement rates of residents is the set of offers, bonuses, which would certainly affect not only the level of engagement, but also the choice of the hospital in Latvia as the next employer after residency.

Answering Question 4 of the study: Is there a correlation between engagement rates of new doctors working at the hospital in Latvia after residency and factors influencing the engagement?

To verify whether there are correlations between the survey on employee engagement and the author’s survey on the factors influencing engagement, the relationship between the scales was examined using the Pearson correlation coefficient for ‘gone’ new doctors and working new doctors. As the data conforms with the reference distribution, Pearson correlation coefficient was used to determine correlation between engagement rates of the new doctors working at the hospital in Latvia after residency and the factors influencing engagement.

Table 5: Pearson's correlation coefficient for scales of 'vigour', 'work dedication', 'enthusiasm' for 'gone' new doctors and working new doctors

	Pearson's Correlation Coefficients		
	Vigour	Work dedication	Enthusiasm
Professional development	,314*	,297*	,095
Manager	,370**	,476**	,266
Motivation system	,325*	,263	,239
Remuneration	,592**	,451**	,416**
Company policy and support	,350*	,366**	,186
Work content	,314*	,365**	,191
Working conditions	,548**	,571**	,553**
Microclimate	,219	,242	,045
Stress	-,184	-,156	-,110
Set of offer	,257	,359*	,330*

Source: authors.

As can be seen in Table 5, there are statistically significant positive correlation in several scales. The positive correlations can be seen between the 'vigour' scale and the 'remuneration' scale ($r=0.59$; $p=0.00$), which means that remuneration plays role in the engagement. Medium correlation is between the 'remuneration' scale and the 'work dedication' scale, where 'work dedication' ($r=0.45$; $p=0.00$) shows that many factors are related to remuneration, including how people are dedicated to their work (whether they are enthusiasts of their work, work inspires them, etc.). There is also correlation between the 'working conditions' scale and the 'vigour' scale ($r=0.54$; $p=0.00$), which means that better working conditions will improve the employee's vigour; the 'working conditions' scale has positive correlation with the 'work dedication' scale ($r=0.57$; $p=0.00$). The 'manager' scale has a positive correlation with 'work dedication' ($r=0.47$; $p=0.00$), which means the more the manager listens to the opinion of employees, helps develop, trusts, gives feedback on the work results, the more the employee is dedicated to their work.

Discussion

Study results call for further research in this area to determine the impact of manager and changes in remuneration on engagement. This study is the first attempt to verify whether the importance of engagement has an impact on the choice of new doctors to continue working at the hospital in Latvia after completing their residency. The authors conclude that further research should focus on the in-depth study of key factors influencing engagement, i.e., would a clearly developed remuneration policy based on the employee's job performance and competences promote employee engagement and the choice of employees to continue working at the hospital in Latvia after residency, as well as to study the correlation between the manager's competencies and employee engagement and the level of engagement. Research in health care shows that managers can improve the patient care experience by increasing employee satisfaction and retention (Lowe, 2012), similarly, a study of five Jordanian hospitals on operational flexibility management in the healthcare industry, particularly in the hospitals, demonstrated that employee engagement has a positive impact on hospital performance. The Ontario Hospital Association's model of work quality predicts that employees who are more

engaged are more productive, better achieve organizational goals, and research by the National Health Service of England has shown that hospitals with higher employee engagement provide higher quality services and have better financial performance (Lowe, 2012). The authors conclude that the challenge for the hospital in Latvia is to find ways to reduce employee turnover rates, as well as how to positively engage employees and improve the services they provide, while also achieving the goals of the organization.

Conclusion

This research confirms that the importance of employee engagement plays an important role for the new doctors to choose to stay in the hospital in Latvia after completing residency and in reducing turnover. As mentioned by the authors Vlosky and Aguilar (2009), when talking about the employee satisfaction model, it is important to include the existing most talented employees in higher levels of responsibility and evaluate them accordingly, which was also confirmed by the authors during this research (Vlosky & Aguilar, 2009). The study proved that engagement level of working new doctors is high and it is higher than that of residents, which can be explained by the evaluation and inclusion of young doctors at a higher level of responsibility. When assessing whether there are differences between the engagement rates of 'gone' new doctors, residents and working new doctors, it can be observed that the accumulated experience during residency has created energetic and psychologically resilient new doctors for whom the most important factor influencing engagement is the manager, and who demonstrate higher engagement than residents. To maintain this level of engagement, it is a big challenge for the manager to ensure further professional development, interesting, dynamic, and development-oriented work duties. To promote personal responsibility and engagement, there must be a balance between all parties involved, the interests and needs of the organization. Creating an environment of mutual respect improves working relations and promotes productivity and achievement (Swingler, 2017). As proven in the research, this is one of the factors influencing the engagement of new doctors and their choice to continue working at the hospital in Latvia. Proposals for the hospital in Latvia are to create a leadership program for managers, strengthening the manager's role and understanding of its importance in promoting employee engagement, as well as building close cooperation with managers of those units where the level of employee engagement is higher and employee turnover is lower, thus gaining valuable experience from their colleagues. The research revealed that engagement level of residents is medium and the choice of new doctors not to continue working at the hospital in Latvia is related to the non-competitive remuneration of doctors, uncertainty about the work content and future perspectives and opportunities for their professional development in the coming years. It is important for residents to be offered a motivating remuneration policy and a clear development plan with transparent working conditions for the coming years after residency. Bonuses or the set of offers is one of the most important drivers of engagement for residents. Proposals – already during the residency to identify the conditions that would be important for new doctors to choose a job at the hospital in Latvia after completing the residency. Here the manager plays an important role being able to involve employees in making more complex, responsible decisions and fulfilling their duties already during the residency. Proposals - to introduce residents with the principles of doctors' remuneration in the hospital in Latvia, changes in remuneration depending on duties and competencies, and to develop a plan of measures for improving knowledge and increasing professional competence. Also, when looking at the correlation between engagement rated of working new doctors and factors influencing engagement for continuing work after residency, the respondents noted that one of the most important factors in promoting work engagement is the manager. Positive correlations can

be observed in the scales 'manager' and 'dedication to work' ($r=0.47$; $p=0.00$), which means that the more the manager listens to employees' opinions, helps them develop, trusts, provides feedback on work results, the more the employees dedicate themselves to work. Positive correlations were also observed in 'vigour' and 'remuneration' scales ($r=0.59$; $p=0.00$), which means that remuneration has a role in the engagement.

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DIGITAL TECHNOLOGIES FOR INDEPENDENT LIVING OF OLDER ADULTS IN HEALTH CARE AND SOCIAL CARE: A STUDY FROM CROATIA

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Abstract

A significant worldwide increase of the older population, and especially in developed countries, is putting the spotlight on the possibilities of using digital technologies for independent living. This has emphasized the need for research aimed at exploring the role of digital technologies in new models of care for the elderly, such as the ability to deliver care remotely and the deployment of digital platforms for health and social care that enable remote interaction and communication. In particular, the use of assistive technologies is expected to play an important role in the ongoing transformation of care services. In the paper, brief literature review is presented to define the role and research issues related to digital technologies for independent living among older adults. The collected articles were analysed to identify commonly cited barriers and challenges to using these technologies. The results of the analysis served as guidelines for the design of two focus group interviews conducted as part of the project Senior 2030 - Thematic Network for Active Aging Policy in Croatia. The goal of the focus group interviews was to explore a broad range of older adults' experiences with digital health and social care services and assistive technologies as tools for independent living. Focus group participants also suggested solutions for overcoming the difficulties identified. The participants' suggestions can be used to establish guidelines for the development of government policies in the observed area.

Keywords: digital technology, assistive technology, older adults, health care, social care

JEL classification: J14, J18, O33

Introduction

Lower birth-rates and an increase in the population over the age of 60 is a global trend (Fuster, 2017) putting a growing amount of pressure on the healthcare providers and services, as well as other welfare services (Svensson & Durst, 2020; Johansson-Pajala & Gustafsson, 2022). This trend is also noticeable in Croatia where the overall share of the elderly population is amongst the highest in Europe, however the system of care for the elderly is not adequate for their needs (Jedvaj et al., 2014). According to the last census, 22.45% of the population is over

65 years old (Croatian Bureau of Statistics, 2022a). The Survey on Poverty and Social Exclusion Indicators in the Republic of Croatia shows that "the at-risk-of-poverty rate by age was highest among persons aged 65 and over, and in 2021 it was 32.4%" (Croatian Bureau of Statistics, 2022b). Compared to the results of the study conducted by Bejaković (2019) on behalf of the Ministry of Labour and Pension System, the poverty rate of older people is increasing. According to the results of this study, the rate of people aged 65 and older at risk of poverty was 28.6% in 2017 (Bejaković, 2019). "The UN's report on extreme poverty, which examines social developments in Europe through various indicators such as poverty and income inequality, employment and unemployment, shows that the proportion of older people at risk of poverty was 15.9 percent in 2018, or 15.6 million people (Social Justice Ireland, 2020). Governments in these countries are developing guidelines to ensure the sustainability of health care (HC) and social care (SC) services as the increase in the proportion of older people in the total population leads to a shortage of health and social care workers (World Economic Forum, 2021).

The aging of the population poses various socioeconomic challenges, such as difficulties in independent living, higher health and social care costs, or the cost of staying in nursing homes. With the goal of mitigating these difficulties, digital technology (DT) can be a game changer in providing assistance and enabling older adults to remain safe and independent at home (Nikou et al., 2020). Recently, the use of specific DTs to assist the elderly in a variety of caregiving situations has gained popularity (Cotton, 2021). However, the use of DT solutions is still perceived negatively, so that older people often refuse to use them, even if they significantly improve their quality of life and enable them to live independently (van Houwelingen et al., 2018; Rossi, et al, 2020). The authors list numerous barriers and challenges to older adults' use of DT, including: self-efficacy and digital literacy issues, insufficient information among older adults about DT options, lack of prior experience and frequency of use, inadequate sources of support and facilitating conditions, legal concerns, and privacy risks (van Houwelingen et al., 2018; Klaver et al., 2021).

The research goals of this study are to (1) identify the challenges and limitations of older adults' use of DT for independent living in Croatia, and (2) to establish guidelines for ensuring better acceptance of DT in the research area. Two phases of research were established to achieve the specified objectives. First, a brief review of the relevant literature was provided and a theoretical framework was defined. Next, the results of the literature review were used to design the empirical part of the study. Focus group interviews were conducted with stakeholders relevant for the area of study. The results were analysed and discussed, conclusions, as well as suggestions for future research, were drawn from the conducted research.

Theoretical background

Digital technology for health care and social care: issues and challenges

As DT is a priority in HC and SC development worldwide, and it is being developed with the active participation of the government, local institutions, and users, most of whom are older adults. There are many unresolved issues affecting the users of DT in the area of health services, such as availability, reliability, security, and trust. The implementation of DT can improve the accessibility and flexibility of HC and SC for the general public, which can have many positive effects, thus this topic has recently been researched by many authors (Senbekov et al., 2020; Maguire et al., 2021). On the other hand, there are many barriers and challenges to using these

technologies, especially when the users are elderly. Ease of use, affordability, and accessibility are factors that encourage older adults to adopt technology (Martín-García et al., 2022; Gwyther et al., 2019).

In addition, issues of social support and prior experience are raised (Gwyther, et al., 2019). According to Pirhonen et al. (2020), "older adults associate digitization with both advantages and disadvantages; inability to use technology leads to feelings of alienation and disconnectedness; a digital divide exists between different socioeconomic groups of older adults." It is critical to provide easy access to new HC solutions, and these solutions should be tailored to the needs of each individual user. The main feelings expressed by older people are a deep distrust of poor HC or SC platforms or a limited ability to deal with technology (Nymberg, et al., 2019). A key factor in the successful adoption of an HC platform is that it is designed to be both customer and user specific (Herrmann et al, 2020). "The ability of HC providers to provide remote care, the ability to extend the clinical setting through home-based care, and the reduction in transportation costs" are among the most valued aspects of using DT, according to elders (Quintas, et al., 2021). According to Klaver et al. (2021), performance risks, legal concerns, and privacy risks perceived by older adults can significantly reduce their intention to use DT. When discussing the adoption of eHealth technologies to support elder caregivers in a community context, privacy, liability, digital literacy, readiness for DT adoption, and municipality innovation budgets are often cited (Christie, et al., 2021). People with lower levels of education are less likely to use e-Health platforms. Adoption of DT for HC can be increased by informing people of the potential benefits and providing opportunities to support its use in practice (De Veer, et al., 2015). Pirhonen et al. (2020) emphasize that the inability to use technology leads to feelings of isolation and disconnectedness; there is a digital divide between different socioeconomic groups of older adults.

Use of assistive technology for independent living

One of the possible solutions for the struggling healthcare and welfare services in Croatia, but also globally, is the aforementioned implementation of digital assistive technology (DAT) for independent living (Frey & Osborne, 2013). It is considered that DAT could replace some services offered by the healthcare workers and fewer workers would be needed to perform certain services and procedures (Svensson & Durst, 2020; Johansson-Pajala & Gustafsson, 2022). The purpose of DAT is not only to lessen the workload in healthcare systems but to also monitor the behaviour and health of the elderly as well as to help them with their daily tasks (Johansson-Pajala & Gustafsson, 2022:167). However, despite its potential benefits, DAT is generally not being implemented and used by the elderly, and the authors Lee & Coughlin (2014) believe that there are ten important factors that could facilitate the adoption of digital assistance technology for independent living: ease of learning and use, affordability, knowledge of its existence and availability, technical support, social support, emotional and affective benefits, protecting the users' independence and autonomy, previous experience and knowledge of technology, and its perceived usefulness.

Some of the examples of the potential for use and user acceptance of DAT for independent living in Europe include the integrated ambient assisted living system SmartSenior@home that was tested in 35 households in Germany with older adults aged between 55 and 88 (Gövercin et al., 2016), the tablet-based home exercise program Active Lifestyle for the elderly that was tested in Switzerland on older adults aged 65 or older (Silveira et al., 2013), and a not-yet-

developed Home Telehealth Services that was presented in the form of potential future services to 400 participants aged 50 or above in Slovenia (Cimperman et al., 2016).

The main goal of SmartSenior@home's services is to maximize independence in old age. The study found that services such as audio/video communication, basic healthcare services such as monitoring blood pressure, as well as an option to communication with a healthcare professional were well accepted among the participants. The most significant acceptance factors appear to be the ease of communication with another person, and the reliability of the system as a whole. Likewise, the goal of the Active Lifestyle is to also improve independence in old age, not through monitoring health but with regular exercise which improves the elderly's overall health. The study found that one of the biggest obstacles was the lack of company and that a "direct remote contact seemed to be a good alternative to supervised on-site exercising" (Silveira et al., 2013:12). The benefit of Active Lifestyle appears to be in its ability to provide social inclusion in terms of direct remote feedback, as well as in the robustness and ease-of-use of the tablet. Telemedicine technology such as the Home Telehealth Services addresses various needs of its users, including the need for independent living and communication. The results of the survey indicate that the deciding factors for participants' willingness to use such technology were the ease of use, perceived usefulness, and perceived security.

While there are many barriers and complexities in development and use of independent living technologies, studies such as these offer a good insight into what users perceive as the most important benefits of those technologies, which is also one of the goals of this study.

Research methodology and results

Research method and data collection

This study is part of the project "SENIOR 2030 - thematic network for active aging policy in Croatia" (Project Senior 2030, 2022). The beneficiary of the project is the National Pensioners' Convention of Croatia ("Matica umirovljenika Hrvatske" – MUH). The aim of the project is to develop a proposal for active aging strategy focusing on the concept of "Silver Economy". In accordance with the project's objectives, this study follows a qualitative approach using a qualitative-descriptive design with an inductive approach using focus group interviews for data collection. The focus group is a commonly used method in qualitative research. According to Green and Thorogood (2004), it is a group of six to twelve people "who discuss a particular topic under the direction of a moderator who has a list of topics to discuss," with the discussion usually lasting one to two hours. A focus group discussion encourages participants to engage and share feelings, opinions, and ideas about a particular topic (Rabiee, 2004).

In accordance with methodological guidelines based on theoretical knowledge and best practice (Parker & Tritter, 2006), two focus groups were conducted in May 2022. The focus groups were formed to collect data on two research subthemes: (1) "DT in health and social care of elderly" and (2) "DAT that enable independent living". All groups involved in this research were invited to participate as stakeholders. Some of the focus group members deal with the elderly directly, e.g., social workers, Red Cross volunteers, representatives of pensioners' associations. Other members work in public institutions that can directly influence public policies regarding the elderly in Croatia, e.g. officials from the Ministry of Labour, Pension System, Family and Social Policy, representatives from the City of Zagreb (Health Sector and Social Welfare Office). Finally, the representatives of the pensioners' associations served a dual purpose: they

represented the opinion of the association to which they belonged, and at the same time expressed their own opinion as pensioners. The concept of DT for HC and SC as well as the concept of DAT were defined at the beginning of the interviews so that there was no confusion about what type of technology was being discussed. The semi-structured focus group questions covered all of the major themes of the research field as presented in the literature review findings. Each question was followed by a discussion and a series of follow-up questions.

Results and data analysis

An inductive thematic analysis with a semantic approach is used to analyse the data, which means that the analyst does not look for anything other than what the informants said (Braun, 2006). Nvivo software was used to organize the codes into categories and themes, along with traditional manual methods such as memo writing and mapping. The analysis revealed two identical themes for both focus groups: (1) challenges in the use of technology at the individual level and (2) suggestions for developing government and institutional initiatives and policies that enable more effective use of technology. Considering that DAT is only one form of DT used for HC services and SC services, it is understandable that the same topics and code categories were defined for both focus groups. When it comes to individual challenges in the use of technology, 6 categories of codes were defined according to the results of the analysis: availability, affordability, attitudes, perception, digital literacy and confidence. Table 1 shows the main individual challenges of using DT for SC and HC, as well as the challenges of using DAT.

Table 1: Individual challenges of using DT for SC and HC and the individual challenges of using DAT

Individual challenges		
Code categories	DT in HC and SC: data extracts	DAT for independent living: data extracts
A. Availability	Internet infrastructure in Croatia is not equally accessible to all. Internet availability, speed and quality are significantly worse in the rural areas of mainland Croatia and on the islands.	Internet access is required to use DAT, and this is still a problem in some parts of Croatia.
B. Affordability	The cost of internet service, the price of computers and mobile devices is the biggest obstacle to their wider use by the elderly.	The cost of DAT is extremely expensive, and many elderly people in Croatia cannot afford it.
C. Attitudes (regarding usefulness and possible benefits)	Elderly with lower levels of education or socioeconomic status are less likely to use DT. Interest varies by life circumstances and increases when the need to use DT arises. Although older adults believe that using DT could improve their quality of life, awareness is lacking.	Older adults are interested in DAT if it allows them to stay in their own homes longer. It would be significant if DAT could replace gerontopsychiatric caretakers. A big advantage would be if DAT reduced the need for doctor visits. This is especially important in rural areas, which are sparsely populated, isolated, and remote.
D. Perception (ease of use and ease of learning)	Cognitive abilities decline over the years, which is why the elderly are do not tend to learn and innovate, and do not adopt new technologies as easily.	There is a misunderstanding of the role of DAT. DAT devices are too demanding. Elderly would use DAT if it were easier, even if it meant lower performance.
E. Digital literacy	The digital literacy of the elderly in Croatia is at a low level. The elderly population has lower general education levels, making it more difficult for them to learn how to use IT.	The elderly lack the necessary IT knowledge and skills to use smart systems for monitoring the health and safety. The cognitive abilities of older people pose a challenge for the acquisition of new skills

Individual challenges		
Code categories	DT in HC and SC: data extracts	DAT for independent living: data extracts
		needed for the application of DAT.
F. Confidence	Older adults are generally sceptical of DT. When it comes to health, people are even more sceptical. No one wants to reveal data about their socioeconomic or health status, especially when it comes to DT.	The level of confidence of the elderly in DAT is not uniform. Some elderly show extreme distrust in the security provided by DAT in the area of monitoring their health. For others, smart bracelets provide a sense of security, and their use has a strong psychological effect and improves their quality of life.

Source: author's work, 2023.

Focus group participants' suggestions for developing government policies and strategies to improve the use of DT in health care and SC, and specifically the use of DAT by the elderly, are presented in Table 2. The participants' proposals were first divided into 7 groups (marked with the letters A to G), and then the main results were described.

Table 2: Proposals for the development of government policies and strategies to improve the use of DT in health care and SC

Proposals for the development of government initiatives and policies		
Code categories	DT in HC and SC: data extracts	DAT for independent living: data extracts
A. Availability	Transportation of older people from rural areas to places that offer IT educational programs is needed. Civil society organizations could set up an "IT corner" for those who do not have Internet access or cannot afford IT equipment.	Due to Internet access requirements and technological complexity, DAT is not available to everyone. In nursing homes, technological requirements are met and it is possible to share DAT with other users, enabling wider use.
B. Affordability	The government could contribute to the Internet costs for the most vulnerable groups of older people. It would be good to start a "voucher" program for IT training.	Cost is the biggest barrier to using DAT. The government and private companies could invest in the development of DAT and offer a lower price for users in Croatia, or provide it for free, thus testing the technology and then marketing it globally. There is already a Croatian manufacturer of smart bracelets "Silver Monitor".
C. Informal social support (from family and peers)	Proposed is the promotion of workshops that provide knowledge about the use of DT through meetings and entertainment. A "young to old" campaign would convey the message that the old now need to learn from the young how to use DT. Pensioners' associations are an excellent venue for informal knowledge transfer about how to use DT.	Word of mouth has the greatest influence. Awareness of the benefits of DAT by those who have positive experiences should be encouraged.
D. Formal social support (from the community, and government institution)	It is necessary to remind young people, through publicity campaigns that it is their responsibility to educate older adults about the use of DT for HC and SC. The government should encourage the establishment of lifelong learning programs in this area. The Red Cross "Older adults for older adults" initiative, which ensures the transfer of knowledge and information between people of the same generation, is an excellent example.	Local entities and retirement homes are locations where it would be reasonably simple to provide help with DAT for the elderly. It is good to inform the elderly about DAT through communication channels that they use frequently and that have a great impact on them (TV programs, radio programs, brochures/newspapers published by pensioners' associations - for example the "Hrvatski umirovljenički list"). The thematic network of MUH can

Proposals for the development of government initiatives and policies		
Code categories	DT in HC and SC: data extracts	DAT for independent living: data extracts
		become a channel for promoting and using assistive technologies for independent living of the elderly
E. Security, privacy and risks of using	Workshops on the risks of Internet use can inform older people about how to use DT and HC platforms for data security and privacy. Older adults should be informed that platforms for HC and SC are developed in accordance with security and privacy regulations and standards.	Proposed poster campaign about DAT safety in places frequently visited by the elderly (health centres, family doctors' offices, hospitals, nursing homes). A good example of the DAT safety campaign is the city of Zagreb where members of one pensioners' association were equipped with smart bracelets that allowed them to safely call for help. The bracelets created a sense of security and had a strong psychological impact.
F. Technology: implementation issues related to the level and quality of IT support.	It is proposed to establish all types of channels for HC and SC support, while maintaining telephone support. It is proposed to establish a single call centre for all HC and SC services to make the process simpler.	Linking MUH with its branches ensures the possibility of testing DAT (e.g., free use by seniors) to convince the elderly of the quality and usefulness of smart devices. Simple DAT devices with only a few functions that do not require special knowledge should be developed. Simpler devices are also cheaper, yet of sufficient quality and functionality.
G. Experience in use and users' engagement in development and design	The E-citizen platform is difficult to use. The platform is complicated; the user has to go through several steps to find the desired option and get information. A unique "one-stop shop" platform should be created to meet the needs of older users.	It would be good to create robots that have a human appearance or look like a pet (are soft and cute). It is useful if the robot's behaviour, communication and appearance are adapted to the environment (geographical, cultural). For elderly who are living alone, it is important that the robot reduces the feeling of loneliness. Helping with housework is not the only thing that is important when it comes to DAT.

Source: author's work, 2023.

Discussion

Common challenges of technology use by the elderly

Regardless of the type of digital technology (DT for HC, SC or DAT), barriers to its use by older adults in Croatia are widespread. They include: the cost of internet access, unavailability and/or quality of internet (depending on the place of living), price of devices (desktop computers, laptops, cell phones, tablets, DAT devices), lack of knowledge and skills needed to use complex devices. These findings are in line with known facts about the large number of older people whose income is below the poverty line (Bejaković, 2019, Croatian Bureau of Statistics, 2022b), the low level of digital literacy in Croatia, and the low availability of broadband Internet (Eurostat, 2022). Croatia was ranked 21st out of 27 EU Member States in the Digital Economy and Society Index (DESI) in 2022 (European Commission, 2022). It is also very important to point out that Croatia ranks 24th out of 27 EU countries in terms of connectivity: Rural coverage remains low at 47%, while coverage with very high-capacity fixed networks (VHCN) is improving but still lags behind (Eurostat, 2022). According to the

Eurostat's document *Aging Europe*, the proportion of the elderly who had never used a computer in 2017 was greater than two-thirds in Italy, Romania, Croatia, Bulgaria, and particularly Greece (Eurostat, 2019). In Croatia, those challenges are becoming more pronounced due to the continually increasing number of the elderly (Croatian Bureau of Statistics, 2022a). Similar to recent research, the results of this study confirm that trust, privacy, and security are also common challenges when it comes to personal data about health, socioeconomic status, and health monitoring of the elderly (Ehrari, 2020; Klaver et al., 2021)

DT for HC and SC: adoption and directions for the future

According to the results presented in Table 1, the most frequently cited challenges in using DT in HC and SC for older people are: attitudes toward usefulness and potential benefits; perceptions of ease of use and ease of learning; confidence and experience in using DT; and engagement in designing and developing DT platforms, which is in accordance with the results of other similar studies, such as those of Martín-García, et al. (2022), Gwyther, et al. (2019), Cimperman et al. (2016). Older adults' perceptions of the opportunities offered by using DT for HC and SC services, as well as the accessibility of these services, differ significantly depending on whether the person is from an urban or a rural setting, which is also one of the findings emphasized in Airola's (2021) research. Most of the proposals (Table 2) to address the problems identified are aimed at the government and local community initiatives that provide older people with physical access to DT (organised transportation, access to the Internet and computers in retirement homes and "IT corners"). Since older people do not respond well to IT workshops and courses, it is important to emphasize the value of informal communication, incentives in the environment, and support from family and friends to improve the digital literacy of elderly.

DAT adoption: challenges and guidelines

The analysis of the results from Table 1 shows that the opinion of the elderly about the applicability of DAT is ambivalent. In addition to problems such as the complexity and uncertainty about its reliability, which was one of the barriers also mentioned in Lee & Coughlin's (2014) and Airola's (2021) research, there are also positive aspects of its use, for example delaying the need for retirement homes or reducing the need for healthcare providers, which is also one of the potential benefits mentioned in Johansson-Pajala & Gustafsson's study (2022). Table 2 shows suggestions that the government and local communities could use to increase the use of DAT in the elderly. The results show that older people are more willing to accept help from friends and relatives. Therefore, to publicise the importance of DAT, it is helpful to use informal channels. The government should support IT companies to work harder to develop DAT that is more financially accessible to older people. One possible approach is for DAT manufacturers to make their products available free of charge for older people as part of their development projects or promotional campaigns. This would have a dual effect: manufacturers would verify the reliability of DAT devices, and seniors would gain confidence in their usefulness.

Limitations of the study

One of the shortcomings of this study is that it relies on data collected through focus group interviews. It is known that some group members do not feel comfortable expressing their

opinions in front of the rest of the group, or that some group members do not have the opportunity to express all of their opinions because others are more dominant in the discussion (Green & Thorogood, 2004). In addition, each focus group was conducted only once, which is insufficient to generalize the conclusions. The inadequacy is also reflected in the fact that some of the focus group participants had dual roles: they were over 65 and they were also active members of pensioners' associations or similar organizations.

Conclusion

Focus group participants' statements, presented in Tables 1 and 2, describe barriers to successful implementation of DT and provide insights into research topics related to the role of DT in HC and SC and its acceptance by older adults. In addition, the analysis of the statements provides guidelines for the public policy in the Republic of Croatia that should be considered when developing e-platforms for HC and SC services for elderly. The results of the focus group on DAT can be used as a basis for establishing guidelines for the government. It is proposed to invest in the development of DAT, which will in return provide financial sustainability for the Croatian IT sector since DAT is scalable and applicable, not only in Croatia, but also in the global market. This approach is economically viable and ensures the profitability of such ventures. This proposal could become an important element of the economic and sustainable development policies, especially in connection with the silver economy, which is largely undeveloped in Croatia.

The results of the comparison showed that the obstacles and problems are similar to those in other countries. For this reason, the practices that have proven to be the best in countries similar to Croatia can also be useful to Croatian institutions as a way to solve the existing challenges in the studied area. For future research, it is suggested that a systematic literature review be conducted to develop a theoretical framework for designing topics and questions for new focus groups, or to develop a conceptual model for conducting quantitative research with questionnaires.

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FUNCTIONAL TIME SERIES APPROACHES TO FORECAST TOURIST ARRIVALS: THE CASE FROM CROATIA

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Abstract

Modelling and forecasting tourist demand is a contemporary issue in tourism and with it connected international economics. Its importance stems from prediction of exchange rate changes, volatilities in terms on national currency, but also a demand for domestic goods and services, and consequently gross domestic product. As tourist arrivals increase on an annual basis, forecasts of inbound tourist arrivals are a prerequisite for forecasting labour market trends, demand for domestic goods and services, exchange rate volatilities, investment and gross domestic product. Both parametric and nonparametric approaches were used in previous studies, whereby non-linear forecasts and multivariate parametric approaches, methods such as spatial dependence and spatial heterogeneity, or fuzzy time series approach, which predicted tourist arrivals with higher degree of accuracy compared to traditional methods. Contemporary methods include machine learning and internet search approaches. This paper takes on a nonparametric approach and univariate specification previously tested in finances and demographic studies, and not evaluated in cases of tourist arrivals series. This paper aims to evaluate forecasting performance of functional time series approaches to forecast tourist arrivals, i.e., inbound tourism. Monthly data sample of tourist arrivals in Croatia from January 2005 up to December 2017 was considered as a training sample while the data from January 2018 up to December 2019 were considered as a testing sample. Tourist arrivals time series in Croatia exhibits unit root and seasonal unit root, which is confirmed with standard unit root tests and seasonal unit root tests. Mean squared error and root mean squared error was used to evaluate forecast accuracy of the considered specifications. Based on empirical evaluation from this research, functional time series approach outperforms seasonal ARIMA as a benchmark. Considering dynamic updates, which were evaluated for different methods, forecast from penalized least squares were more accurate comparing to block moving method and ridge regression. Empirical results from this paper suggested functional time series approach as a promising alternative to forecast tourist arrivals.

Keywords: forecasting, tourism arrivals, functional time series, principal components

JEL classification: F47, L83, Z3

Introduction

Modelling and forecasting tourist arrivals or tourism demand is an evergreen topic in tourism economics. Essentially, multivariate or univariate model specification can be applied to forecast tourist arrivals each having its advantages and disadvantages (Du Preez and Witt, 2003). Contemporary literature considers various methodological approaches such as parametric, nonparametric, Bayesian, fuzzy sets and statistical learning approach among others. However, there is no evidence that any one of model specifications can consistently outperform other specifications in terms forecasting accuracy (Elena et al., 2012; Hassani et al., 2017; Volchek et al., 2019). Research attention in this paper was directed towards nonparametric approach and univariate specification. Hyndman and Shang (2009) suggested functional time series approach as a well-suited approach to forecast seasonal time series. Successful applications of the approach were illustrated in demography (Gao et al., 2019) and finance (Shang and Haberman, 2017) among others. However, its performance to forecast tourist arrivals has not been evaluated. Hence, this paper aims to evaluate performance of functional time series approach to forecast tourist arrivals. The approach was evaluated for the case of small end open Croatian economy with inbound tourism is an important economic activity.

Besides this introductory section, rest of the paper is organized as follows: section 2 summarizes literature development related to the issue under consideration. Section 3 illustrates employed methodology and research data, Section 4 provides results of empirical evaluation, while the final section provides an overview of the main findings from the research.

Brief literature overview

Petrevska (2017) applied Box-Jenkins methodology and several alternative specifications to examine international tourist arrivals in the period 1956-2013 and found ARIMA (1,1,1) specification as the most suitable for forecasting. Tsui and Balli (2017) employed SARIMAX, SARIMA, the Box-Jenkins and SARIMAX/ EGARCH volatility models to forecast monthly arrivals of international passenger for the eight key Australian airports (Brisbane, Gold Coast, Adelaide, Cairns, Darwin, Melbourne, Perth and Sydney) between January 2006 and September 2012 and found all the forecasting models highly accurate. Melendez and Thapa (2017) used the data on more than forty years of tourist arrivals for El Salvador and applied eleven different specifications of time series models to forecast tourist arrivals. Three of the tested models were found as the best predicting model for this particular time series data (Naive 1, Holt-Winters, and single exponential smoothing). Hsu (2017) used the data between January 1997 and August 2015 of the weighted Taiwan tourism stock index and out of the two-period Markov regime switching model application identified two different regimes of the tourism demand in Taiwan. Saayman and Botha (2017) tested smooth transition autoregressive model, unobserved components model and singular spectrum analysis. The found results pointed out that the non-linear model outperform the other specifications and the linear methods showed some superiority in short-term forecasts when there were no structural changes in the time series. Athanopoulos and de Silva (2012) found multivariate exponential smoothing methods more accurate to forecast tourist arrivals comparing to univariate specification as a benchmark. Li et al. (2020) suggested de-noising method based on Hilbert–Huang transform and empirically confirmed superiority of the suggested approach over benchmarks to forecast tourist arrivals. Velos et al. (2020) suggested SARIMA as an appropriate model to forecast tourist arrivals in Philippines. Volchek et al. (2019) investigated micro-level tourism demand forecasting. Number of arrivals to five of London museums was considered. Seasonal autoregressive

moving average with explanatory variables, seasonal Naïve, Naïve I, SARMAX-mixed frequency data sampling, seasonal autoregressive moving average and artificial neural network models were analysed. Research finding from Volchek et al. (2019) suggested no specific preferable method among the applied models and forecasting accuracy was found to depend on forecasting horizons as well as on data frequency. Sun et al. (2019) suggested kernel extreme learning machine as a preferred approach while internet search index was found a predictor of tourist arrivals in Beijing. Peng et al. (2021) employed random forest method to decrease dimensionality of the search query index data and identified it as the most relevant to forecast tourist arrivals. Afterwards, long short-term memory (LSTM) was employed to take into account possible nonlinear nature of the relationship between selected search query index data and tourist arrivals. The suggested procedure was empirically tested for Beijing City and Jiuzhaigou Valley and results suggested that the considered deep learning method was preferred to machine learning and time series methods used as benchmarks in this research. Havranek and Zeynalov (2021) examined mixed-data sampling (MIDAS) using data for overnight stays in Prague from period from January 2010 to December 2016. Empirical results indicated the MIDAS model employing weekly Google Trends data performs better comparing to models based on monthly Google Trends data and models with no Google Trends data. Saayman and de Klerk (2019) evaluated performance of multivariate singular spectrum analysis to forecast tourist arrivals from five continents to South Africa. Empirical findings suggested improved forecasting accuracy of multivariate singular spectrum analysis in comparison to univariate singular spectrum analysis and baseline seasonal naïve model as well. Liu et al. (2018) combined feature selection (FS) and support vector regression (SVR) with particle swarm optimization (PSO) named FS-PSOSVR and empirically tested the proposed method on monthly data of tourist arrivals in Taiwan. The empirical findings confirmed effectiveness of the proposed forecasting method. Yuan (2020) used tourism social network as an alternative to economic indicators and found least square support vector regression with genetic algorithm well suited to predict the tourist arrivals with monthly frequency. Jiao et al. (2020) studied a role of spatial heterogeneity and spatial dependence in accuracy of tourism forecasting. While exponential smoothing, autoregressive moving average and Naïve 1 models were assumed as a benchmark, local and global spatiotemporal autoregressive models for 37 European countries outperformed the benchmark models. Song et al. (2011) considered structural time series approach with time-varying parameter and found it superior to forecast quarterly tourist arrivals to Hong Kong from China, South Korea, the UK and the USA. Hassani et al. (2017) evaluated parametric and nonparametric forecasting techniques for predicting tourism demand in selected European countries. Empirical findings suggested that no single model provided the best forecasts. Forecasting accuracy was dependent on a country and horizon to forecast. Lowest overall forecasting error was found for Recurrent Singular Spectrum Analysis model while Neural Networks and ARFIMA were found to be the worst models based on forecasting accuracy. Chen et al. (2010) examined forecasting performance of adaptive network-based fuzzy inference system model to forecast the tourist arrivals to Taiwan and pointed out that the model was a good alternative for the tourist arrivals forecasting. Elena et al. (2012) pointed out that no one model can consistently outperform other models in terms of forecasting accuracy and provided a comparison of Box and Jenkins approaches of seasonal autoregressive integrated moving average and four models of fuzzy time series. Empirical findings suggested better performance of Chen's fuzzy time series approach comparing to SARIMA and the other fuzzy time series models. As illustrated in this section contemporary literature still struggles to find the most accurate approach to forecast tourist arrivals. Furthermore, vast body of the literature considered multivariate specifications. However, functional time series approach that is under-examined in tourism literature. Hence, this paper contributes to the literature with evaluation of univariate functional time series approach.

Methodology

Following Box and Jenkins (1976) Seasonal Autoregressive Integrated Moving Average model SARIMA (p,d,q)(P,D,Q)[s] for seasonal time series data is represented by the equation (1):

$$\Phi_P(B^s)\varphi_p(B)\nabla_s^D\nabla^d y_t = \Theta_Q(B^s)\Phi_q(B)\varepsilon_t \quad (1)$$

Where $\{y_t\}$ represents time series under consideration, $\{\varepsilon_t\}$ residuals that behave like Gaussian white noise process and s indicates periodicity of time series. Autoregressive components of order p were represented as $\varphi_p(B)$ while moving average components of order q were represented as $\Phi_q(B)$. B represents backshift operator while seasonal autoregressive and moving average components were $\Phi_P(B^s)$ and $\Theta_Q(B^s)$ respectively. P and Q were their orders while ∇_d and ∇_s^D were ordinary and seasonal difference components.

Functional time series has gained recognition and since its introduction by Bosq (2000). Shang and Haberman (2017) employed functional time series for issue of annuity pricing. This paper followed methodology explained in Hyndman and Shang (2009) and used open source R software with several libraries (Shang, 2013) that support chosen algorithms.

Observed data as a functional time series can be represented as $\{x_i, y_t(x_i)\}$ where $t = 1, \dots, n$ and $i = 1, \dots, p$. From the observed data smooth function $f_t(x)$ can be extracted as in equation (2).

$$y_t(x_i) = f_t(x_i) + \sigma_t(x_i)\varepsilon_{t,i} \quad (2)$$

Where $\varepsilon_{t,i}$ represents independent and identically distributed standard normal variable, term $\sigma_t(x_i)$ allows variation of noise with x_i while $\{x_1, \dots, x_p\}$ represents a set of discrete data points. Baseline idea is to employ functional principal components regression and based on a set of functional data $f(x) = [f_1(x), \dots, f_n(x)]^T$ identify a pattern to provide forecasts. A stochastic process f can be decomposed into mean function and sum of products of orthogonal functional principal components and uncorrelated principal component scores as provided in equation (3).

$$f = \mu + \sum_{k=1}^{\infty} \beta_k \phi_k \quad (3)$$

Where μ represents unobserved population mean function, β_k represents k^{th} principal component score while ϕ_k represents k^{th} population functional principal component. At a sample level, the functional principal component decomposition was given in equation (4).

$$f_t(x) = \bar{f}(x) + \sum_{k=1}^K \widehat{\beta}_{t,k} \widehat{\phi}_k(x) + \widehat{\varepsilon}_t(x) \quad (4)$$

Where $\bar{f}(x) = \frac{1}{n} \sum_{t=1}^n f_t(x)$ represents estimated mean function, $\widehat{\phi}_k(x)$ represents k^{th} estimated orthonormal eigenfunction of empirical covariance operator

$\widehat{\Gamma}(x) = \frac{1}{n} \sum_{i=1}^n [f_i(x) - \bar{f}(x)][f_i(x) - \bar{f}(x)]$ while $\widehat{\beta}_{t,k}$ represents k^{th} principal component score for year t obtained by projection of $f_t(x) - \bar{f}(x)$ in direction of k^{th} eigenfunction $\widehat{\phi}_k(x)$. That is $\widehat{\beta}_{t,k} = \int [f_t(x) - \bar{f}(x)] \widehat{\phi}_k(x) dx$. $\widehat{\varepsilon}_t(x)$ represents residuals while K represents optimal number of principal components. Optimal number of principal components was selected following cross validation. Eventually, based on observed data

$f(x) = [f_1(x), \dots, f_n(x)]^T$ and corresponding principal components $\widehat{\phi} = [\widehat{\phi}_1(x), \dots, \widehat{\phi}_k(x)]^T$ the h-step-ahead forecasts $y_{n+h}(x)$ were obtained following equation (5).

$$\widehat{y_{n+h}}(x) = \bar{f}(x) + \sum_{k=1}^K \beta_{n+h|n,k} \widehat{\phi}_k(x) \quad (5)$$

To forecast prediction interval the forecast variance that follows from equations (2) and (3) was calculated. Due to orthogonality, the forecast variance can be approximated by the sum of component variances as in equation (6)

$$\zeta_{n+h}(x) = Var[y_{n+h}(x)|f(x), \phi] = \widehat{\sigma}_\mu^2(x) + \sum_{k=1}^K u_{n+h,k} \widehat{\phi}_k^2(x) + v(x) + \sigma_{n+h}^2(x) \quad (6)$$

Where $u_{n+h,k} = Var(\beta_{n+h,k} | \beta_{1,k}, \dots, \beta_{n,k})$ was obtained from time series model and error variance $v(x)$ was estimated as average $\{\widehat{\varepsilon}_1(x), \dots, \widehat{\varepsilon}_n(x)\}$ for each x while $\widehat{\sigma}_\mu^2(x)$ was estimated using nonparametric smoothing method. Following assumption of normality, prediction interval for y_{n+h} was constructed as $\widehat{y_{n+h}}(x) \mp z_\alpha \sqrt{\zeta_{n+h}(x)}$.

Dynamic updates

Several approaches update trajectories and provide forecast for remaining part of the trajectory. The one is Block moving approach that updates a data block. Newly arrived data are being added to the data block and oldest data from the data block are being left out while size of the data block remains constant. Therefore, based on complete data block and functional principal component regression the forecast were obtained. When new data arrive remaining part of the trajectory can be updated following regression-based approaches as well. Let consider $m_0 \times K$ matrix F_e with elements $\widehat{\phi}_k(x_j)$ where $1 \leq j \leq m_0$ and $1 \leq k \leq K$, $\beta_{n+1} = [\beta_{n+1,1}, \dots, \beta_{n+1,K}]^T$, $\bar{f}(x_e) = [\bar{f}(x_1), \dots, \bar{f}(x_{m_0})]^T$ and $\varepsilon_{n+1}(x_e) = [\varepsilon_{n+1}(x_1), \dots, \varepsilon_{n+1}(x_{m_0})]^T$. Following availability of mean adjusted $\widehat{y^*_{n+1}}(x_e) = y_{n+1}(x_e) - \bar{f}(x_e)$ a regression obtains form as in equation (7):

$$\widehat{y^*_{n+1}}(x_e) = F_e \beta_{n+1} + \varepsilon_{n+1}(x_e) \quad (7)$$

In case of $F_e^T F_e$ being invertible matrix β_{n+1} can be estimated using ordinary least squares $\beta_{n+1}^{OLS} = (F_e^T F_e)^{-1} F_e^T \widehat{y^*_{n+1}}(x_e)$. In case of $F_e^T F_e$ not being invertible regularized approaches such penalized least squares in equation (8) or ridge regression in equation (9) may be followed.

$$\beta_{n+1}^{Ridge} = (F_e^T F_e + \lambda I_K)^{-1} F_e^T \widehat{y^*_{n+1}}(x_e) \quad (8)$$

$$\beta_{n+1}^{PLS} = (F_e^T F_e + \lambda I_K)^{-1} (F_e^T \widehat{y^*_{n+1}}(x_e) + \lambda \widehat{\beta_{n+1|n}}) \quad (9)$$

Consequently, forecasts can be obtained by ridge regression in equation (10) or penalized least square method in equation (11):

$$\widehat{y_{n+1}}(x_l)^{RIDGE} = \bar{f}(x_l) + \sum_{k=1}^K \beta_{n+1,k}^{Ridge} \widehat{\phi}_k(x_l) \quad (10)$$

$$\widehat{y_{n+1}}(x_l)^{PLS} = \bar{f}(x_l) + \sum_{k=1}^K \beta_{n+1,k}^{PLS} \widehat{\phi}_k(x_l) \quad (11)$$

Eventually, frequently used Root Mean Square Error (RMSE) provided in Equation (12) and Mean Square Error (MSE) was employed to evaluate out of sample forecasting performance for each of the approach.

$$RMSE = \sqrt{\frac{1}{n} \sum_{i=1}^n (\hat{y}_i - y_i)^2} \quad (12)$$

Research data in this paper consists of monthly time series data of tourist arrivals in Croatia from January of 2005 up to December of 2020 publicly available from Croatian National Bureau of Statistics as illustrated in Figure 1 in appendix. The time series data were analysed in (natural) log values.

Empirical findings

Following methodological procedure, SARIMA model was estimated firstly as a benchmark model. SARIMA specification was estimated on data sample from January of 2005 up to December of 2017 while out of sample forecasting performance was evaluated on data sample from January of 2018 up to December of 2019. SARIMA (2,1,2) (1,1,2) [12] specification was selected as the best fit and estimated coefficients were summarized in Table 1.

Table 1: SARIMA (2,1,2) (1,1,2) [12] estimates

AR1	AR2	MA1	MA2	SAR1	SMA1	SMA2
-0.0302 (0.2330)	0.3146 (0.1039)	-0.8588 (0.2336)	0.0016 (0.1816)	-0.3482 (0.1996)	-0.0020 (0.2135)	-0.6538 (0.1224)
$\sigma^2 = 0.005371$	loglik.= 167.54	AIC=- 319.08	AIC =-318.01	BIC=-295.38	RMSE=0.06842528	MAPE= 0.3904087

Source: own estimates.

As illustrated in Table 1, SARIMA (2,1,2) (1,1,2) [12] was selected as benchmark. Therefore, forecasts from functional principal component regression were evaluated and compared with forecasts from SARIMA (2,1,2) (1,1,2) [12] specification. Tourist arrivals time series in Croatia exhibits unit root and seasonal unit root. Unit root can be confirmed with standard unit root test while seasonal unit root can be detected using seasonal unit root. Following cross validation based on goodness of fit for in-sample data from January of 2005 up to December of 2017 optimal number of principal components was selected. Various goodness of fit measures for different numbers of principal components were calculated and reported in Table2.

Table 2: Optimal number of principal components

No. of components	MSE	MAPE	ISE	IAPE
4	0.00163	0.00254	0.01432	0.02436
5	0.00140	0.00232	0.01183	0.02165
6	0.00124	0.00218	0.01028	0.02029
7	0.00119	0.00207	0.01033	0.02004
8	0.00116	0.00206	0.01005	0.01975
9	0.00127	0.00209	0.01066	0.01996
10	0.00128	0.00209	0.01063	0.01993
11	0.00147	0.00220	0.01143	0.02041
12	0.00190	0.00241	0.01244	0.02097
8	0.00116	0.00206	0.01005	0.01975

Source: own estimates.

Following results in Table 2, the best fit was found for eight principal components. Consequently, one-step ahead forecast for period January 2018 up to December 2019 were obtained from functional time series with eight principal components as well as based on SARIMA (2,1,2) (1,1,2) [12]. Obtained forecasts and observed data in (natural) log values were reported in Table 3.

Table 3: Forecast evaluation

	FTSA Forecasts		Observed		SARIMA Forecasts	
	YEAR					
MONTH	2018	2019	2018	2019	2018	2019
1	12,16298	12,25064	12,25763	12,24358	12,16421	12,24966
2	12,29187	12,38628	12,29759	12,48554	12,38726	12,44184
3	12,84587	12,9508	12,99514	13,01616	12,84021	12,96781
4	13,69861	13,80664	13,76482	13,91626	13,84277	13,8128
5	14,17397	14,27104	14,31176	14,26612	14,2185	14,33084
6	14,74769	14,86395	14,78167	14,88757	14,86484	14,85662
7	15,30668	15,40957	15,28117	15,28008	15,37729	15,46204
8	15,35228	15,45297	15,29007	15,36563	15,42584	15,53123
9	14,63043	14,74936	14,59981	14,59052	14,60535	14,70616
10	13,75597	13,89182	13,7783	13,88905	13,72106	13,80984
11	12,69193	12,80117	12,82761	12,87617	12,71713	12,8202
12	12,73631	12,8803	12,76402	12,82719	12,65492	12,71076
MSE =	0,006907543				0,00977294	
RMSE =	0,083111631				0,098858181	

Source: own estimates.

Based on obtained forecasts in Table 3, forecasting accuracy were evaluated for functional principal components and SARIMA (2,1,2) (1,1,2) [12] used as benchmark. The results in Table 3 pointed out that functional principal components regression outperform SARIMA in forecasting number of tourist arrivals in Croatia. Furthermore, dynamic updates were evaluated for different methods. The sample data from January of 2005 up to December of 2018 were used to estimate the model while data from January of 2019 up to August of 2019 were considered as newly arrived data. The forecasts and accuracy measures were summarized in Table 4.

Table 4: Evaluation of dynamic updates

Month/year	Block moving method	Penalized least squares	Ridge regression	Observed
9/2019	14,61402	14,63561	13,71794	14,59052
10/2019	13,79883	13,86925	12,85683	13,88905
11/2019	12,82924	12,87187	11,92474	12,87617
12/2019	12,79753	12,86819	11,79402	12,82719
MSE	0,0029	0,0010	0,9499	
RMSE	0,0543	0,0321	0,9746	

Source: own estimates.

Following results in Table 4, penalized least squares method outperformed block moving method and ridge regression to forecast tourist arrivals in Croatia while block moving method outperformed ridge regression. Eventually, dynamic updates methods were evaluated for year 2020 to consider forecasting performance under COVID-19 pandemics. Therefore, from January of 2005 up to December of 2019 were used to estimate the model while data from

January of 2020 up to August of 2020 were considered as newly arrived data. The forecasts and accuracy measures were reported in Table 5.

Table 5: Dynamic updates for year 2020

Month/year	Block moving method	Penalized least squares	Ridge regression	Observed
9/2020	13,63858	13,00972	12,08219	13,09851
10/2020	12,6697	12,20921	11,31872	12,12591
11/2020	11,79585	11,34447	10,50393	11,37624
12/2020	11,5454	11,25696	10,38096	11,04228
MSE	0,2541	0,0155	0,7207	
RMSE	0,5041	0,1244	0,8489	

Source: own estimates.

As illustrated in Table 5, forecasts for year 2020 were less accurate. However, penalized least squares method still outperforms block moving method and ridge regression. Conclusively, functional principal components regression illustrated better performance in comparison to SARIMA specification as the benchmark and represents a promising alternative for forecasting tourist arrivals.

Conclusions

There are several conclusions that can be derived out of research presented in this paper. Firstly, contemporary literature points to no clear conclusion about the most suitable approach to forecast tourist arrivals or tourism demand as frequently referred to in tourism literature. Empirical findings from this paper based on Croatian case suggested functional time series approach as more accurate forecasting method comparing to SARIMA approach often taken as a benchmark in forecasting literature. Concerning dynamic updating procedure, penalized least squares method outperformed block moving method and ridge regression to forecast tourist arrivals in Croatia while block moving method outperformed ridge regression. Conclusively, functional time series approach is a promising alternative for forecasting tourist arrivals. Further research could be directed in a several directions. Firstly, functional time series approach illustrated a potential a further research might be directed towards evaluation of functional time series approach on other issues from economics. Secondly, various statistical learning approaches might be evaluated in terms of forecasting tourist arrivals and compared with results from functional time series approach.

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TOURISTS' ATTITUDES TOWARDS DIGITALISATION BEFORE AND AFTER COVID-19 PANDEMIC – A HUNGARIAN PERSPECTIVE

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Abstract

Digital technology plays a crucial and increasingly important role in tourism, both for travellers and tourism service providers. Based on this phenomenon, the focus of our research is to investigate consumer attitudes towards digitalisation in tourism consumption patterns, based on the recent trends that have fundamentally influenced tourism and everyday life. Thus, the authors aimed to obtain results of tourism consumer behaviour based on the attitudes towards digitalisation by carrying out online surveys and interviews during the Covid-19 pandemic as part of a complex research project, which partly sought to find out whether the epidemic has accelerated the digitalisation of tourism and thus the use of virtual solutions or not. Based on the results, the authors proved that the Hungarian population still has limited and relatively little information and experience with digital tourism services and virtual reality solutions. In our opinion, it is significant to research these phenomena and to continuously monitor the reactions of the tourism consumers in order to better understand their changing attitudes towards digitalisation in tourism.

Keywords: tourism consumer behaviour, digitalisation, attitudes, Hungary

JEL classification: L83, Z32, M31

Introduction

Tourism has been one of the most dynamic sectors in recent decades, creating jobs and driving economic growth. However, it is important to underline that as much as it is a sector with stable growth, it is also vulnerable (Gössling et al. 2020, Cruz-Ruiz et al. 2022). A global economic or natural problem, or social impacts such as terrorism, can bring very rapid and sudden changes, almost immediate setbacks to this sector. Moreover, the kind of global hypermobility

we have been living in over the past decades has not only eroded boundaries, but has also increased the number of shocks that evolve from local to global (Hall 2010).

In spring 2020, the authors launched a complex research project to investigate the impact of the emergence of a new coronavirus (COVID-19) in Hungary on the behaviour of Hungarian consumers related to tourism. It is worth mentioning that there was no comprehensive experience in Hungary on the impact of a pandemic on tourism, consumer behaviour and consumption. Given the prominent role of tourism in the national economy of the country, the authors considered important to examine this area in order to understand the short- and medium-term changes in tourism consumption.

The focus of the research was to investigate consumer attitudes towards digitalisation in tourism consumption patterns, based on the recent trends that have fundamentally influenced tourism and everyday life. Thus, the authors aimed to obtain results of tourism consumer behaviour based on the attitudes towards digitalisation by looking at the period immediately before the Covid-19 pandemic, during the pandemic period and the post-pandemic period.

Theoretical background

Digital-technology trends affecting consumer behaviour

Digital technology plays a crucial and increasingly important role in tourism, both for travellers and tourism service providers. The most important aspects and areas of mutual development can be detected in such areas as online booking, information and research, communication, personalization and sustainable tourism (Table 1.).

Table 1: Major areas of the increasing importance of digitalisation in tourism

Area	Description
Online booking	One of the most significant roles of digital technology in tourism is the ability to make reservations and bookings online. Travelers can easily book flights, accommodations, car rentals, and activities through websites and apps, making it easier and more convenient to plan and book their trips.
Information and research	Digital technology provides travellers with easy access to information about destinations, attractions, and activities. Through search engines, review websites, and social media, travellers can quickly research and compare various travel options, read reviews from other travellers, and plan their itineraries.
Communication	Digital technology allows travellers to stay connected with family, friends, and travel companies while on the go. Social media, messaging apps, and email make it easy to communicate with others, receive updates about travel arrangements, and stay informed about any changes or disruptions.
Personalisation	Digital technology also enables travel companies to personalise the travel experience for individual travellers. With data analytics and AI algorithms, companies can track travellers' preferences and behaviours to provide customised recommendations for destinations, activities, and accommodations.

Area	Description
Sustainable tourism	Digital technology also plays a crucial role in promoting sustainable tourism practices. Travel companies can use digital technology to monitor and reduce their environmental impact, promote eco-friendly travel options, and raise awareness about sustainable tourism among travellers.

Source: based on Csordás et al. (2022), Dredge et al. (2019) and Marx et al. (2021) ed. by the authors.

Overall, digital technology has transformed the tourism industry, making it easier, more accessible, and more personalized for travellers while also providing travel companies with new ways to reach customers and deliver better service. That is why digitalization has become a critical component of modern tourism industry, enabling businesses to improve their customer experience, reduce costs, and increase their competitiveness (Efthymiou et al. 2019, Seraphin, H. 2021).

Its impacts can be seen on such important areas as:

1. *improved customer experience*: enabling tourism businesses to provide a better customer experience through personalized and targeted marketing, easy booking processes, and seamless payment options (Ozdemir et al. 2023);
2. *increased efficiency and cost savings*: the use of digital technology in tourism can improve operational efficiency, automate processes, and reduce costs (Rydzik & Kisson 2022);
3. *enhanced communication*: digital tools such as social media, messaging apps, and chatbots allow tourism businesses to communicate with customers more efficiently and effectively (Chu et al. 2020);
4. *access to data*: digitalisation enables businesses to collect and analyse data on customer behaviour, preferences, and feedback, which can inform decision-making and improve service delivery (Dredge et al. 2019);
5. *and increased reach*: digitalization has expanded the reach of tourism businesses, enabling them to reach new markets and customers through online channels (Dredge et al. 2019).

Possibilities and forms of digital solutions

The use of digital solutions in the tourism market is not a new trend, but it has received a strong boost from the crisis and the inability to travel in 2020, both for private and business travel (Hagen 2021, Hadjielias et al. 2022). New technical elements in the recent period include contactless travel and the development of new security protocols based on digital identification and biometric technologies. Digital passports or integrated digital identity systems, such as the World Economic Forum's Known Traveller Digital Identity initiative, which includes travellers' health data, vaccinations, previous travel history, etc., can also be seen as a similar tool.

At the same time, many business travellers have realised that they do not necessarily have to fly to a meeting in person, as digital solutions (Skype, Zoom) can be used to replace a large part of the meetings, not least as a shift towards sustainable and responsible tourism.

Moreover, virtual tourism is not a recent phenomenon, with increasingly sophisticated AR (augmented reality) and VR (virtual reality) solutions, it is now possible to create experiences that are as close to the original as possible in the comfort of one's home, using a computer and VR glasses (Jayawardena et al. 2023, Zhao et al. 2023). After the abrupt shutdown in spring

2020, this was effectively the only option left to “see” attractions, and operators have responded relatively quickly, with many of the world's famous museums making their guided virtual tours available for free.

However, it is questionable how sustainable the growth in popularity of these “tours” can become, as on the one hand tourists cannot experience and enjoy the trips online as they can during actual trips, but on the other hand, for many (e.g. due to lack of discretionary income, age or mobility limitations), it is the only way to explore other destinations (İşlek 2023). Most likely, VR tours will not replace but complement real trips, even serve as a discouragement and help to make travel decisions.

Methodology

In the present paper the authors used the results of an online survey of 736 respondents on changes in tourism habits for the 1st wave of the pandemic. The survey fieldwork ran from the end of April to the beginning of June 2020. It should be noted at the beginning of the analysis that the possibilities of the research team were very limited in the crisis situation caused by COVID-19 and the survey is not considered representative, but the number of elements of the surveyed population, in terms of gender, age, education, income and other sociological factors, is in our opinion sufficient to draw valuable conclusions. The results drawn from the sample are therefore suitable for reporting pilot results, the pilot nature of the sample being determined by the fact that the vast majority of the 736 respondents (76.8%) are women and that, in terms of the territoriality of the survey, the majority of respondents are related to the capital, Budapest, Pest County and Baranya County. As for the other factors of demographic characteristics, they can be considered as suitable for a professional analysis.

In the online survey respondents were asked about their attitudes towards digitalisation in tourism before the Covid-19 pandemic, during the pandemic period, and their planned attitude after the pandemic. The questions were all formulated by a research group of academics in tourism because no suitable scales were found in the literature in the period of the first Covid-19 outbreak when the related literature did not yet exist. The questions were single-choice, multiple-choice, and 5 point Likert-scale questions. In the case of the Likert-scale section, the respondents were asked to express their opinion in connection with different statements, where 1 meant the respondent strongly disagree and 5 meant the respondent strongly agree with a given statement. In the present study, the analysis is based on descriptive statistics, which were created by using the IBM SPSS 28 software package.

Our qualitative research (in-depth interviews) was motivated by a deeper understanding of the results of the mentioned online survey of 736 respondents on changes in tourism patterns in the first wave of the coronavirus epidemic. The interviewees were identified through the authors' personal network, which was supplemented by snowball sampling. A total of 35 interviews (which is in line with the requirements of interview research methodology) were conducted between June and December 2022. These took place at pre-arranged times and online, with an average duration of 30 minutes. The overall sample split of men and women was 38-62%. 17% of respondents were aged 21-30, 66% were aged 30-50 and 17% were aged 50+. 5% of respondents considered their or their family's monthly net income to be below average, 57% average and 38% above average. In terms of highest level of education completed, 43% have a university degree, 28.5% a college degree, while also 28.5% have a high school diploma. The interviewees were informed in advance that the interview would be audio-recorded, which

would be stored and analysed in a strictly anonymous manner. The interviews were subjected to qualitative content analysis along a descriptive-analytical framework.

Results

Respondents of the online questionnaire were first asked about their use of digital tourism services in the past 3 years and since the outbreak of the COVID-19 Pandemic. The results are shown in Table 2, which shows that the largest increase in popularity was for virtual visits to museums and exhibitions, with up 36.4 percentage points, while there were some digital tourism services that have declined in popularity since the crisis, such as watching travel movies, which fell by 7.8 percentage points.

Table 2: Digital tourism services used in the last 3 years and since the outbreak of the coronavirus (n=736)

Which of the following digital tourism services have you used in the last 3 years and since the outbreak of the coronavirus? You can tick more!

Tourism services requested	In the last 3 years	Since the coronavirus outbreak	Percentage change
I have not used any	380	396	+4,2%
watching road movies	244	225	-7,8%
virtual tours of a tourist site	101	118	+16,8%
virtual visit to a museum or exhibition	96	131	+36,4%
online gastronomy workshops, webinars	54	57	+5,5%
other ¹	11	11	0%
virtual wine tasting	10	13	+30%
watching VR videos with a device (VR glasses)	5	6	+20%

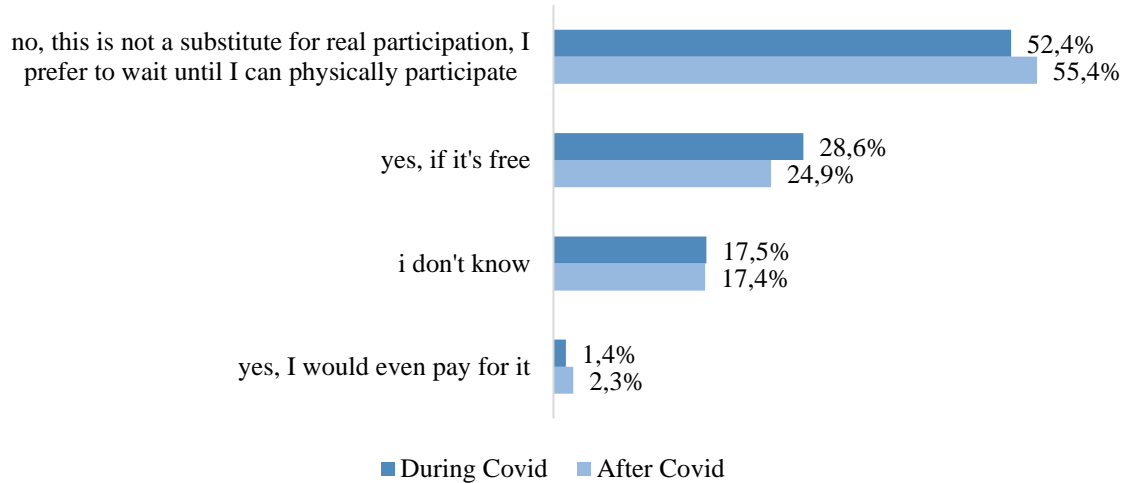
Source: authors.

¹*Responses to the 'other' category in the last 3 years before and following the Pandemic (same answers): meeting my partner, conference, delegacy, wedding, gig-performance, sports competition, own holiday home.*

The survey respondents were then asked if they plan to use digital tourism services while travel options are limited. The results are shown in Figure 1. The majority of respondents, 52.4%, said they did not plan to use these digital tourism services because it was not a substitute for real participation. They preferred to wait until they could physically participate in these programs again. The next question asked whether the respondents planned to use such services after the crisis. Here, the number of respondents who said no, because that is not a substitute for real participation, continued to grow. A further important related finding is that a quarter of respondents still plan to participate in digital tourism services during and after the coronavirus crisis, but only in those cases when they do not have to pay extra to use these services.

Figure 1: Planned usage of digital tourism services during and after the coronavirus crisis (n=702)

"Do you plan to use digital tourism services such as the ones described above during the coronavirus crisis, while your travel options are limited? - Do you plan to use digital tourism services such as the above after the coronavirus crisis, while you have limited travel options?"



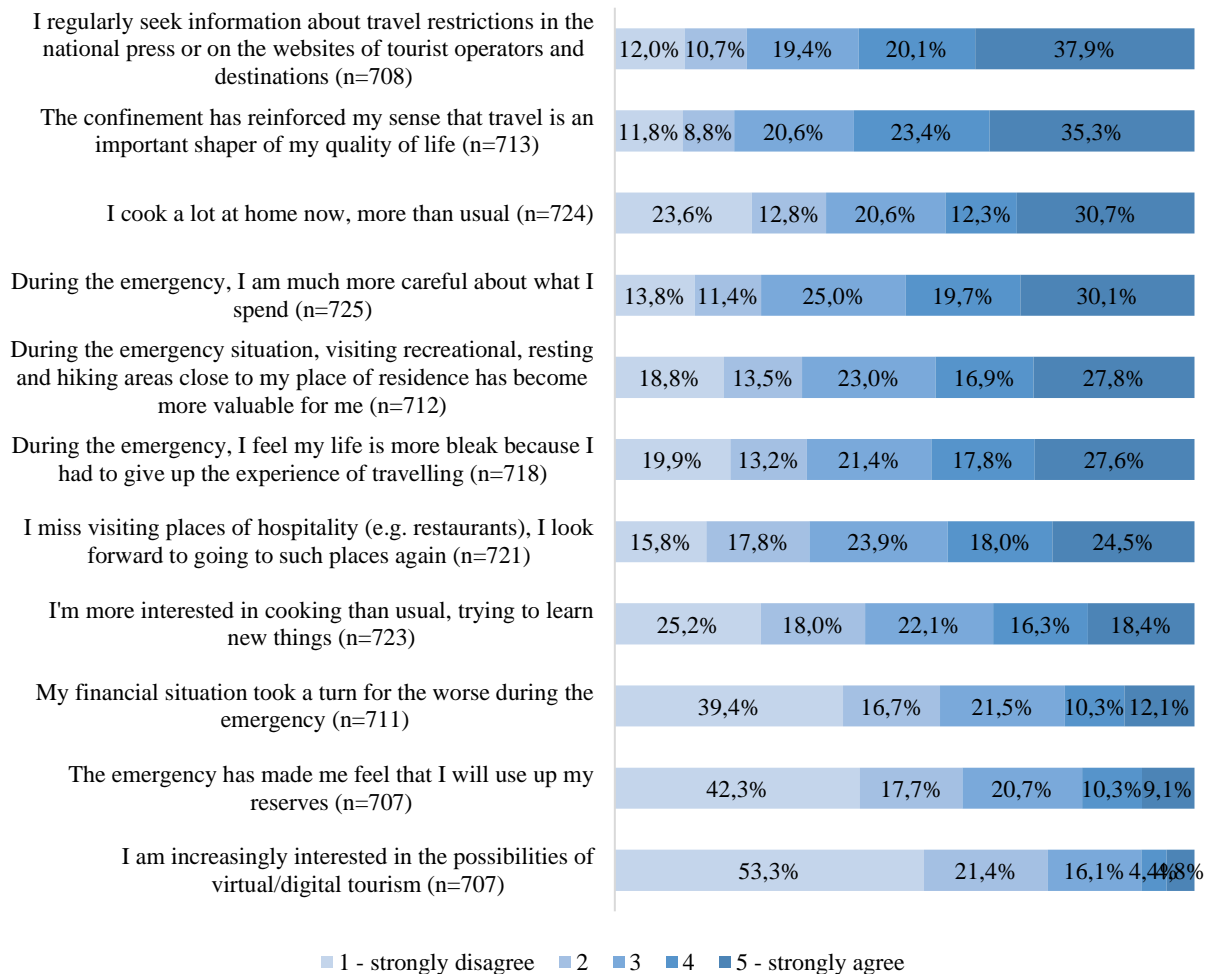
Source: authors.

The following questions intended to reveal how respondents are thinking about the pandemic and related issues of virtual and digital tourism. From the responses, the authors found that there is a clear majority of those who agree with the introduction of travel restrictions, but very few who own or plan to buy a device that would make the virtual experience more enjoyable. This is in line with the previous question's finding that virtual solutions are not a substitute for the real experience. During this process firstly, we used different attitude statements to examine respondents' attitudes towards different pandemic-related topics. All these attitudes were related to everyday actions that could be taken during a pandemic.

The degree of agreement was measured using a five-point Likert scale, where 1 indicated that the respondent strongly disagreed with the statement and 5 indicated that the respondent strongly agreed. The results are summarized in Figure 2. The highest level of agreement was that respondents regularly find out about travel restrictions in the national press or on the websites of tourism operators and destinations. Similarly, high levels of agreement were found with the statement, "The confinement has reinforced my sense that travel is an important shaper of my quality of life". As might be expected from the responses to the previous questions, respondents were least likely to agree that the potential of virtual/digital tourism is increasingly attracting their interest in this changed environment.

Figure 2: Attitude statements related to everyday actions that could be taken during a pandemic (scale 1-5) (n=736)

"To what extent do the following statements apply to you? Please indicate on a 5-point scale, where 1 means you strongly disagree and 5 means you strongly agree."

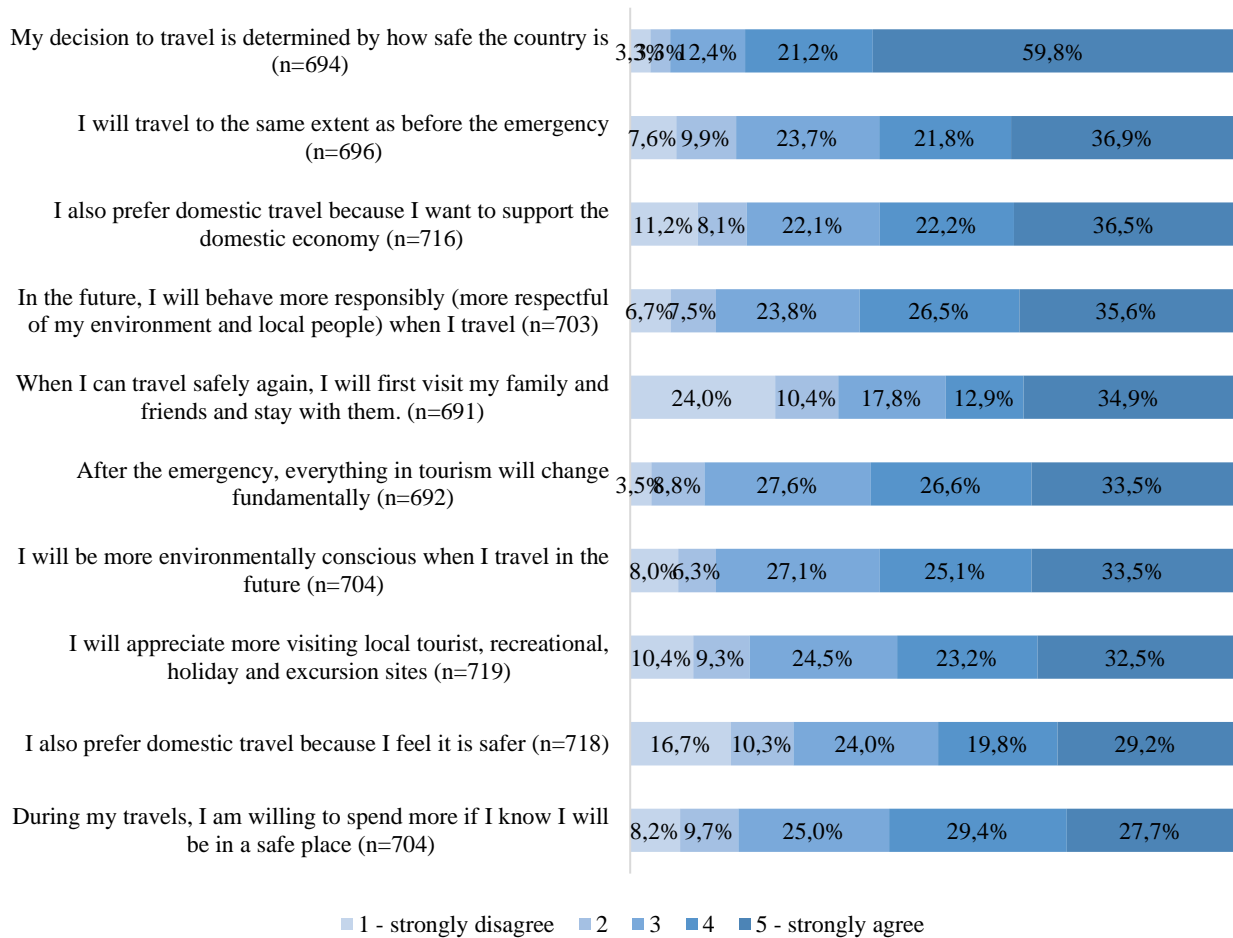


Source: authors.

In addition, our research also sought to find out how respondents felt about the post-crisis period. The results are summarised in Figures 3 and 4. The highest level of agreement was that respondents' travel decisions are determined by how safe the country is. More importantly for the present study, the least agreed statement was that respondents would prefer to use virtual tourism (e.g. virtual visits to museums or other places of interest) because of the potential risks of travel (strikes, natural disasters, terrorism, diseases). More than half of the respondents (58.4%) indicated that they did not agree at all with this statement. Similarly, low levels of agreement were found for our other two statements related to virtual tourism, suggesting that only a very small group of respondents would replace their travel with virtual solutions, and few see this as the future of tourism.

Figure 3: Attitude statements in connection with the post-crisis era

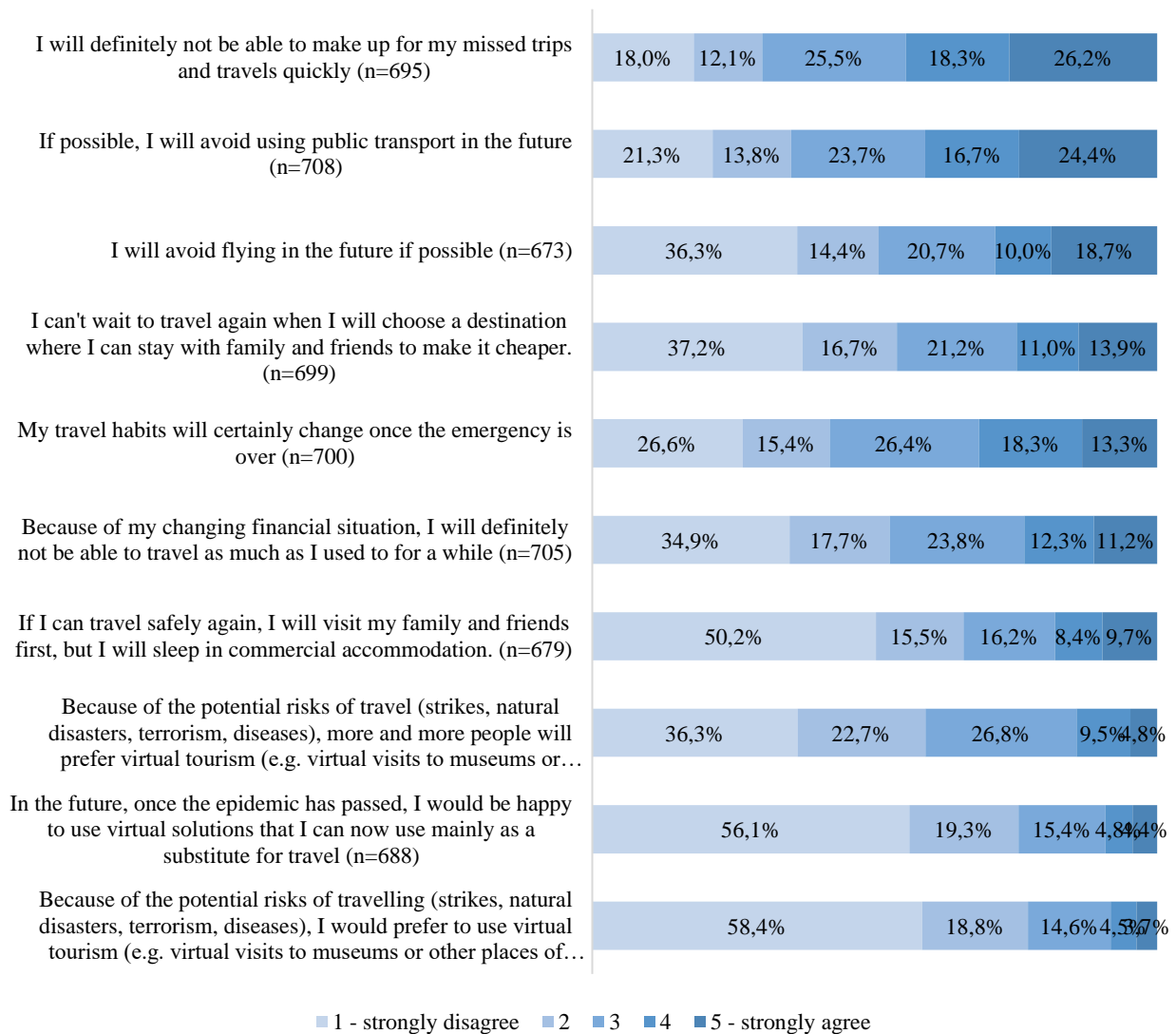
"Let's assume that the current emergency ends and everything goes back to normal. How far do you agree with the following statements? Please indicate on a scale of 5, where 1 means you strongly disagree and 5 means you strongly agree."



Source: authors.

Figure 4: Attitude statements in connection with the post-crisis era

"Let's assume that the current emergency ends and everything goes back to normal. How far do you agree with the following statements? Please indicate on a scale of 5, where 1 means you strongly disagree and 5 means you strongly agree."



Source: authors.

Presentation of the results of the structured in-depth interviews

Continuing the research, at the end of 2022 (suggesting being after the Covid pandemic) the authors made in-depth interviews too. Since the primary aim of the qualitative research was to gain a deeper understanding of the responses to the online survey and the possible personal stories behind them, the authors used narrative analysis. The complexity of the coronavirus outbreak and the wide variation in the living conditions of individuals prompted the authors to choose narrative analysis. The interviews were carried out for more holistic research, nevertheless questions about virtual tourism (as a consequence of digitalisation) made up a certain part of the interview. For the purpose of this study, only the answers to these questions are presented.

Since there is no generally accepted definition of virtual tourism, in the context of this research the authors understood virtual tourism as the use of technology to artificially enhance or create a tourism experience. On this basis, the questions covered in the interviews can be divided into four categories:

- previous experiences with virtual tourism
- the use of virtual solutions before travelling
- the use of virtual solutions during travelling
- virtual tourism as a substitute for real travel

These categories are discussed in more detail below.

After having asked the interviewees about their travel habits, the authors intended to know if the respondents have ever used any virtual tourism services, e.g. virtual tours, virtual museum visits, etc. Only 17% of the interviewees used any kind of digital tourism services, and they did it so mainly during the quarantine period related to the coronavirus pandemic. One mother with young children who regularly used these digital facilities said the following:

We also attended an digital concert and visited the zoo. During the quarantine period, when there was nowhere else to go, the children enjoyed themselves. However, there were frequent problems with poor quality and sometimes the provider's internet connection was interrupted.

Another respondent described his experience of visiting the Louvre online as follows:

I feel it didn't give me the experience I could have had there. My brain just couldn't adjust to that environment at home, I couldn't connect to it. But it was a good teaser, and we decided we wanted to go and see it live.

Of those who used digital tourism services in the past, many said that they had not specifically sought these opportunities but had taken advantage of them when they met with them. The fact that these services were mostly free during the quarantine period probably contributed to this approach.

28.5% of those surveyed said they had never heard of such a possibility (digitalisation, AR, VR in tourism) before. Many of them said they were excited and would like to visit places they had been to before, especially to relive the experience. However, the majority do not currently consider it likely that they will use similar services in the future. Some said they would prefer to see it live, because they felt that digital does not give the experience back.

The interviewees were then asked to indicate on a five-point scale how typical the following statements about virtual reality were for them.

Before my trips, I use virtual reality solutions (e.g. virtual 3D walk) to choose my accommodation and destination.

42.8% of respondents said that they fully agree with the above statement, but it was also said that this mainly relates to their use of Google Street View. There were some who mentioned that they specifically avoid 3D tours on the various accommodation providers' sites because, in their experience, they are generally of poor quality and they believe they get more out of a good photo.

The following statement was: *During my travels, I use virtual reality solutions (e.g. VR glasses) where possible to enhance the experience.*

More than 45% of respondents said that this statement was not at all typical of them. Basically, the authors assumed that younger generations, due to their greater confidence in using different

technological tools, are more open to using them when travelling. However, the results of the respondents in the present study contradict this assumption. One young man in his early 20s said:

I don't need any tools, I want to rely on my own eyes. I don't see the point of being outdoors, for example, but using a device like this.

A woman, also in her early 20s, said:

I love nature, I want to see it for myself.

While a mother of young children in her mid-30s said:

While I'm there, I'd be offended if they put VR glasses on me.

However, there were older respondents in their early 60s who thought it was a very good opportunity and said it would be fantastic to see how people lived in Pompeii before the destruction of Vesuvius, for example, using virtual reality.

Finally, the authors intended to know to what extent the interviewees could identify with the following statement:

Because of the potential risks of travelling (strikes, natural disasters, terrorism, diseases), I would prefer to choose virtual tourism.

More than 68% of respondents said that this was not the case at all. The main reasons given were:

I'm not interested in dangerous places like this anyway.

I'm sure not, I'd rather go somewhere else.

As long as I have something to see for myself, it feels like a waste of time.

I think these solutions can be good as a supplement to the actual trip, but they cannot replace it.

Conclusions

As a result of the pandemic, consumer behaviour in tourism has changed significantly and the use of digital opportunities has become increasingly important in the lives of travellers. Due to this the importance and significance of online bookings, virtual travel, safety and hygiene information together with flexibility became such key areas where digitalisation made significant progress and change in consumer behaviour. Overall, the pandemic has significantly changed tourism consumer behaviour and made the use of digital options increasingly important for travellers.

In the aftermath of the pandemic, changes in tourism consumer behaviour have continued and digital opportunities continue to play an important role in travellers' lives especially in such areas as experiential travel, safety and hygiene measures, sustainability and alternative travel options.

Based on the demonstrated results, the authors believe that the Hungarian population still has limited and relatively little information and experience with digital tourism services and virtual reality solutions. An additional problem for digital tourism services may be the lack of an adequate internet connection for both the consumer and the service provider, while for virtual reality solutions the lack of the necessary tools. The feedback suggests that there are relatively few people who would pay for these services at present, but there is a greater openness to use them during the actual journey to enhance the experience. However, in many cases this was also made conditional on the price of the service.

Although the younger generation has been less open, this could be related to the fact that they have spent relatively more time online in recent years, thanks to the coronavirus epidemic.

In the context of the present research, the authors found that those with relatively less travel experience (including the younger generation) referred more often to “wanting to see for themselves” than those with more travel experience. However, travel motivation itself may also have an impact on the perception of these services, as those whose main motivation is cultural tourism showed a greater willingness to travel than those whose main motivation is nature tourism. Since digitalisation offers multiple opportunities for tourism supply to access new markets and develop new travel products and services, a better understanding of such processes in tourism provides the most important practical implications for this study since a deeper understanding of the demonstrated changes in consumer attitudes towards digitalisation in tourism provide the basis for adequate responses of the actors of tourism. Aiming to reach a holistic goal by better understanding customers' digitalisation behaviour is alongside with the intention of the related international literature as well (Tussyadiah et al. 2018, Khan et al. 2023, Rejón-Guardia et al. 2020).

The research gap of this study, in view of the recent trends which have had a significant impact on tourism and society, is that there has been a lack of research of the exploration of the consumer attitudes to digitalisation in travel consumption patterns in Hungary.

Clarification of these assumptions is the subject of future research, and, in our opinion, it is significant to further research these phenomena and to continuously monitor the reactions of the tourism consumers to understand their changing attitudes towards digitalisation in tourism. A possible future research direction could be to investigate the relationship between travel experiences and openness to virtual reality solutions.

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NAVIGATING UNCERTAINTY: THE IMPORTANCE OF PIVOTING BUSINESS MODEL IN RESPONSE TO COVID-19 CRISIS

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Abstract

Pivoting business models during a crisis often are, in literature, presented as a sine qua non to survive during hard times. However, researchers still need consensus on whether companies pivot from necessity or pursue opportunities that originated due to a crisis. The purpose of this paper and research is to, using qualitative research methods, find out how small and medium-sized enterprises (SMEs) in Croatia pivoted their business models and what was the main driver for the pivoting – necessity or opportunity. For this research, the most appropriate method is the narrative interview method which allowed for the collection of information and data and insights, conclusions, and the decision-making determinants from five SMEs that made major changes in their business models. Results revealed that owners of SMEs during the crisis choose different strategic decisions and approaches and that their choices are usually necessity driven but under the great influence of the ecosystem in which they operate. The article discusses the implications of pivoting business models during the crisis as a prerequisite for survival and the dark side of that decision.

Keywords: COVID-19, pivoting business models, comparing business models, SMEs

JEL classification: M2

Introduction

The crisis COVID -19, identified as an exogenous shock that disrupted the flow of almost all economic processes and caused disruptions in the labor market (Morgan, Anokhin, Ofstein, & Friske, 2020), forced many entrepreneurs to reflect on the effectiveness of their business models. While researchers have done a good job of explaining and researching the causes and consequences of the crisis for large companies, small businesses have remained under the radar (Davidson & Gordon, 2016; Devece, Peris-Ortiz & Rueda-Armengot, 2016). According to Morgan et al. (2020), large companies have greater bargaining power and can negotiate special arrangements with policymakers, but small companies are often "left with nebulous advice on how to pivot their business models" (Morgan et al., 2020, p. 370). This paper aims to analyze the determinants of the decision and motives to pivot their business model and the outcomes of their findings, focusing on case studies of five SMEs from eastern Croatia. Pivoting is presented in the literature as a prerequisite for crisis survival. Still, there needs to be more research covering the negative side of pivoting and the main drivers for pivoting.

A crisis caused by a pandemic affected more than 60% of small and medium enterprises and 44% of large enterprises (Leho, Mandarić, Njegovec, & Oreški, 2021). During the lockdown, when almost all economic processes were stopped, the Croatian government was among the first in the European Union to adopt 66 measures to preserve liquidity and jobs (Delić & Alpeza, 2021). Despite these job preservation measures, more than 50,000 jobs were lost in Croatia (Leho et al., 2021). In order to survive (while waiting for financial aid), SMEs in Croatia pivoted their business models. Some of them also managed to take advantage of opportunities in the market. This paper provides an overview of the spotted opportunities and strategies for pivoting business models of local companies and their adjustment to a dramatically changing environment, but also the result of their decisions on their profitability and sustainability.

Pivot or die

Within the SME sector, the smallest enterprises, that have the fewest resources, are likely to be the most affected by the effects of the crisis (Brown, 2020). Their primary task, during the crisis, is to preserve liquidity, while in the long run, they should focus on behavioral changes. Even in the SME sector, some enterprises had bigger chances to survive: larger and older, male-owned, service-based, and owned by owners with more industry experience and prior disaster experience (Marshall, Niehm, & Sydnor, 2015). Omar, Ishak & Jusoh (2020) found that during the crisis, the ability of SMEs to reshape or pivot their business models is crucial for their survival. Their capability to pivot their business models rapidly is “an important source of sustainable competitive advantage and a key leverage to improve the sustainability performance of organizations” (Geissdoerfer, Vladimirova & Evans, 2018). According to Manolova, Brush, Edelman & Elam (2020), pivoting is necessary during the crisis for two reasons: reducing risks and seizing opportunities. Ries (2011, p. 149) defines pivoting as “a structured course correction designed to test a new fundamental hypothesis “, which refers to searching for new opportunities the enterprise is qualified to exploit. According to Sanasi & Ghezzi (2022), pivoting is a strategic reorientation that enables enterprises to check their business models and probe new hypotheses about them (Frederiksen & Brem, 2017). Zuzul & Tripsas (2020) argue that pivoting guarantees the flexibility to cope with uncertainty. Pivots enable learning while suggesting a need for moderation in strategy, goals, technological applications, market focus, or even identity (Berends, van Burg & Garud 2021; Camuffo, Gambardella & Spina, 2020), to preserve competitive advantage (Sanasi & Ghezzi, 2022) or formulate a response to the crisis. Pivots is essential for reducing uncertainty brought by a crisis (Klein, 2020) and allows enterprises to turn adversity into an opportunity (Andries, Debackere & Van Looy, 2020; Salvato, Sargiacomo, Amore & Minichilli, 2020). But, Morgan (2020) argues that not every entrepreneur's action can be called pivoting, only opportunity-driven steps that reposition companies in response to exogenous shocks. Although pivoting implies seizing the opportunity, there is also a dark side to that activity. Morgan (2020) claims that newly discovered options may be of inferior quality for the enterprise, they may not be sustainable, and the pivoting itself may be a traumatic event in the company's life.

In "normal" times of operation, approval from stakeholders or consumers' adoption of a radical reshaping of the business model is hard to obtain, if not impossible (Maritz, Perenyi, de Waal & Buck, 2020). In times of crisis, a pivoting business model in a divergent way is easier to address (Lindgart, Reeves, Stalk & Deimler, 2009). It is a powerful tool for enterprises to achieve resilience and growth, especially in a global crisis and instability context (Lindgart et al., 2009). Pivoting "creates value for the customers and captures value for the company" (Gassman, Frankenberger & Csik, 2014). When owners of SMEs adopt a discovery-driven

approach, they focus on their current resources and capabilities and identify ways to apply their resources and capabilities to new opportunities (Manolova et al., 2020). Adopting a cost-driven approach changes the focus of SME owners on cost-cutting and moving into a new line of business with a changed pricing model (McGrath & Macmillan, 2009).

Although challenged by the COVID-19 crisis, the ability of enterprises to change quickly will soon reveal the survivors. Anderson, Bieck & Marshall, (2020) claim that the need for speed and flexibility has been amplified dramatically. Old barriers have been removed under the pressure of disruption, rapidly evolving customer expectations, and the number and rate of the changes (Anderson et al., 2020). Organizational challenges (remote workplaces), a remaking of supply chains, and manufacturing of personal protective equipment are challenges caused by the crisis that revealed the ability to adapt to environmental changes. Adaptability will be key competence in the future, especially emphasized and accelerated in times of crisis. Pivoting business models are one of the abilities that will be especially valued in the future. Cowling, Liu & Ledger (2015) suggest that enterprises created during the crisis tend to perform better over the long run and those profiting from the disruptions (Valinsky, 2020). In any case, existing enterprises have pivoted to capitalize on new opportunities from the crisis. Morgan et al. (2020) conclude that the crisis revealed major gaps in available products and services and provided opportunities for those that know how to pivot and solve the problems caused by the crisis.

Was it worthy of a pivot?

The term “business model” came into widespread use with the appearance of personal computers and spreadsheets (Magretta, 2002). Initially, business models were considered "half-baked business plans" (Magretta, 2002), and today term is “among the most sloppily used terms in business” (Magretta, 2002). Magretta (2002) defines business models as stories explaining enterprises' operations. A business model is, according to Osterwalder, Pigneur & Tucci (2005), “a conceptual tool containing a set of objects, concepts and their relationships with the objective to express the business logic of a specific firm.” Although there are many definitions of business models, researchers agree that business models include customer-focused value propositions, profit formulas, key resources, processes, and partners and can be a source of innovation and competitive advantage (Teece, 2010; Zott & Amit, 2008). Business models enable communication between enterprise and stakeholders, demonstrate content, structure, and management that create value for the customers while seizing opportunities (Amit & Zott, 2001) and enable modification of the model itself or specific elements of the model (Amit & Zott, 2001).

While researchers have a consensus that pivoting in crisis is necessary, there are different views on what pivoting is. According to Devece et al. (2016), pivoting is always associated with seizing opportunity, with even enterprises created from necessity pursuing opportunities. Before pivoting, the opportunity itself needs to be evaluated, and whether it fits with the capabilities of an enterprise as well as the cost-structure in the model (Morgan et al., 2020). There are two types of opportunities – arbitrage and innovation (Anokhin et al., 2011). Arbitrage opportunities relate to information asymmetries and pricing disequilibrium when resources are priced differently (Morgan et al., 2020). They are usually associated with the introduction of new technologies. However, arbitrage opportunities, sometimes also called “buy low and sell high” strategy, rarely justify pivoting. On the other hand, innovative opportunities are worth pivoting because they aim to provide high-quality solutions that fit well with the enterprise’s history (Devece et al., 2016). Pivoting should also consider what will happen with

the enterprise after the crisis. Some researchers suggest investing in the enterprise's social value, which may lead to a new level of customer awareness and appreciation (Morgan et al., 2020). Pivoting may leverage existing resources and capabilities to move into a related product category, modify distribution channels to reach customers in new ways, or seek new resources and capabilities to produce completely unrelated products in new markets (Morgan et al., 2020). Innovative opportunities require financial support, human resources, and creative ideas that ensure the enterprise's sustainability, liquidity, and profitability.

The results of a large survey conducted by IBM Institute for Business Value, in 20 countries among 3450 executives throughout the lockdown period (from April till June 2020) revealed that 59% of companies accelerated digital transformation, and 66% completed the initiatives that previously encountered resistance. Anderson et al. (2020) claim that this results from the defensive culture focused on reducing costs. Other changes enterprises have made aimed at exploiting arbitrage opportunities: include shifting to more cloud-based business activities, accelerated process automation, adapting their approach to change management, and making permanent changes to organizational strategy (Anderson et al., 2020). Taking advantage of these opportunities will help the enterprises to survive the current crisis, but the benefits for the business are very small. Comparing enterprises and their answer to the crisis in China, Malaysia, the Philippines, Thailand, and the UK, from October 2020 till January 2022, Autio (2022) concluded that entrepreneurial businesses are more reluctant to release their employees, feel a greater responsibility to their regional communities, need to improvise and pivot to survive the crisis and are more tuned to spot opportunities opened by the crisis. Therefore, Autio (2022) stressed the five most common resilience responses to crisis: experimenting and adapting business models, accelerating digitalization, taking on a social mission, seeking opportunities, and engaging with the entrepreneurial community.

To find an answer to our research question, whether enterprises pivot only to survive during the crisis or whether they have spotted great opportunities that came along with the crisis, we interviewed five enterprises from the eastern part of Croatia. We tracked the results of their pivoted business models from March 2020 till December 2021.

Methodology

This paper is designed as a comparative analysis of enterprises surveyed and is intended to contribute to theory building. Business Model Canvas methodology is used to understand better the analyzed enterprises' strategic choices. We collected data through semi-structured interviews supplemented by data from secondary sources.

The business model is a blueprint representing the business's essence (Mason & Spring, 2011). The business model, according to Osterwalder & Pigneur (2010), describes the rationale of how an organization creates, delivers, and captures value. Osterwalder & Pigneur (2010) provide a business model canvas to compare business models. Business model canvas is a "concept that becomes a shared language that allows easily to describe and manipulate business models" (Osterwalder & Pigneur 2010). Existing business model templates, according to Sinfield, Calder, McConnel & Colson (2011), are suitable for exploring the challenges faced by single existing organizations since the model is a "simplification of reality with a specific purpose" (Morioka, Evans & Monteiro de Carvalho, 2016).

Osterwalder & Pigneur (2010) describe business models through nine building blocks covering a business's key areas: customers, value proposition, infrastructure, and financial viability.

Table 1: Business model canvas elements

Element of the business model	Explanation
Value proposition	<i>describes the bundle of products and services that create value for a specific customer segment</i>
Customer relationships	<i>describes the types of relationships a company establishes with customer segments.</i>
Customer segments	<i>defines groups of people or organizations an enterprise aims to reach and serve</i>
Channels	<i>describes how a company communicates with customers segment to deliver a value proposition</i>
Key partners	<i>describes the network of suppliers and partners that make the business model work</i>
Key activities	<i>describes the most important thing a company must do to make its business model work</i>
Key resources	<i>describes the most important assets required to do a business model work</i>
Revenue streams	<i>represents the cash a company generates from each customer segment</i>
Cost structure	<i>describes all costs incurred to operate a business model</i>

Source: Osterwalder and Pigneur (2010).

For this research, five local enterprises were selected, operating in different markets and industries. The objective in choosing this sample was to identify the important determinants for the decision to pivot and to find out whether new business models are an opportunity or just a strategy driven by necessity. A comparative analysis of their business models was conducted to verify whether selected enterprises were ready to seize new opportunities. The enterprises in the sample differed by industry, market presence, age, and size. All enterprises in the sample were interviewed and monitored during the total lockdown and when social distancing was recommended.

Table 2: Case studies / interviewed enterprises

Case no.	Enterprise	Industry	Market presence
1.	Studio Eccentric, center for training and therapy, Ltd.	service	local
2.	Đanić, craft for schnaps and fruit liquors production	production	international
3.	Ferivi Ltd.	sport clothes and equipment distribution and sale	international
4.	Spin Informatica Ltd.	IT solutions (software)	international
5.	Business Club, hospitality, and entertainment, Ltd.	hospitality	national

Source: authors.

To compare and provide "common ground" of business models from different industries, we identified evaluation criteria from our pilot cases and relevant and recent literature. The research framework, developed based on the literature review, allows us to compare observed business models on eight criteria. Cross-industry models for analyzing business structures and models have yet to be developed (Pedauga et al., 2021). Analyzing the decisions on pivoting that observed enterprises have reached, how they survived, and adapted to the COVID-19 crisis will have major implications and "enormous bearing on future economic and societal welfare for years to come" (Brown, 2020).

Because business ecosystems and exogenous factors strongly influence business model development and pivoting, we identified the determinants critical to business model pivoting decisions when conducting case studies of interviewed and observed small and medium-sized enterprises.

Table 3: Determinants that influence the decision on business model pivoting

Determinant	Implications	Low score (0)	High score (5)
Major fall in capital investment (Herbane, 2010; Doshi et al., 2018)	Financial instability and uncertainty about the future forced enterprises to stop their major capital investments	Enterprises stopped all capital investment during the pandemic	Enterprises continued with their capital investment
Liquidity problems (Brown, 2020; Sanasi et al., 2022; Pedauga et al., 2021; Autio, 2022)	The crisis caused by the pandemic stopped all operations and, therefore, all incomes. State subsidies were the only income.	Enterprises suffered from liquidity problems.	Enterprises did not suffer from liquidity problems.
Closure of operations (Wahyudi, 2014; Craven et al., 2020)	Due to total closure, enterprises had to minimize or completely stop all their operations.	Enterprises stopped all their operations	Enterprises did not have to stop their operations
Laying off workers (Wahyudi, 2014; Craven et al., 2020; Smith-Bingham and Hariharan, 2020; Pedauga et al., 2021)	Enterprises were forced to lay off their workers without the possibility of operating and suffering from liquidity problems.	Enterprises were forced to lay off all workers	Enterprises did not have to lay off workers
Level of accumulated profit (internal sources) (Cowling et al., 2012; Demirguc-Kunt et al., 2020)	Enterprises that had their internal sources of financing did not suffer from liquidity problems but also did not have to lay off workers	Internal sources were not important for the pivoting decisions	Internal sources were crucial for pivoting decisions
Size and age of the enterprise (Autio, 2022)	Bigger and older enterprises have more accumulated profit	Bigger and older enterprises did not have more internal sources	Bigger and older enterprises had significantly more internal sources
Innovation capabilities (Zalina et al., 2016; Mahani and Suraiya, 2019)	Enterprises that have more innovation capabilities will be more ready to pivot.	Pivoting is not connected with innovation capabilities	Innovation capabilities are crucial for pivoting
Networking (Pedauga et al., 2021; McDonald and Eisenhard, 2020)	Enterprises that have bigger networks will be more willing to pivot	Networking is not associated to pivot	Networking is essential for pivoting
Industry (Brown, 2020)	Some industries are more heavily impacted by crisis and lockdown (localized enterprises, service-based, etc.)	Some industries are more heavily impacted	All industries suffered the same

Source: authors.

According to Autio (2022), entrepreneurial responses to a crisis that enable their survival and resilience include pivoting, accelerated digitalization, taking on social missions, and engaging with the entrepreneurial community. His research has shown that younger enterprises are more reluctant to lay off their employees, feel greater responsibility toward their regional communities, must improvise, and will be more tuned to spot opportunities that came with the

crisis. Morioka et al. (2016) suggest that the COVID-19 crisis will push enterprises to leverage their asset capabilities and networks to ensure resilience.

The crisis caused by the COVID-19 pandemic will have a major impact on local service businesses (Brown, 2016). The lockdown was particularly hard for the service sector such as retailers, hospitality (restaurants, night bars, coffee bars), taxi services, and personal services (hairdressers, fitness, and other training). Their strategy will be, according to Brown (2016) and his research results, to minimize expenditures (bootstrap) to survive. While service sector will be more impacted, and some enterprises will be winners of the crisis. According to Brown and Lee (2019), these are high-tech, digitally enabled sectors (life sciences, medical equipment, online delivery-based enterprises, software, and app-based enterprises). Brown & Lee (2019) predict that high-growth enterprises will continue to grow rapidly even in times of crisis.

Pedauga, Saez & Delgado-Marquez (2021) found that the COVID-19 pandemic caused cash flow problems, closure of operations, and interruptions in supply chains. The key survival challenges for most enterprises in Spain were changing business strategies and finding new sources and opportunities for redevelopment. However, the impact of the crisis depends on the nature of the business activity, its size, and its resources (Cassia & Minola, 2012).

The sustainability of enterprises depends on their innovation capabilities, financial resources, networking and technology (Zalina, Firdaus & Azman, 2016; Mahani & Suraiya, 2019). Crisis require enterprises to act quickly and to create opportunities from within (Agarwal & Audretch, 2020). To cope with the uncertainty, enterprises need to quickly gather information about the potential viability of new business models and opportunities (McDonald & Eisenhard, 2020) and change their business strategy.

Analysis of selected business models

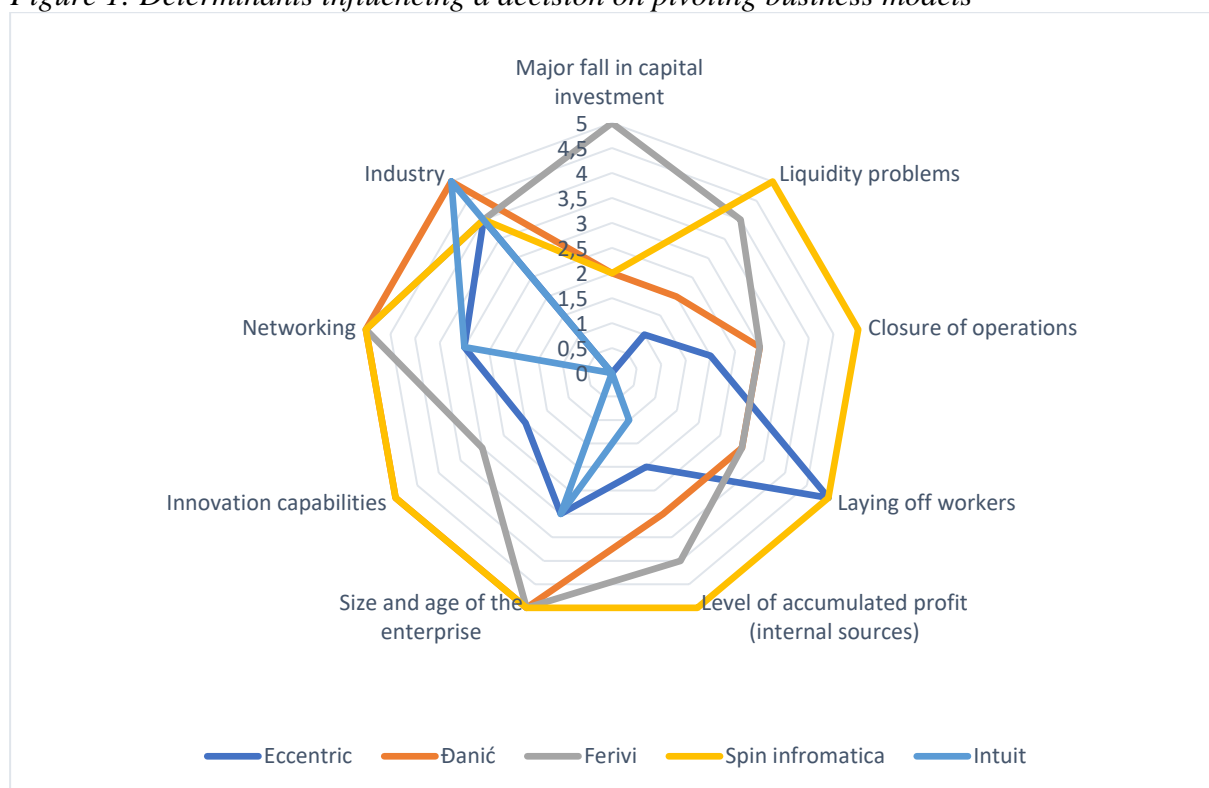
When analyzing the determinants influencing a decision on pivoting business models, the results are inconsistent with previous research. A crisis is always associated with uncertainty, which prevents entrepreneurs from proceeding with their large investments or capital projects. The crisis caused by the COVID-19 pandemic was a different kind of crisis, and therefore, entrepreneurs expected some help from the state. Croatia was one of the countries that provided a large financial aid package to prevent a GDP decline and layoffs ("nanny-state"). This could be why some of the enterprises surveyed continued to pursue their investment plans. Capital investments are also needed for pivoting business models. Ferivi Ltd. discovered the potential of a webshop and therefore pivoted its business model by changing customer relationships, channels, key activities, and resources. This resulted in higher profits despite lockdown and restrictions to prevent the spread of the virus.

Closures of operations are closely linked to liquidity problems. All enterprises in the sample had more than ten years of industry experience and sufficient knowledge about the market and customers, had time to create internal resources from retained earnings, and had built a rich network crucial for making good decisions and avoiding liquidity problems. All enterprises in the sample emphasized that lockdown was particularly difficult for newly established enterprises because they lacked the necessary resources. Studio Eccentric and Ferivi pointed out that they had to make decisions daily but also tried to inform their employees about the impact of those decisions. Spin Informatica easily moved its entire operation to remote channels. Still, the owner pointed out that team and knowledge were the resources he was trying

to preserve, as they were the enterprise's most important resource. The enterprises in the sample proved that strategic decisions about pivoting require a lot of experience, courage, networking, and resources (knowledge and internal financial sources).

Closure of the operations was especially hard for Business Club Ltd. and Đanić enterprise. These enterprises were heavily dependent on tourism and the hospitality industry, so they were forced to lay off their employees (50 to 70%). Đanić is the only enterprise in the sample that completely changed its business model - from producing schnaps and fruit liquors to producing disinfectants for business premises. The owner pointed out that this was the only way to continue production and retain 50 % of the workforce. At the same time, such major changes in the business model probably required more time and planning, as this is the only enterprise in the sample that reported losses at the end of the year 2020. In 2021 they returned to their original business model.

Figure 1: Determinants influencing a decision on pivoting business models



Source: authors.

The analysis of determinants showed that enterprises with a stronger desire to retain their employees and market position were more open to the decision on business model pivoting. Liquidity issues, as well as industry factors, may be associated with the business model pivoting decisions.

The enterprises in the sample that decided to pivot their business model pivoted in customer relationships, channels, key resources, activities, and partners. Table 4 shows that the observed enterprises generally pivoted their business models in the segments of customer relationships, channels, key resources, activities, and partners.

Table 4: Changes in the elements of the business model canvas as a result of pivoting

Element of the business model	Studio Eccentric Ltd.	Danić	Ferivi Ltd.	Spin Informatica Ltd.	Business Club Ltd.
Value proposition	modified (+)	completely changed	the same	the same	modified (-)
Customer relationships	modified (-)	modified (+)	modified (+)	the same	modified (-)
Customer segments	modified (-)	completely changed	the same	the same	the same
Channels	completely changed	modified (+)	modified (+)	the same	modified (-)
Key partners	modified (+)	modified (+)	the same	the same	modified (-)
Key activities	modified (+)	modified (+)	modified (+)	the same	modified (-)
Key resources	modified (+)	modified (+)	modified (+)	the same	modified (-)
Revenue streams	lower	higher	higher	lower	lower
Cost structure	lower	lower	lower	lower	lower

Source: authors

The data for revenue streams and costs (comparison of the income statements and balance sheets from 2020 and 2021) were compiled from secondary data - balance sheets and income statements of interviewed enterprises. For this purpose, the Croatian Financial Agency (FINA) database and data from the Poslovna Hrvatska database were used. The databases used are regularly updated with information from financial reports and changes in responsible persons.

Conclusion and recommendations for further research

Comparative analysis of observed enterprises' business models showed that all enterprises pivoted, but only one changed its business model completely. The results of our study show that entrepreneurs pivoted for different reasons: to maintain contact with customers and suppliers, to avoid liquidity problems, to preserve all work positions, and also to explore new ideas. The results of their pivoting actions were confirmed and justified through their financial results. Larger enterprises, with more experience in the industry and prior experiences with crisis, made bigger changes in their business models. Still, only one enterprise in the sample changed its business model completely. This enterprise was the only one with negative financial results at the end of 2020. Other enterprises that pivoted moderately or not at all reported profits at the end of the year. The results of our research are different from previous research results. Enterprises that have reported profits waited for financial aid from the state and managed to preserve liquidity and sustainability. Big financial aid packages provided by the Croatian government ("nanny-state") helped save jobs but neglected efforts and risks that certain enterprises took while pivoting their business models. More technology-advanced enterprises felt that lockdown and social distance recommendations had remained the same as their day-to-day operations. Enterprises in the service sector, particularly in the hospitality industry, needed alternative ways to conduct their businesses.

Results of our research suggest that waiting for government help was a better decision than trying to change the business model and seize the opportunities that the crisis opened. Enterprises that pivoted their business models moderately took less risk and kept their market positions. Their financial results were positive. One of them even managed to raise its investments in long-term assets. On the other hand, a crisis caused by the COVID-19 pandemic was not like other crisis, so results can be different because of different circumstances and problems that enterprises experienced. After the crisis, only two enterprises continued the

activities developed due to the pivoting business model. The reason could be that their business models adapted to the new circumstances to survive a hard time, but not because of the good business opportunity.

Pivoting is closely linked to the industry and ecosystem in which enterprises operate. Further research could compare business models pivoting on different markets, especially in developed and underdeveloped countries. Finding the optimal level for pivoting business models in crisis and identifying industry-specific elements in business models for their comparison could be one of the recommendations for further research. Finally, comparing the pivoting strategies during the COVID-19 crisis and other crises could help us understand better how decisions about pivoting have been made and which determinants are most important while making those decisions.

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OVERCOMING THE CURSE OF DESTINY: QUO VADIS CROATIA (IN EU)?

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Abstract

The slowdown in economic activity is already noticeable and "self-explanatory," and uncertainty continues to slow investment, which can lead the economy into a vicious cycle of alternating phases between growth, stagnation, and recession. There is no "free lunch" or accelerated economic growth without strategic (specialized) determination, and fairness, uniformity, and convergence are harder to finance precisely when the need for them is growing. Another problem occurs in countries and regions that have "lagged behind" in development. In these countries and regions, there are significant constraints in terms of financial resources, workforce, and the technological base for change. Even when the "will" (political and technical) is there, there are often too many priorities, raising questions about what development priorities should be set at the regional and national levels (individually and then collectively) and whether there is sufficient capacity to implement them. Exploring the causes and consequences of these movements is the main reason for the research and is a contribution to the field. The focus of this paper and the importance of the results obtained are therefore on the following fundamental challenges for research, but also for policy: 1) the state behavior of inflation during global recessions, 2) growth and development in difference: beyond inflation in Croatia, and 3) overcoming the curse of destiny: what are the opportunities for the EU in times of instability? At the same time, "united in diversity" as a basic description of the EU (single market of non-united economies) takes on a different meaning. However, membership in the EU and the Eurozone contributes to the "superiority and resilience of the club". In any case, inflation has been underestimated - worldwide. So the question is who will feel Friedman's hangover after almost 40 years of exciting growth periods in Croatia and what is our destiny?

Keywords: Croatia, government, inflation, recession, stability, structural transformation

JEL classification: E60, F02, F15, F60, O1

Introduction

Structural changes refer to changes in economic structure (demographic, industrial, financial, government administrative, and other stakeholders) that are more interrelated. For example, countries that have "not done well" in international competition for competitiveness and world trade shares often make a sudden (premature) and unprepared transition from labor-intensive to capital-intensive industries. Indeed, this unpreparedness often leads to the need to protect enterprises that are not sustainable, to regional difficulties with rents, to regional imbalances in basic growth factors, to a worse distribution of resources, to the introduction of (individual) price regulations or similar measures. Also, that often leads to even slower economic growth and to a complex restructuring not only of the enterprise but of the entire socioeconomic system. Another problem occurs in countries and regions that have "lagged" in development. These countries and regions have significant constraints regarding fiscal resources, workforce, and the

technological base for transformation. Even when the "will" (political and technical) is there, there are often too many priorities, raising the question of what development priorities should be set at the regional and national levels (individually and then collectively) and whether there is sufficient capacity to implement them. Wage growth occurred in the 1970s and 1980s after two oil price hikes when unions could show "their muscles" (strengthening the role of blocks), concluded Blanchflower & Bryson (2022). So, as they noted, in 1978, there were 22 million union members, which accounted for about a quarter of all workers. In 2022, 14 million members covered a tenth of workers who do not have strong bargaining power.

Former parallel systems of non-market in the countries of Central and Eastern Europe, as well as various forms of non-refundable (centralist) financing, led to increased indebtedness in international relations in the country. Inflation, in practice, served as a financing instrument in conditions of almost unproductive production and consumption, which further impoverished the economy and slowed down economic possibilities (and, therefore, political and technological, but also general social) transition and, later, transformation. Such a state-planning system caused a decline in production, investments, and consumption. Funds for reserves and covering the deficit could only be secured by an even more significant decrease in investments and consumption of the population since there was limited access to (further) borrowing abroad. Economic progress in Central and Eastern Europe countries is unequal and largely depends on the initial conditions and the starting dates of the economic transition (Gajewski, 2018). A fundamental conclusion is that making the necessary adjustments promptly is essential for curbing inflationary pressures and reducing the output costs of political interventions.

The origin of inflation

Inflation is affected by the dynamics of business processes and decisions and the expectations of entrepreneurs (both in the narrower and broader sense of price creation). Often, monetary policy implies the relationship between inflation and unemployment, the classic conflicting goals of monetary (and general economic) policy (for example, the Phillips curve). However, in modern times, monetary policy no longer has its traditional clear and original functions effective in the long term. Otherwise, the most important influencing factor (except interest rates) is the real wage: the expectations (and thus the pressure) of workers who demand wages by expectations (and, primarily, inflation movements) (Kose, Matsuoka, Panizza & Vorisek, 2019). The effectiveness of monetary policy in price stabilization depends on factors such as inflation dynamics, the central bank's credibility (in the case of the EU, ECB), the efficiency of monetary and fiscal policy coordination, and the instruments (or at least partial) monetary policy (Misztal, 2017; Coenen, Orphanides & Wieland, 2003). Uncertainty about aggregate demand conditions during recovery and labor force behavior tends to delay employment. Structural mismatch significantly worsens the efficiency of matching needs in the labor market, increasing unemployment. Otherwise, it adapts to the state of the economy (money is neutral if there is no money illusion and if we assume that workers are rational and adjust their expectations to inflation). Marques (2004) concludes, based on research, that the more flexible the assumed inflation means, the lower its stability. Moreover, inflation was more stable in the 1960s and 1970s than in modern times (although it also emphasizes the so-called "constant mean," especially for the USA).

"Bringing inflation under control" is defined, noted Agarwal & Kimball (2022), as three years of quarterly inflation remaining below 4 percent since 1990. A technical recession (Roland

Berger Institute, 2022) means a "confirmed recession," i.e., a situation when it is pretty clear that a country is not at risk of entering a recession but has already entered a recession (a negative growth rate, i.e., a drop in GDP for two quarters in a row). Some monetary policymakers (in 2021) were on the path to believing that inflation is temporary and caused mainly by the increase in energy and food prices. Unfortunately, in 2022, it is understood that a substantial rise in prices of "affected and relatively unaffected sectors," the shocks due to the war in Ukraine (Burdekin & Siklos, 1999 in Misztal, 2017), are more permanent. The longer-term effect of inflation on expectations (which is very dangerous) lasts quite a long (but also, anti-EU voting and arising of populism are dangerously linked with expectations, as showed by Dijkstra, Poelman & Rodríguez-Pose, 2020). In any case, inflation has been underestimated - and globally. Despite the slowdown in global growth, inflation in many countries grew significantly precisely because of risk (expectations) (Ha, 2023; Rutkowska, Szyszko & Pietrzak, 2023; Misztal, 2017). Inflation persistence (Ha, 2023; Agarwal & Kimball, 2022; Gajewski, 2018; Misztal, 2017; Marques, 2004) stays because of, as Agarwal & Kimball (2022) noted, 1) "panic buying," 2) global supply chains that become so long, 3) shift in demand towards goods and away from services, 4) aggregate stimulus and post-pandemic recovery, 5) shock to labor supply, 6) supply shock to energy food (the Russian invasion of Ukraine). In addition, the global economy is recording almost the most consistent tightening of monetary and fiscal policies in the last five decades. This almost "synchronization of basic economic policy instruments" emphasizes the similarities implemented in 1982 and the differences from 1975 (Guénette, Kose & Sugawara, 2022).

The curse of Croatia's destiny: economic roadmap and other challenges?

Nevertheless, Croatia is continuously growing, and even when it recorded a drop in GDP, the economy had room for "stunted growth" (in almost all sectors). Problems cause and can cause, again and again, the uncertainty that threatens to "get into people's bones" and, through people's perception, dangerously threatens and can reflect on economic activities in the country. In addition, if we depend (and we do) on global flows, the spillover of negative consequences from other countries will make a recovery difficult (which will be the situation in Germany). Croatia's accession to the Eurozone, the strengthening of European monetary mechanisms, the arrangement of Croatian strategic planning, and therefore reform attempts, and what we can then "measure and feel" managing the right track of economic prospects. Still, some new geo-economics formed and geopolitical "elite," which can have several consequences on the role and significance of the (old) EU in the global economy.

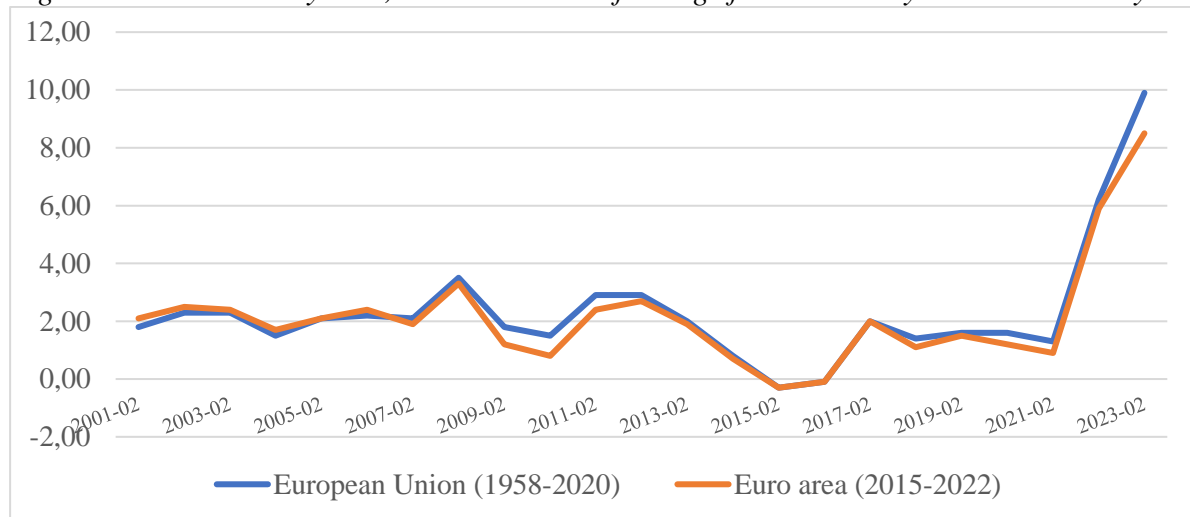
Unfortunately, the slowdown in economic activity (and thus growth) is already noticeable and "self-explanatory." Uncertainty continues to slow investment, which can lead the economy into a vicious cycle of alternating phases between growth, stagnation, and recession. Instead of inflation increasing in the expansionary phase of economic cycles ("overheating of the economy" due to the acceleration of economic activity), Croatia's economy records it in the stage of stagnation or decline (Ha, 2023; Zhu, 2022; Kose, Sugawara & Terrones, 2020). Suppose one examines the country's economic state from independence to today. The processing industry, reindustrialization, or value-added paradigm, was quite a "difficult topic" in the public eye. It is necessary to emphasize that the initial phase of industrialization in Croatia began 127 years later than that in Great Britain (or 30 years later than the USSR), and the years of the fastest development in our country lasted significantly shorter. As a result, the industrial and general economic base was fragile for what followed later - globalization, the Homeland War, and liberalization. Regional redistribution fails to explain the pervasive slowdown in

productivity, points out Goldin et al. (2021). Croats are more inclined to rentiers than to production, which also affects their attitude to wages. The sources of economic growth in Croatia, in general, were 1) the sectors of lower added value, 2) the development of tourism in the sense of "give what you can because you have nothing else" (and often without a long-term sustainable development strategy), 3) an unnatural model of development (consumption vs. production, import vs. export), 4) "lucky" in the sense of objective circumstances (proximity to export markets, security of the area, and natural resources) and 5) individuals who did not bear responsibility for doing and not doing, ("transition of mentality"). Croatian economy (responsibility authorities) must look for its sources of economic growth through highly specialized knowledge and presence in economic activities that are more difficult to copy (the transition from "moderate" innovators to "strong" innovators). At the same time, EU funds are additional "healthy money" aimed at production and restructuring, which is undoubtedly an excellent (continuation) opportunity for structural (and economic) transformation. It seems that the high level of productivity of some sectors (industries) is specific to certain countries, even in a situation where the slowdown is the result of structural transition and "new normal" productivity growth rates (as already noted, due to ICT, for example).

Inflation monitor: EU membership and global instability

The Croatian economy in 2019 needed as many as seven years to reach the level of GDP per capita from 2008. The real growth rate averaged 2.3 percent from 1996 to 2019 (CBS, 2022a), and in addition, the gross added value (market value of all produced goods and services) increased by EUR 3.537 billion from 1995 to 2019 (CBS, 2022b). Still, the indication that the structure of VAT itself has decreased in the same period, especially in the productive sectors of the economy, is worrying. Furthermore, in 2014, employment in the euro area remained around 2.4 percent below its pre-crisis peak (2008), with five and a half million unemployed. The unemployment rate in the euro area rose from a pre-crisis low of 7.3 percent to 12.0 percent in early 2013 and has only modestly decreased. Employment in the euro area took almost nine years (35 quarters) to reach pre-crisis levels, while the unemployment rate only got grades close to the observed levels in 2019 at the beginning of the Great Recession (ECB, 2021). Average inflation in the Euro area increased to 2.6 percent in 2021 from 0.3 percent in 2020. Growing geopolitical risks and the inelasticity of energy price demand boost inflation. Inflation growth was higher than the growth of underlying inflation because of 1) temporary disruptions (post-crisis and restructuring-related expansion, regional divergence, convergence in the EU), 2) expectations and unrealistic wage growth", and 3) (post)pandemic recovery related to growing public debt (Bordignon, Gatti & Onorato, 2022; Schneider et al., 2022; WEF, 2022; Aimola & Odhiambo, 2020; Fukunaga, Komatsuzaki & Matsuoka, 2019; or: Keeley & Love, 2010). The annual inflation rate in the euro area in February 2023 was, for example, in Croatia about 11.7 percent while in the Netherlands, for instance, it was 15.5 percent in Slovakia, 20.1 percent in Latvia or 17.1 in Lithuania, and 17.8 percent in Estonia (Figure 1, Eurostat, 2023). At the same time, "united in diversity" as a basic description of the EU somehow gets a different meaning (single market of non-united economies).

Figure 1: HICP monthly data, the annual rate of change from February 2004 to February 2023



Source: author according to Eurostat Data Browser, 2023.

Based on published assessments of the impact of the integration of value chains on work of productivity growth (Constantinescu et al. 2019 in Goldin, 2021), it is estimated that the slowdown in world trade may have contributed 15 percent to the productivity slowdown, with considerable differences between countries. Quite logically, that inflation is more persistent in lagging regions. Carniti et al. (2019) noted that decentralization had been shrunk to obtain more control over national deficits and debt. It is precisely the countries of Central and Eastern Europe that are usually more sensitive to international capital flows and the monetary policy of the Eurozone. At the same time, they face still-present internal challenges (structural as well as social transformations) (Gajewski, 2018). After the 'place-based' turn in Cohesion Policy, changing political equilibria and a growing body of evidence are calling for a revival in the leadership and responsibility of the member states (Crescenzi, Fratesi & Monastiriots, 2020). However, EU membership contributes to the "club's superiority and resilience."

Around 60 percent of total income is generated annually through employment in the euro area, and the labor force participation rate has steadily increased from 58,5 percent in 1997 to 64,5 percent in 2019 (ECB, 2021). In 2022, the region's economies proved more resilient than expected (however, falling purchasing power, decreasing external demand from advanced Europe, and high financing costs are expected with persistently high energy prices and short-term costs associated with the green transition). The average participation rate of the working-age population in the Eurozone was 73.6 percent in 2019 (regardless of age, gender, educational differences, or even depending on citizenship) (ECB, 2021). But also, as Pissarides & McMaster in 1984 provided (in Johnes & Hyclak, 1988), labor and capital migration would take over twenty years to close the gap between regions.

Suppose the economy is facing a recession when inflation is zero. In that case, the monetary authority is limited in its ability to create a negative short-term real interest rate to mitigate the loss of output (Summers, 1991 in Coenen, Orphanides & Wieland, 2003). Further, if average inflation is 0, potential GDP falls by about 0.1 percent (Coenen, Orphanides & Wieland, 2003). This zero bound literally "distorts" the stochastic properties of the economy and induces a trade-off between the average level of inflation and the variability of inflation and output. Likewise, there must be a clear awareness of how encouraging investment (domestic and foreign) stimulates economic activity even when it affects inflation growth in the short term. Namely, the openness of the economy and movements of FDI positively impact monetary actions

(Todorov, 2022) that can increase the money supply before economic activity increases. Also, as Égert (2021) pointed out, FDI tends to be related to improved multi-factor productivity and the quality of institutions and labor market policies. For example, real GDP growth in Ireland accelerated to 13.5 percent in 2021 due to the recovery of private consumption (after stabilizing the impact of COVID-19 and strong export growth). Additional recovery was through the contribution of FDI (6.5 percent growth supported and labor market recovery) (ESM, 2021). Goldin et al. (2021) noted that the decline in investments is a cyclical phenomenon driven by financial constraints and a reduction in aggregate demand. The question arises as to what radical changes these are? As objectionable as it may seem, strengthening "statism" in times of crisis and excessive administrative regulation is sometimes known through market marginalization in specific segments or undue "interference" in the market. The EU development and investment policy incentives could mean somewhat "centralist." Still, it is the "great return" (has it disappeared at all?) of strategic planning (from the microeconomic level to macroeconomics). Restructuring and productivity growth come about thanks to innovations. At the same time, the innovations necessary for the restructuring of the low-income economy are not limited only by the lack of educated scientists and engineers, the absence of research and development laboratories, or the weak protection of intellectual property. But, the economy (both from the government and entrepreneurs' side of demand) must have the willingness, motivation, and capability/capacity to innovate, according to Ashford (2000 in Ashford & Hill, 2019). Therefore, joining the EU significantly positively impacted the member countries (for more impacts, see also: Campos, Coricelli & Moretti, 2019). As an example, considering intra-EU trade in total exports, the share of Slovakia's exports of machinery, vehicles, and transport equipment was at the level of 39.8 percent in 2002, and in 2019 it was as much as 74.1 percent. In the Czech Republic 51.5 percent in 2002 and 62.4 percent in 2019 (UNIDO, 2020). All countries with similar comparative characteristics achieved export growth, except for Croatia, whose export of the mentioned product group fell from 32.1 percent to 24.2 percent in 2019. In addition, the Czech Republic ranked 18th, Poland 23rd, Slovakia 25th, Hungary 27th, and Croatia 56th regarding industrial competitiveness (UNIDO, 2020). Gross value added per inhabitant, as an essential indicator of the "state of the industry" and the economy in general almost tripled in the Czech Republic and Poland, doubled in Hungary and Slovakia, and remained nearly the same (767 US dollars more) in Croatia from 1995-2002 to 2010-2017 years. The share of medium and high-tech industries in the export of industrial products grew significantly in all the previously mentioned countries except Croatia and Bulgaria (2002 and 2015), just like the industrialization intensity index (2002 and 2017) (UNIDO, 2020). So, is the EU good for the member countries? In view of the above, one could say that it is. But also, the EU funds are still more than 5 percent of Croatia's GDP, and it is essential to remember the European Stability Mechanism (ESM) with a capacity of 500 billion euros (with, for example, 1% interest with a repayment period of 30 years). Moreover, "after the crisis," the functioning of many euro area institutions was restored, the ESM was established, and fiscal policies were better coordinated through the procedure of the European Semester (for more, see: Deskar-Škrbić, 2018). The reaction of the European authorities to the COVID-19 crisis was marked by a more active role of the ECB in supporting member countries and the banking system and introducing new tools to maintain economic convergence.

The euro area is the second most prosperous economy and the largest exporter in the world, and the euro is the second most important currency in world reserves and international transactions. Croatia's GDP makes up about 0.5% of the GDP of the euro area, and we often forget that the ECB is the most democratic European institution. The future vote of our governor is not determined by the number of inhabitants, by GDP, but only by the fact "how many are at the table"! Despite the difficult economic conditions, Croatia's met all convergence criteria

(economic and legal): the exchange rate has been stable for many years (and not just two) and linked to the euro. Production in Central Europe and the Baltic States is expected to grow by 0.6 percent in 2023 (EBRD, 2023).

Although government bond yields increased due to rising euro area inflation expectations in Portugal, market access conditions remained favorable mainly thanks to accommodative monetary policy. But also, annual inflation grows due to increasing energy prices and supply chain disruptions in most EU member countries. The general consumption in the EU member states somehow "grew normally" from the Second World War (except for the second oil shock and occasional world or regional crises) until modern times. Only the crisis of 2008 (European Commission, 2009) and then COVID-19 and Russian aggression against Ukraine caused more severe concern (see, for example, EBRD, 2022a). When "wild inflation" is highlighted, one forgets that the inflation rate must not exceed 1.5 percentage points. Still, above the three-member states that achieved the best results (and not in the short term, and only Croatia and Sweden met this criterion), public finances are relatively healthy and sustainable (we are not in the process of excessive deficit, although it is challenging to maintain stability due to both COVID-19 and rising energy prices), long-term interest rates were the lowest in Bulgaria, Sweden, and Croatia. Legal convergence (harmonization of legislation) was fully realized only in Croatia. Therefore, by entering the euro area, Croatia is making an additional effort and a significant step towards economic, political, but also social integration with the member states of the European Union, which, after the Homeland War and entry into the European Union, is the most significant achievement and our obvious orientation towards the most developed countries not only of the European Union and the European continent but also of the world (and this is often forgotten). Croatia is a young modern democracy but also a historically rich civilization. Moreover, Croatia's are raising it to an even greater international economic, social, and political acceptance and respect. However, as Bordignon, Gatti & Onorato (2022) noted, it is too early to comment on their effects on the development and sustainability of the monetary union. In addition, the currency risk disappears, and the costs of exchange transactions are reduced, which is very important since the Croatian economy is highly euroized and strongly trade-integrated with the euro area's economy. About 127 percent of GDP is the indebtedness of all sectors in the euro, 59 percent of Croatia's total trade in goods is between members of the euro area, and around 65 percent of tourists are from eurozone countries, CNB (2022) and the economic and business cycles themselves are pretty aligned.

It is important to point out that "this" inflation has little to do with the currency. Inflation is ubiquitous, and our trends cannot deviate from world trends. We must be objective and point out the advantages of applying the anti-inflationary package of measures, which, however, amortized the pressures. According to all trends, except inflation, the Croatian economy is progressing, but this is being ignored, and subjectivity is louder than objectivity. Let's ask ourselves why all European countries with five or fewer million inhabitants have either the euro or the value of their domestic currency linked to the euro. But also, it must not be forgotten that, for example, energy subsidies in the EBRD countries are estimated at around 3.6 percent of GDP (EBRD, 2023). Despite almost all growth forecasts, if gas supplies are questionable and cause prices to rise, GDP per capita in the EBRD regions could be around 2% lower in 2023 (EBRD, 2022b), which creates additional pressure on the public debt. According to the WEF Global Risk Report (2022), the fundamental risks that can determine Croatia's development stand out: 1) prolonged economic stagnation (also in Poland, Portugal, and Greece), 2) globalization of strategic resources, 3) digital inequality (also in Greece and Portugal), 4) human-made environmental damage (Poland), and 5) widespread youth disillusionment. Interestingly, they were not highlighted, for example, debt (as in the Czech Republic, Slovakia,

Portugal, Greece, or Ireland), collapses of a systemically important industry (as in the Czech Republic and Slovakia), and failure to stabilize price (as in Hungary).

The state behavior of inflation during global recessions

Thanks to relatively efficient (and quick) efforts of economic policy, but the "first next crisis" (whatever you call it) in the world market shows that stabilization over a long period requires almost radical changes (which "nobody wants ") both in the economic, but also in the political sense. This change must focus on (not only on government policies), as Ashford & Hall (2019) suggested: 1) product changes, 2) process changes, 3) shifts from products to product services, and 4) more far-reaching system changes. Milton Friedman wrote (1980) that inflation is like alcoholism; in both cases, when you start drinking and when you start printing too much money, the good effects and feelings come first, but the worst moments of the (economic) hangover also come very quickly. There is no "free lunch nor accelerated economic growth without strategic (specialized) determination, and fairness, uniformity, and convergence are harder to finance precisely when the need for them is growing. Government cannot be an unreasonable "printer." However, real price growth should be viewed over the long term because then we can see that it is "not too much" despite short-term shocks, especially when considering inflation over the same period. Efforts to develop different strategic concepts of economic stabilization and transformation through financing instruments (primarily funds) to reach the basis for stable and long-term sustainable GDP growth proved to be the right strategic decision. Every global recession since 1970 preceded a significant global growth weakening in the previous year. Also, all last global recessions have coincided with sharp slowdowns in GDP growth or outright recessions in several of the world's major economies (Guénette, Kose & Sugawara, 2022; Ma, Rogers & Zhou, 2020). Blanchflower & Bryson (2022) reached some interesting conclusions: 1) although unemployment is low, the labor market is not 'tight' or close to full employment; 2) by reducing the already low level of consumer confidence, higher interest rates could worsen workers' inability to maintain their accurate, and 3) inflationary pressures are generated by short-term supply-side problems, not excessive demand in the economy.

How to overcome the curse of destiny: Conclusions for the EU in times of instability

The growth of general consumption "accumulated something." With a balanced budget (continuously "filled with healthy funds"), a development, investment, and technological policy ultimately left a positive long-term impact on the economy of EU member states. In addition, the very foundations of "slowing down" should be considered. Namely, GDP growth can slow down if the previous growth rates are extremely high due to the adjustment of productivity growth or some short-term advantages. Rather than a permanent increase in growth rates, but also innovation could lead to a "new normal" levels of productivity, which are high) (Goldin et al., 2021). Creative interventionist policies (Ashford & Hall, 2019) almost encourage system innovation through sustainable transformations. Although there is often skepticism about the EU (Dijkstra, Poelman & Rodríguez-Pose, 2020; Crescenzi, Fratesi & Monastiriots, 2020), in principle, the most developed countries are progressing at a "normal" rate.

What kind of economic policy measures can neutralize the adverse effects of inflation? Most EU member states have resorted to lowering VAT energy prices, price regulation, transfers to vulnerable groups, and support to the private sector. For example, the windfall profits tax to

shift at least some of the tax relief to capital, and the impact of public enterprises (which account for 50 percent of total global GDP), e.g., through more accessible (and equitable) public services and strengthening intermediary government spending. Looking at the long term, none of these countries (as well as the EU and euro area member states) have stagnated economically. Still, their EU and euro area membership has benefited them (for additional readings: Campos, Coricelli & Moretti, 2019). There are many more challenges, just as it has always been in the modern Croatian history, how to maintain the stability of the economy, make the labor market more efficient and flexible (neutralize, to the greatest extent possible, structural imbalances and insecurities both the supply side and on the demand side for work) (see also: Johnes & Hyclak, 1988), increase labor productivity (with technology and knowledge, but also perhaps with smaller contributions to wages), how to try to ensure the fastest possible structural and digital transformation of the economy, but also a green transition that will not only be "declarative," but also meaningful with concrete moves, achievements, and benefits. At the same time, the economy's resilience is imposed as an internal obligation and responsibility, not an excuse due to external circumstances. The problem is and will be the vulnerability of the European (and Croatian) economy due to Russia's aggression in Ukraine, dependence on energy sources, damaged supply chains, and several "damaged" industries and activities on the world market. It is not only geopolitical challenges but also serious geo-economic challenges that dangerously disrupt distribution chains, pressure the price and availability of labor, raw materials, and energy, and make general (in)security the most severe factor of economic growth. Economies grow when they are stable, and democracy thrives when it is possible to ensure a basic level of living standards for the population. Maybe, all these circumstances are a prelude or announcement for some new "industrial-energy-digital revolution" that will neutralize existing and threatening problems expectedly and unexpectedly. It is also a question of our civilizational maturity for the same, just as the First Industrial Revolution once did. And the exchange rate, we've kept the exchange rate stable and "European" for a long time anyway, so it wasn't a "joker call" for us as an economic instrument to stimulate the growth of competitiveness (nor would it be good now). That is why this exchange rate will not cause "chaos" (that is, not new chaos) and will help the economy (exporters, tourism) and society as a whole, especially in the long term. Economic policy must be long-term oriented and resistant to short-term risks that must (successfully) amortize.

The conclusions of the forecasts of numerous reputable institutions and authors are almost aligned that the global economy will experience the most significant drop in GDP (Guénette, Kose & Sugawara, 2022) concerning all the challenges of world crises since the 1970s. Also, Bruno (1982 in Goldin et al., 2021) attributed that in that crisis, the slowdown was also connected with capital's adjustment to rising energy costs which reduced productivity. Despite the pessimistic forecasts, we must be aware of the "accumulated problems of all these years" due to subjective inabilities and objective circumstances. It is imperative to understand the fundamental causes of the crisis, that is, their origin, and then try to prevent the multiplicity of negative consequences. It is possible through basic economic policies, i.e., the macro-economic framework, then the institutional-regulatory and political framework (let's not forget, social consensus is also critical). Resilience must be strong through action on the efficiency of the labor market, the growth of economic productivity, and the economic and structural transition of the economy. Nevertheless, what is certain is that a period of political responsibility and economic transformation will be necessary and imposed. Sometimes result in faster reform interventions and an orientation towards sectors that achieve (or have the potential to achieve) added value through their technical-technological complexity. And innovation. Economic policyholders must act almost simultaneously on the supply and demand sides to influence price

stability, labor market efficiency, energy efficiency, fairness, and uniformity to avoid economic deterioration and support growth.

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DEVELOPING GREEN CENTRAL BANKING IN THE EUROPEAN UNION

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Abstract

The financial sector, including central banks, can have an important role in supporting the transition to a low-carbon economy and mitigating the risks associated with climate change. The purpose of the paper is to give a brief overview of selected researches on the field of green central banking and to examine how central banks integrate green initiatives into their operations and practices to address climate-related risks within their core policy frameworks. Since the European Union has set ambitious targets to reduce greenhouse gas emissions and speed up transition to a low-carbon economy through its European Green Deal, the focus of the paper is to explore the development of green central banking in the EU, including the challenges and opportunities that this presents. The research pointed out many advantages of green central banking, but also limitations. Central banks have a limited set of policy tools at their disposal to promote environmental sustainability. They may not be able to directly regulate carbon emissions. Policies that discourage investments in fossil fuel companies could have a negative impact on economic growth and price stability. Additionally, incorporating climate risks and sustainability factors into financial regulation could increase complexity and compliance costs for financial institutions, potentially leading to unintended consequences. There are also other challenges associated with the development of green central banking. Central banks must ensure that their efforts to promote environmental sustainability do not compromise their primary objectives of maintaining price stability and financial stability. This requires careful consideration and analysis of the impact of environmental sustainability on the economy and financial system.

Keywords: green central banking, monetary policy, European Union

JEL classification: A13, E58, Q01, Q56

Introduction

Green central banking is a concept that has gained significant attention in recent years. It refers to the integration of environmental considerations into the operations and policies of central banks to promote sustainable development and mitigate the risks associated with climate change. The rise of the concept of green central banking has been driven by the growing recognition of the role of financial systems in promoting sustainable development and the need for central banks to address the risks posed by climate change to financial stability.

One of the key drivers of the development of green central banking is the Paris Agreement from 2015, according to which the global temperature increase should be limited below 2 degrees Celsius above the pre-industrial levels (Rogelj et al., 2016). The agreement calls on all sectors of society to take action to address climate change, including the financial sector.

The transition towards a green society of low-carbon emissions is connected to large amounts of economic resources, which should be invested in the green sectors (Campiglio, 2015; McCollum, 2013). As the investments require money, the banking system is one of the key parts of the completely green transition. And especially important is the role of central bank, as the regulator on the market who can stimulate crediting special fields, those that could be described as ecology friendly.

The development of green central banking

The financial sector, including central banks, has an important role to play in supporting the transition to a green economy with low-carbon emission. Central banks have a mandate to maintain price stability and financial stability, and the risks posed by climate change to these objectives are becoming increasingly clear. For example, climate change can lead to physical risks, such as damage to infrastructure and property, and transition risks, such as the revaluation of assets as the economy transitions to a low-carbon future. To address these risks, central banks can integrate environmental considerations into their operations and policies. This can include incorporating climate risk into their risk management frameworks, conducting research on the impact of climate change on the stability of economy and financial sector, and giving the support to the rise of green finance.

One of the key tools that central banks can use to support the development of green finance is the use of green bonds. Green bonds are bonds issued by individual firms or states for financing environmentally sustainable projects. The use of green bonds can help to channel funds towards sustainable investments and encourage private investors to invest in green projects.

The development of green central banking has been led by many central banks in the world, of which one is the European Central Bank. The ECB has taken a leading role in promoting environmental sustainability through its operations and policies. The ECB has established a climate change centre to research and analyze the impact of climate change on the economy and financial stability, and it has also announced that it will start purchasing green bonds as part of its asset purchase program. In addition to the ECB, a number of other central banks have also taken steps to integrate environmental considerations into their operations and policies. For example, the Bank of England has established a climate change stress test to assess the resilience of the financial system to climate change, and the People's Bank of China has issued guidelines on green finance to support the development of green finance in China.

Literature overview

Green central banking is relatively new topic in the literature. However, there are papers investigating this new trend. In this literature overview, we give the short description of selected papers and researches, in the chronological order.

Talisma and Kassim (2016) conducted a study that examined the correlation between profitability and green financing. The study analyzed data from a sample of 30 banks in Bangladesh and utilized various profitability ratios to determine the relationship between the banks' use of green financing funds and their financial performance. The results indicated that the banks' Return on Assets (ROA), Return on Deposits (ROD), and Asset Utilization (AU) had significant positive correlations with their use of green financing. However, there was no significant relationship observed between the banks' Return on Equity (ROE) and their use of green financing.

Laskowska (2018) presents two institutions involved in the green banking concept and compares them from the aspect of the environmental protection. Both institutions integrated ecological considerations into their overall strategies and profited from their implementation. The study suggests that pursuing pro-environmental activities can yield cost-effective benefits in the long-run. Moreover, competition within the green banking sector is continually increasing, and experts predict that the trend towards eco-friendly practices in Polish banks will continue, making it an increasingly lucrative market.

Central banks are now aware of the potential economic and financial dangers caused by uncontrolled global warming and are taking steps to address them. However, monetary policy, which is central to their mandate, has yet to be fully integrated into the fight against climate change. Kempf (2020) has proposed a way to align monetary policy with environmental objectives without compromising the central bank's primary mission of stabilizing the economy and controlling inflation. The proposal involves modifying the operational framework of monetary policy to incentivize commercial banks to adjust their lending practices based on the associated carbon emissions. Two options are available: adding a climate premium to the interest rates and using a climate rating system for its credits, and differentiating the approach of counterparties based on their CO₂ emissions when providing liquidity.

In recent years, central banks have become significantly involved in combating climate change. As the consensus grows that climate change represents a financial risk, green central banking is increasingly seen as a means of promoting financial stability - a goal that has gained widespread acceptance in the post-financial crisis world. Therefore, it is the responsibility of central banks to address environmental sustainability in their efforts to promote financial stability. Şimandan and Păun (2021) look at the costs of green central banking and their trade-offs. Their findings suggest that when the costs and trade-offs are considered, the argument for implementing green policies within central banks is not as clear-cut as previously depicted in the literature.

Dikau and Volz (2021) demonstrated the connection between central bank mandates and their green initiatives, which involve promoting sustainable growth, integrating green finance into mainstream practices, and addressing climate-related risks within their core policy frameworks. Their study examined 135 central banks and found that 52% of them are mandated to contribute explicitly to the sustainability of growth and development or to support the government's economic policies, which typically include sustainability objectives. However, a half of central banks do not have any explicit or implicit sustainability objectives.

There is a growing interest in incorporating green policies into monetary policy, but central banks are wary of interfering with market neutrality. However, research indicates that the market tends to favor carbon-intensive companies. Schoenmaker (2021) has proposed a method for adjusting the ECB's asset and collateral framework to include more green assets. This

approach could reduce CO2 emissions in the ECB's corporate and bank bond portfolio by more than a half, without adversely affecting the monetary transmission mechanism. Key insights from the study show that the ECB's current portfolio is overweighted in high carbon companies and that a medium tilting approach towards low-carbon companies could significantly reduce carbon emissions in the portfolio by 55%. Additionally, this approach could lower the cost of capital for low-carbon companies, potentially incentivizing high carbon companies to adopt more sustainable practices and technologies.

McConnell et al. (2022) explore various green monetary policy instruments, identifying the inclusion of "brown" collateral haircuts as the most effective channel for green monetary policy. In the context of green finance, "brown" collateral haircuts are risk management tools used to assess the credit risk of assets associated with high carbon emissions or other environmental and social risks. The study suggests that both "brown" and "green haircuts" can increase carbon-neutral investments while reducing carbon-intensive investments and emissions.

ECB made climate change a priority for the coming years through unanimous agreement. Deyris (2022) investigates how this change came about and identifies a combination of internal and external factors that led to climate integration. The renewal of the Executive Board and modifications in organizational dynamics created a large coalition for change within the institution, while politicians, NGOs, academics, and citizens push the institution to develop its expertise and provide insiders with additional resources to advocate for their green agenda.

Yin, Chang, and Wang (2022) conducted a study using a panel of 133 countries from 1960 to 2018 to explore the impact of expansionary monetary policy on green innovation. The study found that such policies have a significantly positive effect on green innovation performance, both in static and dynamic models. However, in developing countries with lower degrees of central bank independence and weaker property rights protection, the positive effect of monetary policies may not be transmitted smoothly to green innovation activities. Additionally, stringent environmental regulations can amplify the positive effect of expansionary monetary policy on green innovation, but good national governance quality (higher corruption control, better government efficiency) is needed to support this moderating effect.

In their study of Hungary, Desalegn, Fekete-Farkas and Tangl (2022) analyzed the impact of monetary policy and private investment on green finance. The results indicate that there is a strong positive correlation between inward foreign direct investment and green financing in both the short and long term. In contrast, the correlation between outward foreign direct investment and green finance is strongly negative. Accordingly, central banks, commercial banks and regulators should adopt both neoliberal and reformist approaches to promote greater investment in sustainable projects.

Key representatives of the ECB have emphasized the importance of incorporating environmental goals into the bank's monetary policy, such as transitioning from market neutrality to green market efficiency as a guiding principle for decision-making. Schnabl (2023) investigates the potential use of the EU taxonomy as a benchmark for the ECB's monetary policy, which could influence the credit allocation of commercial banks. However, Schnabl's study highlights concerns that such an approach may have a negative impact on allocation efficiency and economic growth in the European Union.

Despite some other research about green central banking (Dikau and Ryan-Collins, 2017; Breitenfellner, Pointner and Schuberth, 2019; Langley and Morris, 2020; Ferrari and Landi,

2021; Giovanardi et al., 2021), we believe that the presents literature overview gives a good insight into the main ideas of the existing researches.

Ideas of green central banking in the European Union

The European Union has set ambitious targets to reduce greenhouse gas emissions and transition to a low-carbon economy through its European Green Deal, and central banks are playing a critical role in supporting this transition through their operations and policies. This paper will explore the development of green central banking in the EU, including the challenges and opportunities that this presents.

ECB has been at the forefront of promoting environmental sustainability through its operations and policies. In 2019, the ECB established a climate change center to research and analyze the impact of climate change on the financial stability as well as on the overall economy. The center aims to provide policymakers with the necessary information to develop policies that promote environmental sustainability while maintaining price stability and financial stability. It is responsible for producing research on the impact of climate change on the euro area, including the transmission channels through which climate risks affect the financial system. This research is critical for informing the ECB's policy decisions and ensuring that it is well-equipped to address the challenges caused by climate change.

In addition to its research efforts, the ECB has also announced that it will start purchasing green bonds as part of its asset purchase program. The ECB's purchase of green bonds is intended to support the green bond market development and encourage investments in environmentally sustainable projects. The ECB's commitment to purchasing green bonds sends a strong signal to the market and reinforces the importance of environmental sustainability in the financial system.

However, there are also challenges associated with the development of green central banking in the European Union. One of the key challenges is the lack of a common framework and taxonomy for green finance. The absence of a common framework makes it difficult for investors to identify environmentally sustainable investments and for central banks to assess the risks associated with climate change. To address this challenge, the EU has developed a taxonomy for sustainable finance, which provides a classification system for environmentally sustainable economic activities. The taxonomy is intended to provide a common language for investors and financial institutions and promote greater transparency in the market.

Another challenge associated with the development of green central banking in the EU is the potential conflict between the promotion of environmental sustainability and the mandate of central banks to maintain price stability and financial stability. Central banks must ensure that their efforts to promote environmental sustainability do not compromise their primary objectives of maintaining price stability and financial stability. This requires careful consideration and analysis of the impact of environmental sustainability on the economy and financial system.

Despite these challenges, the development of green central banking in the EU presents significant opportunities for promoting sustainable development and mitigating the risks associated with climate change. By integrating environmental considerations into their operations and policies, central banks can help to support the transition to a low-carbon

economy and promote sustainable development. This, in turn, can help to mitigate the risks associated with climate change and ensure the long-term stability of the financial system.

Advantages and disadvantages of green central banking

The adoption of policies and practices by central banks that aim to promote environmental sustainability and address climate change has several advantages. Some of the potential advantages of green central banking include:

1. **Mitigating climate risk**
Central banks can incorporate climate risks into their financial stability assessments, helping to reduce the likelihood of financial instability caused by climate change.
2. **Promoting sustainable finance**
By setting standards for sustainable finance and providing incentives for financial institutions to invest in green projects, central banks can help redirect capital towards sustainable economic activities.
3. **Encouraging innovation**
Green central banking can encourage innovation in areas such as green finance, renewable energy, and sustainable transportation, which can drive economic growth and job creation.
4. **Enhancing reputation**
Central banks that prioritize environmental sustainability can enhance their reputation and credibility with stakeholders, including investors, policymakers, and the general public.
5. **Supporting global efforts to address climate change**
By adopting green policies and practices, central banks can support the global effort to mitigate climate change and achieve the objectives of the Paris Agreement.

Together with these advantages of green central banking, there are also some possible disadvantages to consider, such as:

1. **Limited policy tools**
Central banks have a limited set of policy tools at their disposal to promote environmental sustainability. For example, they may not be able to directly regulate carbon emissions or implement environmental taxes.
2. **Potential conflicts with monetary policy objectives**
Green central banking policies could potentially conflict with traditional monetary policy objectives such as price stability, employment, and economic growth. For example, policies that discourage investments in fossil fuel companies could impact economic growth and employment in those sectors.
3. **Increased complexity**
Incorporating climate risks and sustainability factors into financial regulation could increase complexity and compliance costs for financial institutions, potentially leading to unintended consequences.
4. **Risk of greenwashing**
There is a risk that financial institutions could engage in greenwashing, presenting themselves as environmentally friendly without actually making substantial changes to their business practices.
5. **Lack of international coordination**
The effectiveness of green central banking policies could be limited by a lack of international coordination, as environmental risks and sustainability issues often cross national borders.

Based on the analyzed potential advantages and disadvantages of green central banking, it could

be concluded that the green central banking has the potential to promote both financial stability and environmental sustainability, while also supporting long-term economic growth and development.

Examples of green central banking in the EU

One example of green central banking is the efforts of the Deutsche Bundesbank to address climate change risks and promote a transition to a low-carbon economy. In 2019, Deutsche Bundesbank, the national central bank of Germany, published a discussion paper on climate-related risks and their impact on the financial system. The paper highlighted the need for financial institutions to manage and disclose climate-related risks, and stressed the importance of integrating climate risks into financial stability assessments.

Bundesbank has also established a sustainable finance working group to develop proposals for promoting sustainable finance in Germany. The working group includes representatives from the financial industry, academia, and civil society, and has focused on issues such as sustainability reporting and green bonds. Furthermore, in 2021, the Bundesbank launched a new climate stress test for banks and insurance companies operating in Germany, which is designed to assess their resilience to climate-related risks such as extreme weather events and the transition to a low-carbon economy.

Banque de France, the central bank of France, has been actively involved in promoting green central banking policies and practices. In 2017, the bank launched a program to purchase green bonds as part of its asset purchase program, and it has also provided guidance to market participants on green bond standards and disclosure requirements. In 2019, Banque de France launched a climate stress test for French financial institutions to assess their exposure to climate-related risks. The stress test focused on the impact of transition and physical risks on banks and insurance companies, and aimed to identify potential vulnerabilities in the financial system.

Banque de France has integrated climate risk assessments into its financial stability reviews. It has highlighted the need for financial institutions to disclose and manage climate-related risks, and has called for greater collaboration between financial regulators and the private sector to address these risks.

Austria's green central banking initiatives include the Austrian National Bank's involvement in the Network for Greening the Financial System (NGFS), a global network of central banks and financial supervisors focused on promoting sustainable finance and managing climate-related risks in the financial sector. Since joining the NGFS in 2018, Austrian National Bank has actively participated in its working groups and initiatives. Austrian National Bank has also taken steps to integrate environmental sustainability into its own policies and operations. For instance, it has adopted an Environmental Management System (EMS) and set a goal to reduce its carbon footprint by 20% by 2025. Austrian National Bank has also incorporated climate-related risks into its financial stability assessments and supports research on the impact of climate change on the Austrian economy.

Furthermore, it is involved in promoting sustainable finance in Austria through various initiatives. It has organized conferences and workshops on green finance, provided guidance to Austrian banks on integrating environmental sustainability into their operations, and supported

the development of green financial products and services. Additionally, Austrian National Bank has played a role in establishing a green bond market in Austria.

Complementary good – UN Principles for Responsible Banking

Green central banking cannot be analyzed without commercial banks. The UN Principles for Responsible Banking (PRB) is a framework for banks to align their business strategies with society's goals, as expressed the Paris Agreement. These principles from 2019 are made in partnership with 130 banks from around the world, representing over USD 47 trillion in assets (Torre Olmo et al., 2021).

By committing to the PRB, banks can contribute to a more sustainable and equitable future, while also strengthening their own resilience and competitiveness. The PRB is a complementary framework to the green central banking, and its aim is to stimulate the use of green banking among business banks.

There is a clear connection between green central banking and the PRB, as both aim to promote sustainable finance and manage climate-related risks in the financial sector. Central banks that adopt green central banking practices are effectively implementing the principles of responsible banking in their own operations. In fact, the Principles explicitly call on central banks to integrate sustainability into their operations and collaborate with other stakeholders to promote sustainable finance.

Many central banks that have adopted green central banking practices are also signatories to the PRB. By signing them, these central banks commit to align their strategies and portfolios with the goals of the Paris Agreement and to work with their clients and other stakeholders to promote sustainability in the financial sector.

Conclusion

The green central banking in the European Union has gained significant momentum in recent years, with the growing global concern over climate change and environmental degradation. The ECB has taken a leading role in promoting environmental sustainability through its operations and policies, including its climate change center and green bond purchase program. Green central banking in the EU has the potential to bring numerous benefits to society, including promoting sustainable development, enhancing financial stability, encouraging green finance, and fostering international cooperation. However, it also faces challenges, including lack of expertise and political interference.

To overcome the challenges facing green central banking in the EU, further research is needed. Future research should focus on developing common frameworks and policies that promote environmental sustainability while achieving price stability and financial stability. There is a need to evaluate the effectiveness of various green central banking policies, such as climate stress tests, green bond purchases, and sustainable finance initiatives. This research could examine how these policies impact the financial system.

Central banks can play a significant role in the transition to a low-carbon economy by promoting sustainable finance, integrating climate risks into their operations, and supporting

the development of green finance markets. Future research could explore the potential impact of central banks on the transition to a low-carbon economy, as well as the challenges and opportunities that arise in this context. Green central banking policies can have implications for financial stability, as they may impact the risk profile of financial institutions and the broader financial system. Future research could also analyze the relationship between green central banking policies and financial stability, as well as the potential trade-offs between promoting sustainable finance and maintaining financial stability. The current limitation is the lack of the larger data sets, which would enable such analyses especially from the empirical aspect.

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ANALYSIS OF THE DETERMINANTS OF EMPLOYEE WELL-BEING AND RETENTION THROUGH A SAMPLE OF HUNGARIAN EMPLOYEES

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Abstract

The literature review indicated a significant knowledge gap regarding the holistic approach to the issue of employee retention and well-being. This research aims to develop a model that explores the holistic relationship between employee well-being and retention. Our model seeks to answer the research question of what are the factors of employee well-being on which a retention strategy can be based. The research was conducted through an online quantitative survey. The questionnaire used contained 58 validated statements that are suitable for measuring employee well-being, organizational commitment, normative commitment, and intention to leave. The PLS-SEM (partial least squares - structural equation modeling) method was used for data analysis and modeling. Results were first analyzed to check convergent validity using Cronbach's α , composite reliability (CR), and average variance extracted (AVE) indices. The Cronbach α and CR values were above the threshold of 0.7 for all constructs, and the AVE values of the latent variables were above 0.7, indicating high internal consistency of the measures. In the next step, the validity of the discriminant was checked using the Fornell-Larcker criterion and the HTMT (Heterotrait- Monotrait) ratio. The results showed that the model met both the convergence and discriminant validity criteria, and the variance inflation factor (VIF) values ruled out the existence of multicollinearity. The fit of the generated model was assessed using the standardized mean square root (SRMR), whose value (SRMR <0.08) showed a good model fit. The constructed model shows several significant relationships between latent variables and reveals important, previously unexplored relationships between some factors of employee well-being and retention. The results reflect that changes in perceptions of communication, job nature, and normative commitment variables affect both organizational commitment and intention to leave, but the direction of the effect is the opposite.

Keywords: employee well-being, employee retention, commitment, intention to quit, psychological well-being

JEL classification: C52, I39, J28, M54

Introduction

The workforce is of paramount importance in the life of an organization, as the quality of human resources ensures the competitive advantage of businesses. The level of labor supply has fallen significantly in recent years as a result of economic growth, and changes in worker behavior

have created a complex labor market problem, which has been accompanied by a significant strengthening of workers' bargaining power. Thus, the acquisition and retention of labor have become a strategic issue in maintaining the competitiveness of organizations. The loss of appropriately skilled workers with organization-specific skills can be a problem for organizations from other perspectives in addition to the difficulty of replacing their workforce. Employers invest considerable effort in the recruitment, selection, integration, training, and development of employees, and therefore the loss of return on investment is high when experienced employees decide to leave the organization (Bibi et al., 2007; Potháczky, 2022). Not only the departure of employees but also the loss of commitment can have a negative impact on the functioning of organizations. If employees are less committed to the organization, this will also be reflected in lower performance levels, which can have negative consequences for customer satisfaction. Furthermore, the negative organizational effects of turnover include that employees who choose to leave take with them, in addition to the skills they have acquired, elements of organizational culture that can give them an advantage over competitors (Singh, 2019). In turn, employers that adopt effective retention strategies can gain significant advantages over competitors. Experienced employees know their jobs well and therefore require less training and development. Retaining them not only saves recruitment, selection, and onboarding costs but also allows managers and more experienced workers to focus on tasks other than training, thus improving efficiency and reducing the need for overtime (Arnold, 2005; Szentgróti & Tapolczai, 2011; Bite et al., 2020). Increasing employee engagement and reducing the propensity to leave cannot be achieved without corporate strategies and measures to target retention. These strategies should include measures to encourage employees to stay longer in the organization by increasing satisfaction. There is a long history of research on retention, but only recently has it begun to be suggested that different factors influence the intention to leave (Gyurián-Nagy & Gyurián, 2022; Magyar-Sifter & Potháczky-Rácz, 2023) and employee engagement (Holtom, et al., 2008; Lee et al., 2004). The literature on this topic shows that it has mainly focused on factors associated with employee exit, with much less known about factors influencing employee engagement. The majority of studies on employee well-being only consider a few factors when studying employee well-being, and therefore the holistic context of the topic and the interactions between the different well-being factors have remained unexplored. The holistic approach focuses on employers recognizing the individual needs, motivations and values of employees and creating a working environment that supports these needs. While the majority of retention studies have looked at satisfaction factors. The literature review did not identify any research that took a holistic approach to the issue of retention and employee well-being. In response to this research gap, this research aims to develop a model that explores the holistic relationship between employee well-being and retention. The research examines the question of which well-being factors influence employee retention and can affect organizational commitment and intention to leave. The study aims to explore the relationship between employee well-being factors, organizational commitment and turnover intention in a sample of Hungarian employees.

Literature review

Literature background

Early research on human behavior at work also examined how individuals' work-related behavior and attitudes are influenced by the satisfaction of human needs (Spector, 1985). Research on motivation and satisfaction, work stress, job satisfaction, workplace violence and work-life balance has led to new scientific findings. In 2019, the WHO adopted burnout as a

workplace disease, a fact that has also led researchers to the realization that there is a strong correlation between employee well-being and retention. Employee well-being is one of the most important factors influencing employees' long-term engagement at work. Employees who are satisfied with their jobs are more likely to remain loyal to their employer and less likely to move to other jobs (Madigan & Kim, 2021; Bite & Konczos-Szombathelyi, 2020). Research has shown that human resources and employee well-being play a key role in corporate competitiveness (Miao & Cao, 2019; Kóczy et al., 2022), as employees' knowledge, competence, effort, motivation and loyalty have a fundamental impact on the performance of the organization (Hanaysha, 2016; Ágoston & Varga, 2018; Karacsony et al., 2002).

In general, however, employee well-being is determined by a combination of physical and psychological factors, based on positive emotional attitudes toward work, and this concept cannot be reduced to the health of employees alone. Worker well-being is influenced by a combination of physical and psychological factors and includes 'invisible' aspects such as opportunities for advancement in the workplace, the quality of management, the physical conditions of work, and the physical and psychological health of workers (Belloni et al., 2022), which need to be identified quantitatively. Research has shown that employee well-being has an impact on sickness and health care costs (Grawitch et al., 2006), employee absenteeism and turnover (Spector, 1997), employee satisfaction (Nagyová & Gyurián, 2018) and engagement (Huang, 2016). Employees who are satisfied with their jobs are creative and productive, able to exert more effort and have a higher workload, which is reflected in the quantity and quality of tasks performed (Binnewies & Wörnlein, 2011; Fogaça & Coelho Junior, 2016; Hosie et al., 2012).

The literature has highlighted the contribution of employee-centered HR systems to workforce retention. However, one of the major limitations of this research is that it has only examined a few factors in the relationship between retention and well-being and thus cannot detect the combined effect of different factors.

Theoretical research model

The research model is an extension of Spector's (1985) theory. The aim was to create a research model whose measurement scales and claims have been successfully used in international research. The structure of the theoretical research model is presented in Table 1.

The model is divided into two main dimensions and several sub-dimensions. The first part of the model measures employee well-being, based on Spector's (1985) employee satisfaction questionnaire, which is considered one of the most important pieces of literature on the subject. Spector (1985) examined employee well-being through a total of nine dimensions and 36 statements. The related dimensions are salary, fringe benefits, performance-based rewards, promotion opportunities, quality of relationships with immediate supervisors and co-workers, organizational operating procedures, nature of work, and organizational internal communication. The perception of *pay* in the context of retention is an area of debate among researchers. Research agrees with the view that pay plays an important role in both attracting and retaining workers (Mandhanya, 2016). (Mandhanya, 2016). *Promotion* can have a significant impact on retention, motivation and engagement as it is an opportunity for high-performing employees. The negative impact of promotion can be a problem for employees who are not promoted, which has a positive relationship with the intention to leave (Bibi et al., 2017). *Benefits* refer to non-monetary incentives aimed at improving the quality of life of employees

and reducing turnover. If an employer adopts a conscious benefits strategy, it can improve work morale and reduce feelings of stress and overwork, improving the health of employees (Park & Martinez, 2022). *Rewards* include recognition, bonuses and small gifts, which can have a positive impact on employee satisfaction. If employees feel that rewards are not commensurate with their performance, or if rewards and gifts are too frequent or less valuable, employee dissatisfaction may increase (Bryant, & Allen, 2013). A *supervisor* is a manager who directly directs and supervises an employee or team. According to Cerutti, Macke & Sarate (2020), leadership style can positively influence job satisfaction, which in turn has a positive impact on organizational commitment and job performance. Good *co-worker* relationships contribute to long-term employee engagement, and employers should therefore strive to develop a supportive and cohesive workplace community (Alexander et al., 2007). *Operating procedures* are the documented processes that an organization uses to determine how to carry out different tasks and processes. Well-designed and effective operational procedures, processes and systems enable employees to work more efficiently and effectively, while reducing stress and prolonged working time (Hanaysha, 2016). The *nature of work* refers to the characteristics of the job that influence the working conditions, nature and difficulty of tasks (Miao & Cao, 2019). The nature of work influences the impact on employees' work, health and well-being. *Communication* processes relate to the internal functioning of an organization. They include the flow of information within the organization, the sharing of resources and information, decision-making processes, hierarchies and management communication. In an organization with good organizational communication, employees can more easily identify with the values and goals of the organization and feel valued and important for the work they do in the organization (Singh, 2019).

Table 1: Models on which the survey is based

Dimensions	Factors	Number of items	Sources
Employee well-being	Pay, Promotion, Fringe benefits, Contingent rewards, Supervision, Co-workers, Operating procedures, Nature of work, Communication	36	Spector (1985)
Employee retention	Organizational commitment	7	Kim, Song & Lee (2016)
	Turnover intention	7	Sjöberg & Sverde (2000) Newman et al. (2011)

Source: created by the authors.

The second part of the research model questionnaire aims to examine the issue of retention. Literature sources most often approach the issue of retention in terms of commitment and intention to leave. A multi-faceted categorization of commitment appears in the different literature sources, of which normative and organizational commitment are the most relevant to my research question. Normative commitment is where the employee feels a moral obligation to stay with the organization for some reason (Allen & Meyer 1990). While organizational commitment is when individuals identify with and bond to the organization as a whole (Kim, Song & Lee, 2016). However, the normative commitment dimension was not included in the final model due to fit considerations. Turnover intention is viewed as employees' voluntary, self-reported decision to terminate employment, measured using the statements of Newman et al. (2011), Sjöberg & Sverde (2000).

However, the dimension of normative commitment was not included in the final model due to fit considerations - the standardized mean square root (SRMR) value when fitting the normative commitment model exceeded the maximum value of 0.08 as defined in the literature sources (Hu & Bentler, 1999). The statements in the survey were rated by respondents on a 5-point Likert scale (1= strongly disagree, 5= strongly agree). Table 1 summarises the sources, dimensions and key factors that formed the basis of the questionnaire survey.

H1: *A decrease in organizational commitment significantly increases the intention of key workers to leave.*

Method

Data collection and sampling

The research is based on an online questionnaire survey, in which a total of 382 active Hungarian employees participated. The survey questionnaire was designed based on the models described in Table 1. The questions were designed to be meaningful to all respondents, regardless of their field of work, title or job title, so as not to limit the number of possible answers. Sampling was carried out using the non-random sampling technique of snowball sampling, as the PLS sampling methodology does not require representative sampling. Data collection was carried out between March and May 2022.

The background data of the respondents are summarised in Tables 2 and 3, which show that the majority of respondents (68.2%) are female and have a college degree (50.3%). 56% of the survey respondents are currently employed in the market sector, with most employees being employed in large companies in the service sector with more than 250 employees. The vast majority of respondents work in white-collar jobs (89%), as subordinates (72.1%).

Table 2: Demographic composition of the sample by gender and educational level (n=382)

Background variable		Percentage of respondents (%)	Number of respondents
Gender	Male	29,7	116
	Female	68,2	266
Education	Primary education	0,3	1
	Vocational or technical school education	0,8	3
	School leaving exam	23,6	92
	Bachelor's degree	50,3	196
	Master's degree	18,5	72
	Ph.D. degree	4,6	18

Source: created by the authors.

Table 3: Respondents' work-related background data (n=382)

Background variable		Percentage of respondents (%)	Number of respondents
Sector	Public sector	31,5	123
	Non-profit sector	10,3	40
	Market sector	56,2	219
Branch	Service	71,5	279

Background variable		Percentage of respondents (%)	Number of respondents
	Industry	21,5	84
	Agriculture	4,9	19
Organizational size	Micro company (1-9 people)	5,6	22
	Small company (10-19 people)	10,3	40
	Medium-sized company (20-249 people)	28,2	110
	Large company (over 250 employees)	53,8	210
Position	Intellectual	89,0	340
	Physical	11,0	42
Managerial level	Subordinate	72,1	281
	Group leader	10,0	39
	Middle manager	12,1	47
	Senior manager	3,8	15

Source: created by the authors

Statistical Methodology

Among the data analysis methods used, the PLS-SEM (partial least squares structural equation modeling) method was applied. According to Kovács and Bodnár (2016), the path model obtained in PLS analysis is effectively a series of regression models that build on each other. Kazár (2014) distinguishes between variance-based and covariance-based methods for structural equation modeling, of which Horváth and Hollósy-Vadász (2019) classify PLS path analysis as a variance-based method. Similar to regression methods, the direct and indirect relationships between variables in the path model are represented by the correlation coefficient, if the relationship between variables is not significant, the relationship is not included in the model. According to Kovács and Bodnár (2016), one of the advantages of the method is that it can be used to investigate latent relationships between variables, and PLS-SEM allows for the simultaneous running of factor analysis and regression models during path model construction. Based on Kazár (2014), PLS-SEM creates latent variables from indicators, which are then tested by regression analysis. Other advantages of the method include that PLS-SEM does not require a normal distribution of variables and can be applied to small sample size (Kovács & Bodnár, 2016).

PLS-SEM consists of a measurement and a structural part. The measurement part allows the identification of the observed variables through which the latent variables can be measured, and the structural part shows the causal relationships between the latent variables, which corresponds to confirmatory factor analysis. According to Horváth and Hollósy-Vadász (2019), the only model fit indicator used in PLS modeling is the SRMR (standardized root mean square residual), whose value always lies between 0 and 1. The SRMR model fit indicator is used to determine the fit of the theoretical model to the empirical data. According to Hu and Bentler (1999), the SRMR value below 0.08 is acceptable, so the fit of the model we have drawn is adequate at an SRMR value of 0.064. Based on Horváth and Hollósy-Vadász (2019), convergence can be measured using standardized factor weights for factor analysis. According to Kazár (2014), Cronbach's α measures the reliability of latent variables. Convergence validity can be assessed using the average variance explained (AVE) indicator. According to Kovács and Bodnár (2016), Cronbach's α and AVE can have a value between 0 and 1. A Cronbach's α of 0.6 and AVE above 0.5 are considered acceptable.

Results

To analyze the results, we performed a PLS analysis using SmartPLS 3.0 software. Our objective was to use latent variables to create a regression model that can explain which employee well-being factors affect employees' organizational commitment and intention to quit. In analyzing the results, convergence validity was first checked. Cronbach's α -coefficient measures the reliability of latent variables, which is based on the correlations between the manifest (directly observable) variables associated with the latent variables. The indicator is expected to have a value of at least 0.6. However, in the PLS algorithm, Cronbach's α underestimates the degree of internal consistency, as it assumes that all variables have the same factor weight. This problem is eliminated by the composite reliability (reliability) indicator, which already takes into account the different factor weights associated with the variables, the value of which should exceed 0.7 (Kovács & Bodnár, 2016). The convergence validity was qualified using AVE (average variance extracted), based on the criterion value of 0.5 proposed by Fornell and Larcker (1981). The AVE indicates the average percentage of the variance of each latent variable that is retained by its manifest variable. The results are summarised in Table 4, which shows that the data meet the required criteria.

Table 4: Internal Consistency Reliability and Convergent Validity

Factor	Cronbach's α	Composite reliability	AVE
Benefits (Ben)	0.812	0.877	0.644
Promotion (Pro)	0.835	0.890	0.670
Supervision (Sup)	0.830	0.887	0.663
Pay (Pay)	0.877	0.916	0.732
Contingent rewards (Cr)	0.863	0.907	0.709
Turnover intention (Ti)	0.897	0.924	0.708
Communication (Com)	0.827	0.885	0.658
Nature of work (Now)	0.858	0.905	0.707
Co-workers (Cow)	0.771	0.871	0.700
Organizational commitment (Oc)	0.924	0.939	0.689

Source: PLS-SEM generated results.

In the figure illustrating the results of the PLS path analysis, only the latent variables are shown, therefore the observed variables and outer loadings of the statements are presented in Table 5, which shows that the majority of the outer loadings of the statements associated with the constructs are above 0.8.

Table 5: Factor loadings

Dimension (Cronbach's α)	Scales	Loadings
Benefits (Ben) (α =0.812)	I am not satisfied with the benefits I receive.	0.802
	The benefits we receive are as good as most other organizations offer.	0.818
	The benefits package we have is equitable.	0.903
	There are benefits we do not have that we should have.	0.668
Promotion (Pro) (α =0.835)	There is too little chance for promotion in my job.	0.781
	Those who do well on the job stand a fair chance of being promoted.	0.871

Dimension (Cronbach's α)	Scales	Loadings
	People get ahead as fast here as they do in other places.	0.739
	I am satisfied with my chances for promotion.	0.874
Supervision (Sup) (α =0.830)	My supervisor is quite competent in doing his/her job.	0.815
	My supervisor is unfair to me.	0.768
	My supervisor shows too little interest in the feelings of subordinates.	0.792
	I like my supervisor.	0.879
Pay (Pay) (α =0.877)	I feel I am being paid a fair amount for the work I do.	0.875
	Raises are too few and far between.	0.805
	I feel unappreciated by the organization when I think about what they pay me.	0.860
	I feel satisfied with my chances for salary increases.	0.879
Contingent rewards (Cr) (α =0.863)	When I do a good job, I receive the recognition for it that I should receive.	0.815
	I do not feel that the work I do is appreciated.	0.850
	There are few rewards for those who work here.	0.834
	I don't feel my efforts are rewarded the way they should be.	0.868
Turnover intention (Ti) (α =0.897)	I plan to stay in this company to develop my career for a long time.	0.835
	I often think of quitting my present job.	0.850
	I may leave this company and work for another company in the next year.	0.852
	I am actively looking for other jobs.	0.795
	As soon as I can find a better job, I'll leave my workplace.	0.874
Communication (Com) (α =0.827)	Communications seem good within this organization.	0.784
	The goals of this organization are not clear to me.	0.786
	I often feel that I do not know what is going on with the organization.	0.841
	Work assignments are often not fully explained.	0.833
Nature of work (Now) (α =0.858)	I sometimes feel my job is meaningless.	0.691
	I like doing the things I do at work.	0.886
	I feel a sense of pride in doing my job.	0.885
	My job is enjoyable.	0.885
Co-workers (Cow) (α =0.771)	I like the people I work with.	0.934
	I enjoy my co-workers.	0.930
	There is too much bickering and fighting at work.	0.604

Dimension (Cronbach's α)	Scales	Loadings
Organizational commitment (Oc) ($\alpha = 0.924$)	I talk up this organization to others as a great organization to work for.	0.827
	I am proud that I am a part of this organization.	0.892
	I would like to continue working at this organization by considering this organization as a workplace for life.	0.786
	I am pleased to choose this organization as a workplace.	0.765
	Even if the opportunity to choose work again is given to me, this organization will be considered a priority.	0.864
	I accept this organization's future and fate as mine.	0.781
	I think this organization is the best workplace for me.	0.885

Source: PLS-SEM generated results.

The discriminant validity was checked by examining the HTMT (heterotrait-monotrait) ratio based on Henseler et al. (2015). The numerator of the ratio is the average of the pairwise correlation coefficients between the manifest variables associated with the two latent variables, while the denominator is the average of the pairwise correlation coefficients between the manifest variables associated with the same latent variable. According to Henseler et al. (2015), it is sufficient for the discriminant validity to be assumed if the values of the HTMT indices are below 0.9. The HTMT ratios of the latent variables are illustrated in Table 6, which shows that there is satisfactory discriminant validity between the variables.

Table 6: HTMT ratios of the latent variables

	Ben	Pro	Sup	Pay	Cr	Ti	Com	Now	Cow	Oc
Ben										
Pro	0.489									
Sup	0.332	0.471								
Pay	0.726	0.604	0.424							
Cr	0.702	0.650	0.597	0.823						
Ti	0.378	0.497	0.503	0.486	0.617					
Com	0.408	0.418	0.554	0.446	0.632	0.616				
Now	0.218	0.363	0.396	0.337	0.395	0.653	0.520			
Cow	0.371	0.436	0.593	0.421	0.606	0.546	0.632	0.539		
Oc	0.440	0.491	0.447	0.497	0.597	0.810	0.617	0.751	0.597	

Source: PLS-SEM generated results.

Before assessing the structural model, multicollinearity was checked using the variance inflation factor (VIF). The VIFs of the indicators were below 3.33, indicating no issue of multicollinearity between the latent constructs (Diamantopoulos & Siguaw, 2006).

The next step was to analyze the mediating effects, which include all paths from one latent variable to another latent dependent variable. The bootstrap method is a non-parametric test, so it does not require a normal distribution of variables. The procedure uses the path-invariant

Cronbach's α and R^2 statistical coefficients. According to T. Nagy and Bernschütz (2017), the procedure considers the original full sample as the population and further samples are taken from it by random sampling. For each bootstrap sample, a PLS path model is generated and bootstrap path coefficients are calculated. If the number of elements in the bootstrap samples is large enough, an empirical bootstrap distribution of each coefficient is obtained, from which various statistics can be estimated and compared with the original sample. The significance of the path coefficients can be tested using a t-test. The results of the bootstrap procedure are presented in Table 7, and the model generated during PLS analysis is illustrated in Figure 1.

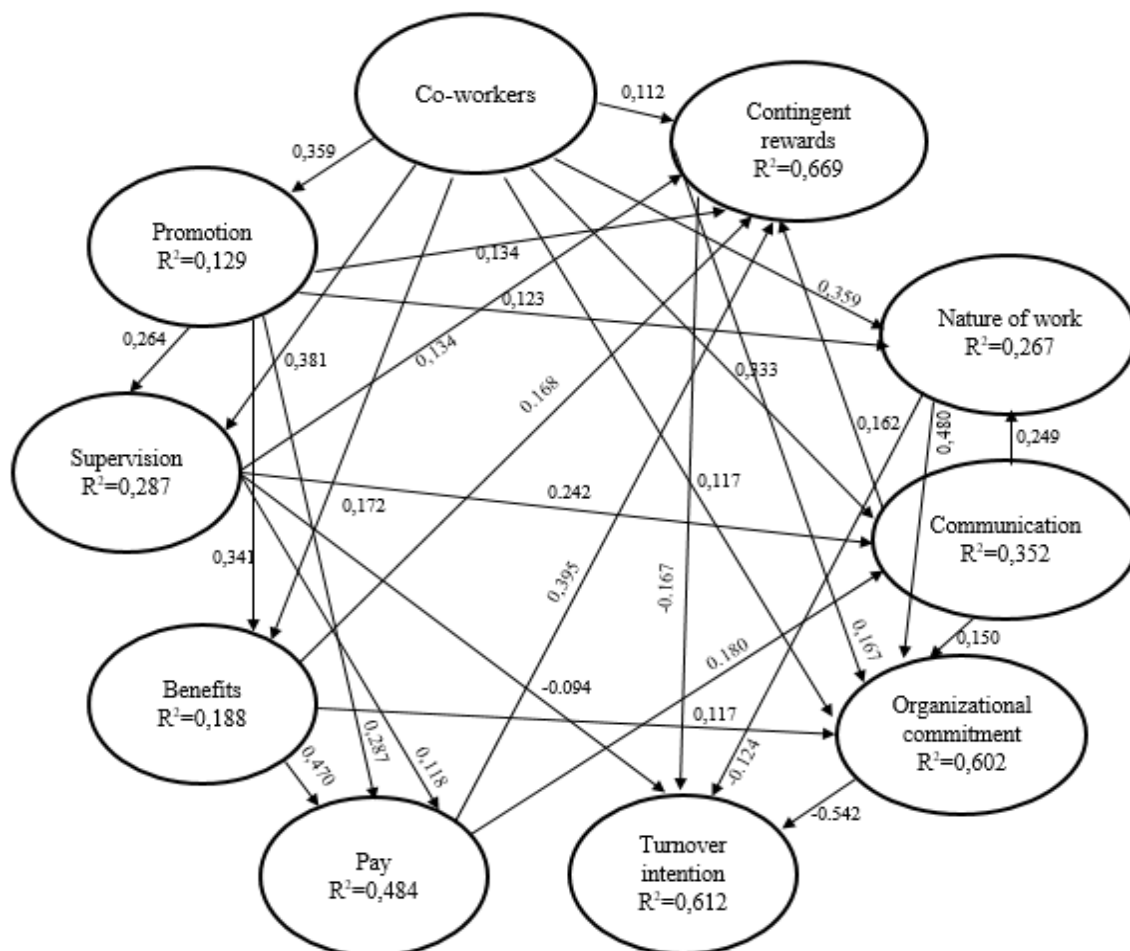
Table 7: Bootstrapping report

Relationship between latent factors	Original sample	Sample Mean	Standard Deviation	T Statistics	P Values
Benefits → Pay	0.470	0.472	0.040	11.756	0.000
Benefits → Contingent rewards	0.168	0.164	0.041	4.075	0.000
Benefits → Organizational commitment	0.117	0.119	0.043	2.694	0.007
Promotion → Benefits	0.341	0.343	0.051	6.640	0.000
Promotion → Supervision	0.264	0.267	0.044	6.002	0.000
Promotion → Pay	0.287	0.288	0.045	6.391	0.000
Promotion → Contingent rewards	0.134	0.134	0.039	3.390	0.001
Promotion → Nature of work	0.123	0.121	0.049	2.501	0.013
Supervision → Pay	0.118	0.116	0.046	2.559	0.011
Supervision → Contingent rewards	0.134	0.133	0.036	3.751	0.000
Supervision → Turnover intention	-0.094	-0.092	0.037	2.551	0.011
Supervision → Communication	0.242	0.243	0.052	4.638	0.000
Pay → Contingent rewards	0.395	0.398	0.043	9.262	0.000
Pay → Communication	0.180	0.181	0.044	4.117	0.000
Contingent rewards → Turnover intention	-0.167	-0.169	0.045	3.732	0.000
Contingent rewards → Organizational commitment	0.167	0.166	0.054	3.073	0.002
Communication → Contingent rewards	0.162	0.163	0.037	4.408	0.000
Communication → Nature of work	0.249	0.247	0.062	4.041	0.000
Communication → Organizational commitment	0.150	0.151	0.047	3.168	0.002
Nature of work → Turnover intention	-0.124	-0.122	0.049	2.560	0.011
Nature of work → Organizational commitment	0.480	0.480	0.042	11.307	0.000

Relationship between latent factors	Original sample	Sample Mean	Standard Deviation	T Statistics	P Values
Co-workers → Benefits	0.172	0.171	0.052	3.298	0.001
Co-workers → Promotion	0.359	0.362	0.046	7.843	0.000
Co-workers → Supervision	0.381	0.377	0.049	7.764	0.000
Co-workers → Contingent rewards	0.112	0.112	0.037	2.994	0.003
Co-workers → Communication	0.333	0.332	0.046	7.169	0.000
Co-workers → Nature of work	0.272	0.274	0.062	4.410	0.000
Co-workers → Organizational commitment	0.117	0.116	0.049	2.404	0.017
Organizational commitment → Turnover intention	-0.542	-0.543	0.048	11.220	0.000

Source: PLS-SEM generated results.

Figure 1. Results of the path analysis



Source: PLS-SEM generated results.

Discussion

This research aimed to develop a model that explores the holistic relationship between employee well-being and retention using the PLS-SEM method. The research model includes 10 factors with a total of 29 significant relationships between them. Based on the path analysis, the correlations do not reach the 0.5 level in most cases. The results in Figure 1 and Table 7 show that the strongest - moderately strong - correlations in the model are between organizational commitment and turnover intention ($r=-0.542$), nature of work and organizational commitment ($r=0.480$), satisfaction with benefits and Pay ($r=0.470$), satisfaction with pay and contingent rewards ($r=0.395$), satisfaction with co-workers and supervision ($r=0.381$), satisfaction with co-workers and promotion ($r = 0.359$), satisfaction with Promotion and benefits ($r=0.341$), satisfaction with co-workers and communication ($r= 0.333$) are observed between latent variables. Among the latent variables, the strongest correlation ($r=-0.542$) is found between Organizational commitment and Turnover intention, which suggests that increasing employee commitment can effectively address the problems caused by employee turnover. Results indicate that employees' organizational commitment was significantly affected by satisfaction with benefits ($r=0.117$), co-workers ($r=0.117$), communication ($r=0.150$), contingent rewards ($r=0.167$) and nature of work ($r=0.480$). Among the examined employee well-being factors, the nature of work contributes the most to employees' organizational commitment. Employees' turnover intention was significantly negatively affected by satisfaction with Supervision ($r=-0.094$), the Nature of work ($r=-0.124$) and Contingent rewards ($r=-0.167$). The nature of work and the contingent rewards are therefore employee well-being factors that have a significant effect on the employees' organizational commitment and turnover intention, but the direction of the effect is the opposite. Satisfaction with contingent rewards ($r=0.167$) increases employees' organizational commitment to the same extent as it decreases employees' Turnover intention ($r=-0.167$).

Conclusions

The research explored the relationship between employee well-being factors, organizational commitment and employee turnover intention on a sample of Hungarian employees with active employment. The model obtained as a result of PLS path analysis contains significant results, but mainly weak to moderate correlations between the constructs are observed. The results confirmed *hypothesis (H1)*, that a decrease in organizational commitment has a negative effect on turnover intention, so increasing employee commitment may be more effective in retaining key employees. Among the employee well-being factors examined in the survey, nature of work, i.e. characteristics of daily work, and job characteristics have the strongest impact on employee commitment. The results of the survey reveal a correlation between several of the employee well-being factors examined. Among others, relationships were found between satisfaction with pay, benefits, contingent rewards and promotion opportunities. These correlations may be important to consider when developing a company-wide retention strategy.

Managerial implications

Based on the results of the research, it can be concluded that improving the nature of work is the most effective way to improve employee retention. Employers are therefore advised to pay particular attention to providing meaningful, interesting and challenging tasks for employees, as this not only increases their commitment but also their performance. In addition to the nature

of the work, satisfaction with contingent rewards, the effectiveness of organizational communication, the quality of co-worker relationships, and benefits also have a significant impact on employee commitment. Therefore, it is important to pay attention to these factors when developing a workforce retention strategy.

Pay had no significant effect on either organizational commitment or employees' turnover intention. This leads to the conclusion that pay plays a role mainly in attracting employees, but not in retaining them.

Limitations

The research has limitations. In our study a holistic model was developed based on literature sources and tested on a sample of a heterogeneous group of employees, so there is no empirical evidence yet on the use of the scales with homogeneous groups of workers. As the present survey mainly included employees in intellectual jobs (89%), the aim for future research is to include a higher proportion of manual workers. To this end, the data collection process has started. Future research plans include the analysis of the results and the correlations between the demographic data of the employees and their work-related background data (sector, industry, size of organization, position, etc.).

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IMPLEMENTATION BARRIERS OF ARTIFICIAL INTELLIGENCE IN COMPANIES

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Abstract

Artificial intelligence bears great potential for companies and will massively change the way we work in the future. Despite this, studies show that AI is not yet widespread in European companies and companies face many hurdles to adoption. In order to understand the problems that companies face, the objective of this study is to investigate the hurdles to AI adoption and identify the problem areas. With a literature review, studies on the use of artificial intelligence in companies are researched and methodically evaluated with a qualitative content analysis. The individual hurdles are assigned to superordinate categories in order to identify which levers for the introduction of AI have the greatest impact on companies. The results make it clear that most of the hurdles are to be found at the management, employee, organisational and data levels. But external factors also play a major role in the introduction of AI, such as a lack of skilled workers, technical infrastructure and a lack of knowledge about software offerings. The results will help companies to take targeted measures for the introduction of AI and can be used to develop an implementation framework.

Keywords: artificial intelligence, implementation barriers, categories of implementation hurdles, literature review, qualitative content analysis

JEL classification: C40, C45, L21, L25

Introduction

It is undisputed that artificial intelligence will be a game changer in the corporate world and will add value to companies (Wamba-Taguimdje et. al., 2020; Plastino & Purdy, 2018; Chamoni & Gluchowski, 2017). Artificial intelligence already encompasses a wide range of different technologies, such as text recognition, speech recognition and generation, translation programmes, chatbots or image classification. AI can be used to optimise products or services, processes and many other areas in the company and thus increase business performance. There are now a number of publications examining the drivers of business performance through AI (Reis et. al, 2020; Mishra & Pani, 2020; Lui et. al, 2022). There has also been a lot of activity in business and accounting regarding the use of artificial intelligence (Maričić et al., 2019; Gulin, Hladika & Valenta, 2019; Mertens & Barbian, 2019; Koropp & Treitz, 2019). Machine learning algorithms have become increasingly popular in the stock market and in banks in recent years. They are used, for example, to analyse stock market prices, to value real options or to detect fraud (e.g. Han & Kim 2021; Charalambous & Martzoukos, 2005; Bao et. al., 2022).

Despite all these achievements of artificial intelligence, it is clear that this technology has not yet arrived in many companies. Based on national statistics, Eurostat (2022) published a study on the use of AI in companies. It shows that on average in the EU, only 8% of the companies surveyed use at least one AI technology. Also unsurprising is the fact that company size and

the use of AI are positively correlated. The larger the company, the more likely it is to use at least one AI technology. In Austria, 92% of small companies, 85% of medium-sized companies and 74% of large companies have not yet considered AI (Statistik Austria, 2021). Particularly in small and medium-sized enterprises, it is evident that the advantages are seen, but the expertise is very low, often possible fields of application are unknown and the benefits often cannot be assessed (Bunte, Richter & Diovisalvi, 2021). Based on the low adoption of artificial intelligence in European companies, the reasons for this will be investigated. The following research questions are posed:

RQ1: What are the implementation barriers to artificial intelligence in management in companies?

RQ2: What overarching categories can be derived from the individual implementation hurdles?

The objective of the paper is to understand where companies fail or experience difficulties when adopting artificial intelligence. The method chosen to answer the first research question was a literature review. First, the scientific database Scopus was searched for papers dealing with the introduction of artificial intelligence and implementation barriers. In addition, an Internet search was conducted for studies dealing with implementation barriers. Qualitative content analysis was used to answer the second research question. Since the studies identified differed in part from the study design, the focus of the study, the time period of the study, and the countries in which the study was conducted, a quantitative comparison of the results is not possible. For this reason, a qualitative analysis is possible in order to interpret the results on the one hand and to generalize them on the other. The results of this paper should help companies to take targeted measures for the introduction of artificial intelligence. Furthermore, the results can be used to develop an implementation framework.

The structure of the paper starts with the introduction. The second chapter presents the method and approach. The third part is followed by the literature review on implementation hurdles for the use of artificial intelligence. This chapter is followed by the results, in which the implementation hurdles are presented and grouped. The paper ends with the conclusion.

Methodology

A qualitative approach was chosen to answer the research questions, specifically a qualitative content analysis. The approach largely followed Mayring's (1992, 1993) approach. First, literature on the topic of implementation barriers to artificial intelligence was researched on the basis of a literature search. The search for papers was carried out in the scientific database Scopus. The search was conducted at the beginning of March 2023. The keywords for the search and the search string are shown in Table 1.

Table 1: Keywords and search strings

Keywords	Content searched	Boolean Search Operator	Search String
Artificial Intelligence AI Machine learning Deep learning Neural network Decision tree Regression	Article title, Abstract, Keywords	OR	"artificial intelligence" OR ai OR "machine learning" OR "deep learning" OR "neural network" OR "decision tree" OR regression OR "Clustering" OR "Classification" OR "KNN" OR "k-nearest neighbour" OR "k-means" OR

Keywords	Content searched	Boolean Search Operator	Search String
Clustering Classification KNN K-Nearest Neighbour K-Means Naïve Bayes Supervised Unsupervised Reinforcement Language Processing NLP Speech Robot process automation RPA Intelligent process automation IPA Expert system			"naive bayes" OR supervised OR unsupervised OR reinforcement OR "language processing" OR NLP OR "speech" OR "robot process automation" OR RPA OR "intelligent process automation" OR IPA OR "expert system"
AND			
Implementation hurdles Implementation barriers Implementation problems Implementation obstacles	Article title, Abstract, Keywords	OR	"implementation hurdles" OR "implementation barriers" OR "implementation problems" OR "implementation obstacles"

Source: author's contribution.

When selecting the keywords, care was taken to ensure that the search was as comprehensive as possible, so that the most common keywords related to artificial intelligence were entered. Putting the keywords in inverted commas (e.g. "machine learning" or "implementation hurdles") was necessary because too many non-specific hits were obtained in the search with an OR connection.

Table 2: Process of papers' selection based on Scopus search

Database search up to February 2023	Scopus
All keywords	287
1. Included language (limited to): English papers	275
2. Included papers (limited to): article, conference paper, book chapter	255
3. Included categories (limited to): Business, Management and Accounting	18
4. Included papers after reading titles and abstracts	2

Source: author's contribution.

Table 2 shows the results of the Scopus search using the key terms defined in Table 1. The restrictions were placed on English-language papers, conference papers or book chapters. Since the topic is to be analysed from a business perspective, the restriction was further placed on business, management and accounting. The result was 18 hits. After reviewing the papers, only two papers were identified that described implementation barriers in a broader context.

Due to the low number of scientific papers, the search was expanded to include application-oriented studies on the topic of the introduction of AI systems and implementation hurdles. To this end, studies were searched for using the search function of Internet browser, whereby the focus was specifically on management consulting firms, since they (a) build up competencies in this area for consulting purposes and (b) have the clients who can be surveyed on these topics.

The identified studies are presented in the following chapter.

After identifying the studies, the qualitative content analysis was started. Based on the studies, the implementation hurdles were entered into an Excel spreadsheet and the frequencies were determined. This Excel table is used to structure the implementation barriers, which can then be used to develop an implementation model.

Literature review

Based on the internet research, several studies from different institutions were found which explicitly ask about the hurdles in implementation. The literature review identified four institutional organisations that have conducted studies related to AI and machine learning: (1) Academic institutions that conduct studies on the use of AI in companies. Not many studies could be found in this area yet. (2) Government institutions are interested in the use of AI in companies to increase competitiveness, improve medical care or optimise agriculture. The EU alone provides one billion euros for research in its Horizon Europe and Digital Europe programmes (European Commission, 2020). Accordingly, the statistical federal states of the EU member states are conducting studies on the use of AI. (3) Tax and business consultancies advise their clients on AI and have access to larger companies, which can also be interviewed on the progress of adoption and deployment. (4) The fourth category includes associations with a focus on AI or computer-savvy companies that conduct studies on the current status themselves or in cooperation with survey companies.

Kumar, Raut, Queiroz & Narkhede (2021) exemplified in their study eighteen critical barriers of AI adoption in Indian public distribution system. These are lack of trust in technology, limited AI literacy, political issue, legal and ethical challenges, lack economic policy and regulations, lack of IT competence, lack of established framework, language complexity, lack of transparency, lack of integrated approach, lack of IT infrastructure, loss of accountability and responsibility, lower incentives, lack of alignment with stakeholders, fear of exclusion of poor, negative attitude of employees, lack of consumer's motivation, lack of cognitive awareness. Ulrich, Frank & Kratt (2021) conducted a study in which they contacted 11,248 SMEs with a standardised online questionnaire with 33 questions and achieved a response rate of 283 questionnaires. Part of the questionnaire also covered barriers in the field of AI. It shows that the lack of competence in this area, obstacles in implementation and data problems are the main challenges.

Public institutions also conduct surveys among companies. The Federal Statistical Office of Austria ("Statistik Austria") is an independent, non-profit federal agency under public law. Its task is to provide services of a scientific nature in the field of federal statistics (Section 22 of the Austrian Federal Statistics Act). For the year 2021 (Statistik Austria, 2021), the institute surveyed 37,003 companies with more than 10 employees from selected industries on whether and how AI is used. According to the survey, over the entire average of 90.4% of companies have not considered using AI technologies. Interestingly, the 90% (+/- 4%) is constant across all survey sectors. Only in the information and communication sector is the share at 58.1%, which can presumably be explained by the close technological proximity. On average, 9.6% of the companies have considered the use of AI technologies, but have not considered it for various reasons. The main reasons are lack of expertise, high costs, incompatibilities and data requirements. A German study by Rammer (2021), published by the German Federal Ministry for Economic Affairs and Energy, examined the challenges of using artificial intelligence in

young and medium-sized companies in Germany. The challenges were examined very closely and focused on the areas of internal organisation, data, cooperation with third parties and external framework conditions. The sample is 516 companies, with only 515 responses in the area of cooperation with third parties. In terms of internal organisation, the biggest hurdles are the high costs of development and implementation, the lack of staff skills and the management of legal and technical risks associated with AI. With regard to data, the challenges are related to data protection issues, the lack of access to external data and data security issues (e.g. unauthorised access). In the area of collaboration with third-party providers, the insufficient business budget of the business partners, the lack of customised AI solutions on offer and the lack of customer trust in AI solutions are particularly relevant. In terms of external framework conditions, the supply of specialists, technical equipment (network coverage, transmission speed, etc.) and suitable cloud offers are problematic. A publication issued by the OECD explicitly gives the barriers and challenges to adopting AI in SMEs. These are high costs and uncertainty about AI benefits, reputational and legal risks, the human factor (unclear understanding of potential and risks of using AI, from managers to workers; raising the skillset for an effective implementation of AI solutions) and lack of data culture and weak data management practices (OECD, 2021).

The third group that conducts surveys are the large tax and management consulting firms, which also have corresponding global access to large companies. Deloitte (2022) surveyed 2,620 global business leaders from thirteen countries in their study. All participants have adopted AI technologies and are AI users. The survey was conducted in April and May 2022. In addition to this survey, qualitative telephone interviews were conducted with 15 AI experts from various industries. Barriers in scaling AI initiatives include managing AI-related risks, implementing AI technologies, obtaining necessary input data for model training and proving business value. McKinsey&Company (2018) conducted a study on the state of artificial intelligence in companies in 2017. The biggest barriers for organisations to adopt artificial intelligence were lack of a clear strategy for AI, lack of talent with appropriate skill sets for AI work, functional silos constrain end-to-end AI solutions, lack of leaders' ownership of and commitment to AI, lack of technological infrastructure to support AI, lack of available data, uncertain or low expectations for return on AI investments, underresourcing for AI in line organization, limited usefulness of data, personal judgment overrides AI-based decision making, limited relevance of insights from AI, lack of changes of frontline processes after AI's adoption. A study conducted by PwC (2019) together with the market and opinion research institute Kantar EMNID among 500 decision-makers of German private-sector companies in the 4th quarter of 2018 surveyed, among other things, that companies that do not use AI see, in particular, citizen scepticism towards AI, less state money for AI and weaker economic growth compared to the USA and China. Unfortunately, the published study does not provide any information on the frequency distribution of the answers of the 245 companies that are far away from AI.

Furthermore, studies by associations with a focus on AI or computer-related companies that conduct their own surveys or in cooperation with survey companies were identified. A CAWI survey conducted by Reder (2021) in April and May 2021 on the use of machine learning by companies operating in the DACH region received a response of 367 questionnaires. The greatest obstacles to the use of machine learning are seen in the lack of specialised personnel, insufficient programming knowledge, a general lack of know-how, a lack of mathematical and statistical foundations, the incomprehensibility of machine learning algorithms, the difficult integration into existing systems and the insufficient data quality of the input data. In a study conducted by Bitkom Research GmbH (2020) on behalf of Tata Consultancy Services in the period from May to June 2020, the companies surveyed see the high investments in particular

as the greatest challenge. Other obstacles to the introduction and implementation of AI include data security requirements, long decision-making processes, data protection requirements, a lack of application examples and expertise, the complexity of the topic and a lack of acceptance among employees and customers.

Results

Table 3 shows the implementation barriers from the relevant studies. The procedure for preparing the table was such that the individual barriers from the various studies were recorded line by line in an Excel document. The barriers that occur frequently were ranked higher up and those that are mentioned less frequently were ranked lower down. The individual studies were recorded in columns. The individual barriers of the studies were assigned to the defined barriers in the document as far as possible. The percentage values indicate whether and to what extent the individual barrier was recognized as existing by the companies and to what extent this barrier was classified as relevant. A qualitative content analysis of the studies is also necessary for the reason that the studies cannot be compared with each other quantitatively due to the different survey designs and survey priorities. For example, Rammer (2021) addresses implementation barriers intensively in his study, while in other studies implementation barriers were a subsection of the entire questionnaire. Therefore, the frequency of occurrence is used as a significant criterion for the relevance of the implementation barrier. This is shown as a total in the last column of the table.

Table 3: Hurdles in the implementation of artificial intelligence in companies

	Statistik Austria (2021)	Ulrich, Frank & Kratt (2020)	Rammer (2021)	Deloitte (2022)	Reder (2021)	Bitkom (2020)	McKinsey & Company (2018)	Sum
n =	3552	283	516	2620	367	431	1646	
1. Lack of competence	5%	63%	35%		24%	39%	42%	6
2. Obstacles to implementation		52%		42%	19%			3
3. Data problems (quality), data availability	3%	52%	27%	44%	17%		24%	6
4. Inadequacies in IT infrastructure / incompatibility	4%	46%	27%				25%	4
5. Financial obstacles/high costs	4%	39%	46%		19%	60%		5
6. Lack of commitment/know-how from top management		32%			22%		27%	3
7. Management of regulatory hurdles / technical risks	2%	32%	33%	50%				4
8. No business case / lack of identification of business cases	2%	28%		44%				3
9. Ethical aspects	1%		16%					2
10. Privacy concerns	2%		37%			45%		3
11. No additional benefit discernible; Missing evidence of added value of AI vs. alternative methods; low expectation of added value		7%	14%				24%	3
12. Difficulty in finding use cases/ Lack of use cases			9%			45%		2
13. Acceptance by employees			8%		32%	26%		3
14. Lack of access to external data			34%					1
15. Data security issues (e.g. third party access to data, cyber attacks)		13%	29%		26%	46%		4
16. Lack of availability of internal data, limited usefulness of data			21%				20%	2
17. Lack of methodical knowledge in dealing with data			19%		21%			2

	Statistik Austria (2021)	Ulrich, Frank & Kratt (2020)	Rammer (2021)	Deloitte (2022)	Reder (2021)	Bitkom (2020)	McKinsey & Company (2018)	Sum
n =	3552	283	516	2620	367	431	1646	
18. Lack of individual AI solutions (tailored to the company); lack of market maturity			24%		26%			2
19. Lack of external support on AI issues			23%					1
20. Lack of willingness to cooperate on the part of universities or research institutions			4%					1
21. Insufficient investment budget of business partners to implement AI solutions			47%					1
22. Lack of customer confidence in AI solutions			23%		24%	16%		3
23. Supply of skilled labour			84%		37%			2
24. Technical conditions (network coverage, transmission speed, failure safety etc.)			73%		20%			2
25. Cloud offerings			70%					1
26. More trust of users and users in AI			67%					1
27. Adaptation of data protection to facilitate AI-based data analyses			61%					1
28. Comprehensive information of the public about AI and the benefits of AI applications			58%					1
29. Incomprehensibility of machine learning algorithms, complexity of the topic					21%	44%		2
30. Insufficient programming skills					25%			1
31. Mismanagement of the company					18%			1
32. Lack of machine learning skills					17%			1
33. Lack of an overview of the market					17%			1
34. Lack of traceability of decisions					16%			1
35. Lack of clear strategy							43%	1
36. Functional silos constrain end-to-end AI solutions							30%	1
37. Underresourcing for AI in line organisation							21%	1
38. Personal judgment overrides AI-based decision making							19%	1
39. Limited relevance insights from AI							18%	1
40. Lack of changes to frontline processes after AI's adoption							12%	1
41. Long decision-making process						46%		1
42. Other		7%						1

Source: author's contribution based on the studies mentioned in the table.

The implementation hurdles of Table 3 are assigned to the categorisation made by the author and presented in Table 4. Based on the individual implementation problems, a rough distinction can first be made between internal and external influencing factors. In the case of external influencing factors, such as the availability of skilled workers or acceptance by the population, the company has no means of control. The company can influence the internal factors. Based on the individual problems, these can be assigned to the management level, the employee level, the organisation level and the data level.

Table 4: Categories of implementation barriers

Level	Implementation barrier number	Sum
Management Level	6, 7, 9, 31, 33, 34, 35, 38, 41	9
Employee Level	1, 8, 11, 12, 13, 17, 29, 30, 32, 39, 40	11

Level	Implementation barrier number	Sum
Organisational Level	4, 5, 36, 37	4
Data Level	3, 10, 14, 15, 16,	5
External Level	18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28	11

Source: author's contribution.

The analysis of the implementation hurdles makes it clear that the implementation problems of artificial intelligence can be traced back to four areas internal to the company and areas external to the company. The internal levels can be influenced by the company. For the implementation of artificial intelligence, the first step is that management is open to this technology and releases resources for the implementation. At the employee level, the lack of knowledge in particular is a problem. Other problems can be traced back to this problem, such as the lack of knowledge about use cases. At the organizational level, the existing infrastructure and the financial resources in particular are a problem. At the data level, the biggest problems are data availability and data quality, but also the protection of this data are the central hurdles.

One essential problem, namely that of the software available on the market, must be singled out specifically. Artificial intelligence is a subfield of computer science and therefore very application-oriented for companies. For the introduction in companies, this means that two things must be taken into account. (a) The relevant know-how must be available in the company and possible application fields must be identified. (b) As soon as possible use cases are clear and the data basis for the application of algorithms has been created, software must be programmed or obtained from a third-party supplier. The medical field is already very far along in this respect, since the application fields, such as in radiology for image analysis, are also clearly defined and concrete software solutions can accordingly already be analyzed. In his article, Bahl not only provides an overview of the implementation hurdles, but also of the products available on the market for breast imaging (Bahl, 2022).

As soon as the knowledge has been acquired in the company, suitable software has been selected and the data has been processed accordingly, the AI in the company must be adapted on an ongoing basis. During ongoing operations, risks in particular must be considered and measures taken to maintain the competitive advantage. Ammanath, Hupfer & Jarvis (2020) surveyed at the end of the year 2019 2,737 executives from nine different countries on what actions are needed to increase competitive advantage: Modernizing data infrastructure for AI (20%), Gaining access to the newest and bet AI technologies (19%), utilizing cloud-based AI services and capabilities (17%) deploying data science and AI development platforms (16%), developing partnerships that will help execute AI initiatives faster (14%), hiring world-class AI experts (9%) and using lower-code or AutoML (6%). Deloitte (2022) propose in their study a four action plan to push AI technology in companies. These include investing in culture and leadership, transforming operations, orchestrating technology and talent, and selecting appropriate use cases to accelerate value creation.

Conclusion

This paper examines the reasons why companies have not yet implemented artificial intelligence. On the basis of studies conducted, it was possible to condense the individual implementation barriers into superordinate categories. Here, a distinction must first be made between external and internal barriers, whereby the internal problems can be divided into four areas. At the internal level, it must first be ensured that management is convinced of the use of

this technology. Both financial and time resources must be made available. At the employee level, the appropriate knowledge about AI algorithms and use cases must be created. At the organizational level, the appropriate infrastructure must be created to have the best possible data available. At the data level, data availability and data quality as well as data security are the key challenges in particular. It turns out that external factors can also have a major influence on whether a company uses AI or not. This is primarily a question of the software available for use in companies. There is usually a lack of knowledge about possible software providers. However, the availability of specialists, acceptance in society and the technical infrastructure are also decisive success factors for the use of AI.

The state of research is currently very limited on the topic of adopting artificial intelligence in companies. One reason is certainly that there is no standard software solution in this area and AI technologies have to be individually adapted to the company and are therefore not yet used. A study by Kumar, Raut, Queiroz & Narkhede (2021), which explicitly addresses implementation barriers in the Indian public distribution system, identified eighteen critical barriers to adoption. As in this study, lack of knowledge, lack of AI or IT skills, and lack of IT infrastructure are seen in particular. Interestingly, this study cites many external factors that are beyond the control of the company and go beyond the hurdles in this study. These include lack of coordination with stakeholders, fear of exclusion of the poor, lack of consumer motivation, and lack of cognitive awareness. Similar problems lie in the lack of popular acceptance, political issues, legal and ethical challenges.

Practical implications for companies arise in that by knowing the implementation hurdles, targeted measures can be set to avoid them. Many of the issues raised can be avoided and implementation time shortened if employees are properly trained. This is primarily a matter of knowledge about AI algorithms and use cases. Once knowledge is built up at the employee level, further implementation hurdles can be avoided, such as the identification of use cases, the preparation and creation of a suitable database, acceptance by employees, or the ongoing adaptation of systems. In practical terms, however, it is also apparent that the existence of software products in particular is a key problem for the use of AI. For software providers, this means that they must present their services to companies in concrete terms with application examples. However, it is becoming clear that socio-political measures must also be taken to strengthen Europe as a business location. The biggest problem is the lack of skilled workers who have AI competencies and programming skills. This is a longer-term measure to build up the appropriate skilled workforce. With appropriate training and awareness of the topic, the problem of lack of acceptance should also be solved. On the technical level, the focus is on data protection and the processing of this data, as well as the necessary infrastructure, such as a fast Internet connection, network coverage and the prevention of system failures.

Theoretical implications for this study arise due to the heterogeneity of companies and the variety of different AI technologies. In addition to the different sectors, company size also plays a significant role. While small companies are likely to be affected by all implementation hurdles, larger companies, for example, usually have a budget available for implementation projects. A need for research is therefore seen in a finer breakdown of implementation hurdles by sector and company size. A further need for research can be seen in the implementation barriers themselves. Certain barriers are dependent on other barriers. For example, lack of knowledge about use cases is mentioned as an implementation barrier. However, if employees have the knowledge of AI technologies, certain implementation barriers fall away as a problem, such as not knowing about use cases in the company, dealing with data, or acceptance among employees. Therefore, there is a certain dependency of the implementation hurdles, which

should be identified in a further research.

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THE PAST, PRESENT AND DIGITAL FUTURE OF MARKETING EDUCATION

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Abstract

Digital technologies and the 'invisible hand' of digitalization, or digital transformation, have been a catalyst for the new industrial revolution manifested through creation of a digital economy – Economy 4.0. Some of the key tenets of traditional economic theory, such as scarcity, had been challenged by the attention-driven mechanics of the new economy so educational system faces a major reconfiguration too, metamorphosing to the outlines of Education 4.0, where not only students have to understand and deal with high technology, but the teaching staff often requires a re-training too, facing the technology that bids to transform the human cognitive process to the extent that hadn't been done since the invention of printing press. Due to these new rules, lifelong learning stops being a luxury and becomes a required necessity. When it comes to digital disruption in scientific disciplines, it's reasonable to say that marketing has been going through a very significant one ever since the advent of Internet. The education in marketing, on the other hand, still hasn't been able to properly adjust to its pace. This paper covers the history of academic opinion on marketing education, ever since it became a major scientific interest in the 1970s, all the way to the days of its digital disruption in the 2010s, which led to expansion of experiential learning, paradigm shift and alternative educational models built in order to keep up with the pace of technological progress. The coverage is focused on the most important research from the field, including key ideas regarding the curriculum development, as well as its critical flaws and shortcomings in regard to student training for the real-world problem-solving and market competency. Finally, the paper positions marketing education in context of digital economy's Education 4.0 and covers of-the-moment Artificial Intelligence (AI), such as ChatGPT, implementation in the educational practice; a practice where a sudden disruption led to the growing importance of human skills and foundational meta-skills, a priority for those seeking the future success.

Keywords: marketing education, digital economy, education 4.0, digitalization, AI, literature review

JEL classification: I21, M31, O33

Introduction

Due to its growing popularity as a buzzword, digitalization is recognized as a key new source of competitive advantage and thus has numerous definitions in the academic literature; being lauded as a catalyst of the technological renaissance, a second machine age and a new industrial revolution (Qureshi & Woo, 2022). Drawing from the relevant academic research, this paper aims to provide some insight into digital disruption's relationship with marketing education in the past, present and future. The main purpose of the paper is to acknowledge and identify some critical shortcomings that followed marketing education over its history and, in order to fill a

relevancy gap, present some future opportunities for its upgrade in the Education 4.0's ecosystem.

Digitalization and digital economy

Broadly, digitalization, or digital transformation, can be defined as the technical processes of converting traditional manufacturing or paper-based operations to digital operations, increasing the accessibility of information and data-based activities. Digital economy, its direct consequence, also has no standard definition yet, in a broad way it can be perceived as the digitalization of the economy at corporate, national and global level, so it is very difficult to generalize one model which would adequately represent the ideal digital economy system (Dumitra & Ganda, 2022).

The term was originated by Dan Tapscott in 1996 and has since went through several iterations, mostly relating to it as the complex structure and even being understood less as a direct concept but more of a methodology, a way of doing things, while in broadest sense being observed as an economy based on digital technologies. Because of that, its definition were always a reflection of the times and trends of the time; definitions from the 1990s were mostly centered around the emergence of Internet, later definitions adopted the new technologies such as mobile and sensor networks, then cloud computing and big data, and finally some more current advanced technologies. Bukht and Heeks (2018) propose the definition of Digital economy as the part of the economic output derived solely or primary from digital technologies with a business model based on digital goods or services. While authors admit that that definition may be too broad, they argue that the one is also it is also flexible enough to incorporate digital business model innovation over time. Also, they highlight the clear distinction between Digitalized economy as a macro way of observing the economy, and digital economy as more focused, narrow point of view (Bukht & Heeks, 2018).

The Digital economy has proven to grow on a greater rate than regular economy but they shouldn't necessarily be observed as a conflicted entities; digital economy stimulates the growth of a regular economy and the aim should be to adequately integrate the two, promoting the digital industrialization, industrial digitalization and digital governance (Fu, Yu, Da and Kan, 2022), as well improving the national economy by rapidly developing the knowledge and technology. Still, it is important to note that even though digital economy is lauded as an essential driver of innovation (Limna, Kraiwanit & Siripipatthanakul, 2022), the innovation itself is affected by the threshold effect of country's pre-existing industrial structure and urbanization level (Xu & Li, 2022).

The effects and importance of digitalization has reached quite an extent, to the point where Dumitra and Ganda (2022) refer to it as 'the invisible hand' of the current economic environment, using it as a metaphor for the way digital technologies are reshaping the mechanics of doing business, including its supply chain and its markets. In context of digitalization, the authors use the metaphor in order to illustrate the way in which it helps the economy to adjust and adapt to different scenarios, especially during the crisis such as the COVID-19 pandemic which helped in shifting the economic paradigm to more digitalized economy by pushing the companies and public sector to implement digital technologies in their day-to-day activities; proving that digital economy is neither an academic nor commercial concept, but the prioritized reality (Dumitra & Ganda, 2022).

While scarcity had been the basic tenet and core assumption of traditional economics, digital economy offers a limitless supply of digital products and services – the key is in limited and fixed time and attention span that people have. Because of that, companies need to shift their focus from production factors and market to users and their attention – a valuable and limited resource. The true influence of digital economy is yet to be understood though, since most of its measurement methods are still lacking in contrast to the traditional ones, for example there are severe limitations in using GDP as a major indicator to evaluate economic scale in the new era since there is now an increasing gap between it and economic activities (Zhou & Hu, 2022).

Education 4.0

After digitalization entered all the aspects of the economy, the social development of the state became one of the key priorities, especially the aspect of higher education, necessary to increase the opportunities and competitive advantages of citizens, turning them into a skilled labor force qualified for the current, digital, economic environment (Dumitra & Ganda, 2022). Education is a socially facilitated process of cultural transmission whose explicit goal is to effect an enduring change for the better in the character and psychological well-being of its recipients and, by indirection, in their broader social environment, which ultimately extends to the world at large (Jackson, 2012). In a broader sense, education is anything which leads to individual's personal growth (Ross, 1966), while it can also be perceived as a biological need to adapt in order to sustain and grow (Faure, 1972).

A need for education to adapt to the highly technological environment of Industry 4.0 is also classified under the banner of Education 4.0, where future workers should be educated in various interdisciplinary and soft skills, but also in advanced technologies such as Artificial Intelligence (AI), Augmented Reality (AR), Virtual Environment (VR), Mixed-reality (MR), Extended Reality (XR), Cyber-Physical Systems (CPS), and Internet of Things (IoT) (Sofiadin, 2022). The technology utilized for printing of the Gutenberg Bible in 1455 set the stage for a rapid spread of an abstract human thought; on the other hand, the today's innovative technology reverses that process. Whereas the printing press caused a profusion of modern human thought, the new technology achieves its distillation and elaboration. In the process, it creates a gap between human knowledge and human understanding (Kissinger, Schmidt, Huttenlocher, 2023).

Education 4.0, or University 4.0, is characterized by continuous learning in the short-term and focus on the development of skills need to foresee the sustainable digital strategies in the long-term; it is a philosophy of lifelong learning, where one learns daily through the constant challenges in life and work (Haktanır, Kahraman, Şeker & Doğan, 2022). Lifelong learning is based on a premise that individuals should continue learning throughout their whole life, not only through organized formal systems but also informally, creating their own paths between educational system, home and work (Singh, 2015).

Marketing education

The history and current state of marketing education

Before diving into mechanics of its educational system, it's important to define the marketing itself. According to the latest definition by American Marketing Association, marketing is the

activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large (AMA, 2023).

In a research undertaken on a sample of professionals from American Marketing Association, Hunt, Chonko & Wood (1986) got to a concerning conclusion that there is no empirical connection between a degree in marketing and a career success in marketing. The research was very controversial because the authors used it to call out the educational institutions and criticize their curriculum design (Hunt et al., 1986). Meanwhile, Carson (1993) proposes that students' incompetency to apply theoretical marketing knowledge on real-world problems, happening on the actual market, also translates to their later career which indirectly hurts the economy in the long run considering how important for the economy's health small and medium enterprises tend to be (Carson, 1993). The similar sentiment was shared by Rotfield (1993, as cited in Kaur, 2019), who implicates that students are not adequately trained for business success due to lack of foundational skills in logic, problem analysis, writing and math, which blocks them from properly understanding the world around them (Kaur, 2019).

Almost ten years into the 21st century, the marketing education was still primarily employing the traditional learning paradigm; an approach characterized by the passive, lecture-based transfer of knowledge from the professor to the student, while maintaining distant, impersonal relationship between students and faculty staff, and competitive spirit between students themselves. Recently, there is a newfound application of experiential learning paradigm, whose key premise is that knowledge is socially constructed through conversations and interactions with others. The root of this approach lies in technology, due to its compatibility with today's students' communication style, as well as its ability to be easily incorporated in faculty's mechanics (Granitz & Koernig, 2011). Direct experience, in contrast to abstract theory, combines students' own experience, reflection, cognition, and behavior, in order to enhance the learning process. Applied to marketing, it provides students the opportunity to apply current marketing knowledge and skills in a real-world context, including real-life brands and situations, which is in contrast to the traditional lecture approach often operated in a hypothetical vacuum where hypotheses and conjectures are never tested (Rohm, Stefl & Clair, 2019).

Brennan, Lu and von der Heidt (2018) agree that the students are generally unprepared in terms of workforce skills, however they don't transfer the blame solely on the institutions in this case. Considering the today's rapid information flow, which widens the gap between life skills and education on daily basis, it would take an average student to graduate around the age of 35 in order to gain sufficient skills to deal with modern workforce requirements. The four years of traditional college education are simply not enough to keep up with the rapidly changing world. Because of that, lifelong learning becomes a real need. Universities, focusing on education, are unlikely to fill skills gaps but only knowledge gaps. On the other hand, knowledge itself is no longer enough and universities are usually not funded to teach skills. Authors think that the future lies in partnerships with technical and vocational institutions offering micro credentials, potentially delivered via MOOCs (Massive open online courses). Students may concurrently learn skills and knowledge but via different pathways (Brennan et al., 2018). L. Hunt, Eagle & Kitchen (2004) imply that the paradigm shift in education is needed in sense that the process of learning shouldn't be perceived as a basic accumulation of facts but as a personal growth instead, where the student identifies meaning in information and learns to apply it to real-world problems and tasks. This andragogical approach doesn't necessarily require technology for its implementation but it can surely be a catalyst for it, in order to make it more sophisticated and

efficient (Hunt et al., 2004). There is also an opinion that learning is first and foremost an active process, so students should be responsible for developing their own methods to defining and solving problems (Kennedy, Lawton & Walker, 2001).

Journal of Marketing Education, founded in 1979, is a leading scientific journal in area of marketing education. According to their decade-based analysis of every single issue published until 2012, the adequate design of marketing curriculum and career success were key research areas during every single decade. Considering the future directions, the journal's staff considers critical thinking and technology as the main topics of interest, noting that technology is not only significantly changing the business landscape, but also the boundaries and methods of learning (Gray, Peltier & Schibrowsky, 2012).

Despite the consistent efforts of academic institutions to modernize and update their curricula in order to match the market's demands for digitally equipped marketers, the intensity of innovation has led to a substantial shortage of such individuals; traditional marketers are struggling to upskill while digital professionals are often inconsistent due to lack of standardized skills training. Even though there are streams which argue that an academic marketing education should be measured on its theoretical outcomes, the market's high demand for relevant, professional, technical knowledge is forcing institutions to reconsider their approach to training as an existential matter of relevancy, especially when corporations such as Google and IBM eliminated college degree as job requirements (Langan, Cowley and Nguyen, 2019).

The history and current state of digital disruption in marketing education

Digital disruption is the change that occurs when new digital technologies change customer experiences, business processes and business models, thereby changing how value is cocreated by actors in an ecosystem. Similarly to Digital economy, digital disruption cannot be pinpointed to one clear definition; it is important to note that it isn't a single occurrence but a longer process manifesting through various aspects of the business model, often trying to destabilize the market in order to enable the creation of the new ones. Not only had the marketing been disrupted by the digital technologies, but the education system did too. Business schools and universities were forced to reengineer and adapt their established practice to incorporate new approaches to course design and interaction with students, whose attitudes, capabilities and resources are significantly changed by the digital technology (Bolton, Chapman and Mills, 2018).

As cited by Crittenden and Peterson (2019), Jarvis states that education, due to its noble cause, deserves disruption the most, arguing that that is because it potentially opens the most opportunities for the future disruption. Digital technology contributes a significant shift to the practice and operation of higher education, challenging and innovating its program design (Crittenden & Peterson, 2019). Top Down approach can be efficient in this situation because if a higher administration and staff understand the sheer importance and context of courses they offer, the (financial) resources needed for their development and progress can be directed more efficiently (Zahay, Altounian, Pollitte, & James, 2018).

Expansion of Internet as the leading technological force which will disrupt the marketing education is first recognized by Atwong & Hugstad (1997) in their article '*Internet Technology and the Future of Marketing Education*'. Even though their suggestions and examples are closely tied to the era of writing, i.e. mention of transferring textbooks to compact discs and

sending homework via e-mail, the visionary aspect is manifested through alarming the marketing teachers about the necessity of incorporating Internet into marketing curriculum, highlighting the importance of shifting the course focus on the relevant real-world problems and suggesting how important meta-skills would become in the modern business environment. The authors predict that the curriculum which incorporates aforementioned aspects will create competitive advantage not only for the institution, but also produce workers who stand out (Atwong & Hugstad, 1997). Similarly, Evans (2001), in an article '*The Emerging Role of the Internet in Marketing Education: From Traditional Teaching to Technology-Based Education*', notes the key problems of technology's implementation into marketing education, observing it from the perspective of all the stakeholders involved. Some warnings, such as student hours management, were solved over time while others, most notably those on the institution's side still remain unsolved (Evans, 2001).

Based on the research of Mueller and Oppenheimer (2014) and Hembrooke & Gay (2003) (as cited by Crittenden, W. F., Biel & Lovely, 2018) the aversion towards implementation of digital technology in education was also a product of fear that electronic devices may affect students' focus and concentration levels, or that digital note-taking leads to lesser results on exams. The research also showed that despite higher quantity of data and note accumulation while using digital technology, students actually remember less information and more often lack its contextual understanding (W.F. Crittenden et al., 2018) so even though there is more immediate knowledge out on the Internet, often it's superficial and avoids memorization (André, 2019). The other concerns were primarily based around the faculty staff and their competence in the realm of digital technology, especially for those who got the position before the expansion of Internet so, suddenly, there is a situation where digital natives have to learn from digital immigrants (V.L. Crittenden & Crittenden, 2015).

One of the direct consequences of digital disruption in marketing education is a growing role of independent certificates and degrees in digital marketing, where some authors believe that their experiential nature and hands-on approach may even help filling the void within the traditional marketing curriculum. Bishop and Frincke (2004) classify these certifications into three distinct categories; vendor-specific certifications offered by a company and mostly focused on mastery of a skill related to a platform or technology by that vendor (i.e. Google Analytics), domain-specific certifications focused on a specialized body of knowledge applied in real-world contexts (i.e. Content Marketing) and, finally, practical certifications which are usually more complex and require the completion of a specific task. Implementation of independent certificates into university curriculum can be useful since they are often based on the current, of-the-moment skills and technologies which aren't present in the textbooks at the given moment, thus they can elevate the institution's practice to a higher level (Cowley, Humphrey, & Muñoz, 2021).

Marketing education in the Education 4.0

In order to make marketing education more competent and to fill a relevancy gap, it is argued that digital marketing should be a headlining course in marketing education. Wymbs (2011) considers that traditional marketing syllabus cannot train a competent workforce anymore nor its practice relevantly matches the needs of a constantly-growing digital economy (Wymbs, 2011). One of the key priorities of reforming the education and adjusting it to the demands of the digital economy should be a proper re-training of the teachers and educators in order to understand the digital technologies and gain skills to use them, which then they can transfer to

their students (Rohm et al., 2018; Maymina, Divina & Liulia, 2018). The emergence of AI is considered an opportunity to rethink and relocate, in time and space, the nature of exchange between teachers and students, especially individualized ones, and revolutionize the educational framework (André, 2019).

The implementation of AI in marketing education

Generative AI will open revolutionary avenues for human reason and new horizons for consolidated knowledge which, if navigated successfully, could open new concepts of human thought. Despite the disruptive parallels with printing press innovation, there are some key categorical differences. Enlightenment knowledge was achieved progressively, step by step, with each step testable and teachable; AI starts at the other end though. Enlightenment science accumulated certainties; the new AI generates cumulative ambiguities. The essential difference between the Age of Enlightenment and the Age of AI is thus not technological but cognitive. The essential challenge of the age of AI is thus the development of interaction with the machines (Kissinger et al., 2023).

ChatGPT is one of the innovations which has a potential to bring a significant change to both, digital marketing practice and the education system. ChatGPT is an AI-powered chatbot platform implementing natural language processing (NLP) and machine learning (ML) algorithms through which individuals can have real-time, human-like conversations with a machine. Even though its primary purpose is to be used in roles of customer service agents or automated support, the difference it brings is the natural tone of voice, which allows it to participate in meaningful conversations with humans. While ChatGPT's implementation in digital marketing could provide advantages manifested through increased efficiency due to automation, improved customer engagement and more accurate data collection which can eventually lead to better decision-making, it also provides a greater scalability since it does not require additional human resources when expanding operations into new markets or launching campaigns globally. Again, the key aspect is a proper understanding of the actual platform. In education, ChatGPT can easily be implemented for the basic automation tasks, such as providing the general course information and services without a human help. The way its capabilities can be further utilized is by using it as the virtual assistant of sorts; providing students with personalized learning experiences tailored to their specific needs, using AI technology to design student-specific lesson plans but also by giving them feedback on-the-go and relieving teachers of manual grading tasks (George, George and Martin, 2023). This sentiment is shared by Kaur (2019) who suggests that customized education should become a priority for universities, switching the mass learning plans for personalized ones, where graduate programs would become career-oriented instead of manifesting through general learning which later leads to job-seeking (Kaur, 2019).

Implementation of AI as an assistant tutor is also recommended in an article titled '*The Future of Marketing*', published in *International Journal of Research in Marketing*. Rust (2020) calls for the higher level of cooperation with advanced AI systems, instead of solely using them for basic automation tasks. In the article's section about marketing education, the author also suggests the curriculum's shift towards service, rather than goods sector, stating that it holds a lion's share of the overall economy and thus there is also a need to reconfigure a classic marketing mix, questioning the relevance of 'product' inclusion in 4P. Further, he also implicates that people skills, primarily empathy and communication, should be emphasized more instead of being in shadow of STEM skills which can easily be delegated to the AI

systems. Finally, there's a call for more attention on complex, dynamic systems, a skill necessary for future managers participating in markets with dynamic equilibriums, where understanding techniques such as agent-based models and computationally intensive approaches will be a critical skill (Rust, 2020). Nonetheless, Gershon (2017) implicates that human skills are still the hardest technology to imitate and thus they should hold a special importance in the education system (Elbeck, 2018).

In context of AI, it is also important to note the crucial role of educators, which have a responsibility to teach students to be able to make ethical and moral decisions since AI is not likely to perform successful decision-making (Sofiadin, 2022). Morals and ethics were an important aspect of the marketing education even in its early days. Hawkins & Cocanougher (1972) undertook a controversial research whose results suggested that the higher level of education in marketing also implies the higher level of tolerance for a potentially shady business methods. Their conclusion was that the teaching staff is primarily responsible for developing the sense of ethics, care and morality in their students (Hawkins & Cocanougher, 1972). With time, the situation seemed to change, since Yoo & Donthu (2002) came to findings how individuals with a marketing degree tend to have a higher sense of ethics when it comes to business. However, their findings show that the stand-alone ethics course brings more positive results than continuous implementation of ethics into other courses, where student's cultural background seems to have a stronger role (Yoo & Donthu, 2002). Recent social marketing trend, with its genuine concern for the well-being of society and the environment, is positioned to help accelerate the transformation of marketing education for the next generation of ethical marketers (Harris, 2022). Fundamentally, our educational and professional systems must preserve a vision of humans as moral, psychological and strategic creatures uniquely capable of rendering holistic judgments (Kissinger et al., 2023).

The importance of experiential learning and meta-skills development

Rohm et al. (2018) implicate that current marketing education, fueled by the digital technology, needs to abandon the 4P model of the marketing mix and instead implement the 4C, consisting of creativity, critical thinking, collaboration and communication skills. Authors argue that this model properly trains the students for the ambiguity and challenges of the workplace since most of them are future-proof skills and real-world ready (Rohm et al., 2018). This reinforcement is in line with research of scholars who tried to identify a set of skills which are likely to remain complementary with automation, even in the era of AI. Consisting of the skills from 4C framework, these are general cognitive and socio-emotional skills that can be useful in almost any work context and that will help workers adapt and reskill if necessary. Still, this doesn't imply that some specific training should be discouraged or abandoned, the key lies in lifelong learning and ability to re-skill (Qureshi & Woo, 2022).

The knowledge transfer methods are going through new iterations as well. One of current trends in education is gamification, which aims to increase student motivations by implementation of a reward system. Elements such as points, rewards, mystery, collecting collections, storytelling, levels and feedback are proven to reinforce learning. Once again, as in case with ChatGPT, Big Data has a crucial role in making it possible (Haktanır et al., 2022). Further, in the field of a creative education there is narrative technology, a term used to describe the synergy of storytelling and computing. Due to its ease of use, a synergy of digital technologies and sheer human power is potentially enabling more learners to be creative with digital media—irrespective of their creativity or lack of creativity before, thus creating a possibility for a

renaissance in education and educational technology (Hall, 2012). The use of artificial intelligence techniques can handle the more routine aspects of information requests and further help in generating new forms of content not initially envisaged by the creator (Earnshaw, 2021).

The seeking for change in educational system also led to the development of Competency-based education (CBE) and Project-based learning (PBL) models. These approaches don't have a fixed amount of lecture hours but are instead focused on mastering a skill by completing a task or a project based on that skill. In these models, teachers don't have their traditional role but play more of a coach, or a trainer role instead. The positive sides of these models are predominantly manifested through acquiring a skill which can be applied to real-world problems on the actual market, while negatives come from questioning the longevity and sustainability of these approaches (Ye, Van Os, Chapman & Jacobson, 2017). The New Marketing DNA is another similar model, rooted in growing discrepancy between marketing education and marketing practice. The model is metaphorically named after a fluid nature of marketing's constituent parts; how they contribute to another in inextricable ways but how each can also be taken out and investigated or taught in their own right. The curriculum of this approach remains loyal to the seminal marketing works but it tries to incorporate them into new contexts and intersects them with technological and analytical skills, based on the premise that they are of critical importance since technology progress also dictates the progress of marketing itself (Harrigan & Hulbert, 2011).

In the vein of adapting new experiential learning methods, there are also computer-based business simulations, a sophisticated and interactive digital training tool intended to enhance the learning experience and provide students with realistic business experiences. Research had shown plenty of benefits of utilizing this approach, such as increased student enjoyment and involvement, improved performance and overall greater perceived value of the learning experience due to shared enthusiasm by, both, students and teachers. There are also benefits specific to the environment infused with digital technology; unlike traditional education, simulations constitute a space for knowledge transfer by linking contextualized cognition, relevant, real-world application, and instant, personalized support from the educators. Further, simulation enables skill development not only in the basic context of the given course but also in the student-specific context in relation to their position in the team. Finally, simulation challenges student's existing thinking and analytical frameworks which leads to attitudinal and behavioral changes (Bolton et al., 2018).

Conclusion

Marketing education is in a transitional period; a transition where even the course name of its digital variant, nor its scope for that matter, aren't clearly defined and vary in relation to an author or an institution in question. There is a significant gap between the traditional educational paradigm, mostly adopted by universities, and acquisition of skills needed on the market disrupted by the digital technology (Finch, Nadeau & O'Reilly, 2013; Granitz & Koernig, 2011; Rohm et al., 2018; Brennan & von der Heidt, 2018; Zahay et al., 2018.). The priority meta-skills that marketing professionals require from the new graduates cannot be linked to a single discipline, therefore, in order to be competitive, marketing education needs to focus on the development of foundational meta-skills through experiential learning methods applied to marketing-specific contexts (Shaltoni, 2016; Granitz & Koernig, 2011; Finch et al. 2013; Bolton et al., 2018; Rohm et al., 2018; Dahl et al., 2018). The speed of technology-fueled transformation led by the Internet was rightfully predicted as a strong building block for

educational institution's competitive advantage (Rotfield, 1993; Atwong & Hugstad, 1997; Evans, 2001; Gray et al. 2003.; Hunt et al. 2004), but there is still a high priority and responsibility in institutional support towards the adequate re-training of teachers and faculty staff in order to narrow the gap between curriculum content and digital skills needed on the market (Smart et al., 1999; Evans, 2001; Close, Dixit & Malhotra, 2005; Crittenden V. & Crittenden, 2015; Kaur, 2019). Education 4.0 and implementation of Artificial Intelligence offer new possibilities and opportunities in facilitating the knowledge transfer process and reconfiguring the core mechanics of the educational system, highlighting the context-based understanding and lifelong learning in the forefront as an undeniable necessity (Qureshi & Woo, 2022), still, it's important to keep intellectual and moral underpinnings in order for AI to amplify humanity (Kissinger et al., 2023; Sofiadin, 2022).

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DIGITAL TRANSFORMATION IN THE INSURANCE SECTOR AND ITS IMPACT ON BUSINESS RESULTS

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Abstract

At a time when many companies are struggling with their businesses due to various external and internal influences, many see enterprise digital transformation as a way to improve their businesses. Digital transformation itself is recognized as an opportunity to improve market position against competitors and increase the value of the company. The insurance industry faces similar issues to other industries, but also has its own unique characteristics, as the insurance industry is a highly regulated sector, regulated by regulators in their own country and by companies outside their home country. Digital transformation in the insurance industry is a process with many factors at play, and there are risks to the success of implementing the digital transformation process. In this paper, we have analyzed the changes during the pandemic COVID-19 using the examples of purchasing an insurance policy online, developing and using a mobile application or improving the company's market position to see what changes have been realized in the digital transformation process. We emphasize that the pandemic COVID-19 has accelerated the need for digital transformation in all industries, including insurance. Digital transformation does not only concern the sales department or IT, but is a multidisciplinary project in which top management acts as the owner of the business processes. Digital transformation facilitates the analysis and management of data, and its implementation is necessary if all regulatory requirements are to be met.

Keywords: digital transformation, insurance, insurance company, the impact of the COVID-19 pandemic on the insurance sector

JEL classification: G22, O3

Introduction

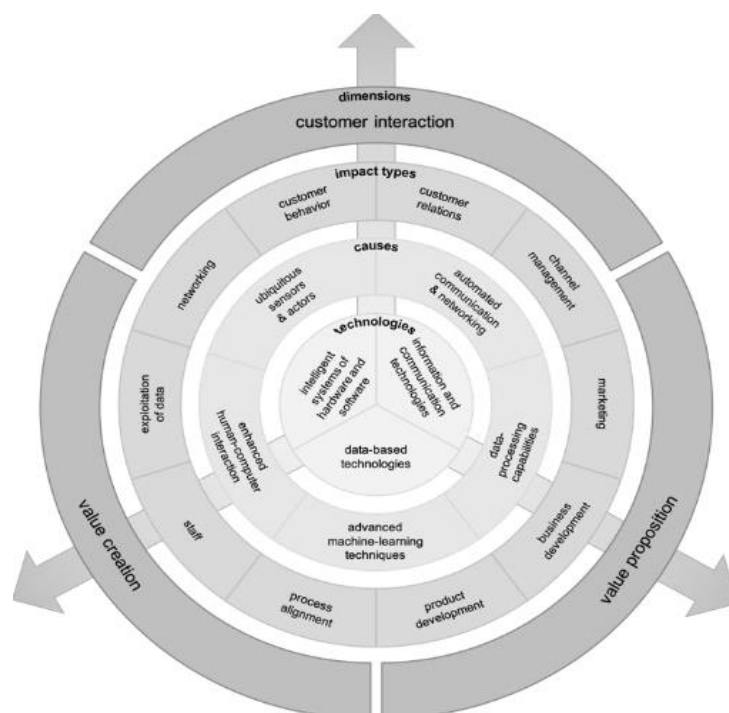
Digital transformation is not only imperative due to the "new normal" brought to the world by the COVID-19 pandemic, but customer demands are higher than ever. Transformation, by definition, is the intensive use of digital technology and digital resources as a tool to create new revenue, new business models, or new ways of doing business in general. A digital business transformation occurs when a company makes significant changes in business activities such as strategy, structure, business processes, business model or organizational structure simultaneously and in a short period of time. These are usually changes in which digital technologies connect business processes and provide a company with competitive advantages (Spremić, 2017). Insurance companies, where the legislature allows this type of business model, enable digital claims processing and virtual inspections. The pandemic, where Bosnia and

Herzegovina is not excluded either, has highlighted the importance of travel insurance and the need for policies that provide comprehensive coverage for COVID-19 related risks (Tan & Caponecchia, 2020).

One of the greatest challenges for companies in our country is digital transformation of certain segments of an organization, while other segments remain operational by previously settled patterns (Lazić & Jović, 2019). Of course, digital transformation is not only related to IT, but must be carried out strategically in various business areas, for example in organizational business models or customer/client relationship processes. Literature recognizes that the adoption of e-business technologies in companies, the use of cloud computing services, e-sales, the information security and disruptive technologies, big data analytics and artificial intelligence are of fundamental importance for digital business transformation (Boneva, 2018; Petrova & Fustik, 2021). For companies founded before the digital age, like the one we observe in this paper, the fundamental problem is change, and the real place to look for change is the organizational culture and attitude toward change. Businesses in general are confronted with political and structural challenges, scale, scope, regulations, as well as customized product systems (Boneva, 2018).

Considering company's vision and position on the market, it is important to be aware of need for a change and resources available for its performance. Literature (Sanchez, 2017; Kozina, 2019) provides framework for determining company's readiness for change. Successful digital transformation is conditioned by using adequate strategy. The strategy serves as a central concept for integrating the entire coordination, prioritization and implementation of the digital transformation within a company (Matt et al., 2015). A change strategy doesn't necessarily have to remain within the organization, but can also have an impact on business processes like sales channels as well. Digital transformation, we must repeat, is having a major impact on the way companies do business.

Figure 1: Relation between technologies, causes, impact types and dimensions of transformation



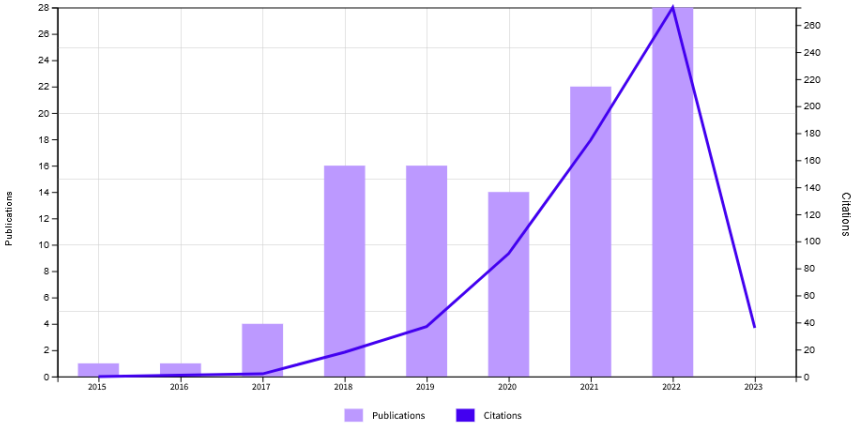
Source: Pousttchi et al., 2019.

The motivation for writing this article was to describe the algorithm we used, extracted from the available literature, and to provide foundations for further research on a topic from Bosnia and Herzegovina’s insurance company. Section I of this paper is introduction, including emphasized importance of strategy, the impact of the COVID-19 pandemic on the insurance sector and definitions. In this chapter we also provide literature review. In section II are shown data of an analyzed insurance company, its market position, role of company’s IT sector in digital transformation and segments that were transformed. Section III describes implementation of digital transformation in the company, providing data about travel insurance. In section IV is given conclusion and suggestions for further research.

Literature review and related work

Digital transformation has advanced researchers over the past decade. A rapid increase began in 2014 and 2015. Digital transformation is expected to play a key role in addressing pandemics such as COVID-19 and represent an opportunity for business growth (Kim et al., 2021). We can notice same trend in Scopus research, where we can find more than 51.000 documents under topic “digital transformation”. Under same topic we found more than 24000 papers in Web of science database. We have narrowed the search, and results were in total 102 publications, where first appearance was in 2015 for “digital transformation” and “insurance” shown as follows.

Figure 2: Search topic “digital transformation” and “insurance” in Web of science base through years



Source: authors’ work.

From year 2016 to 2018 list of digital technologies leading to digital transformation or Fourth Industrial Revolution increased on 8 (Kim et al., 2021): Internet of Things, blockchain, bitcoin, on-demand economy, centralized cloud, quantum computing, optical computing, neural network processing. Automatically, research results topics on Web of Science evolved and they can be chronologically sorted as follows.

Table 1: Research topic by period

Period	Topics of interest in digital transformation
Early 2000s	Cloud computing
Mid 2000s	Social media, mobile technology
Late 2000s	Big data
Early 2010s	Internet of things

Period	Topics of interest in digital transformation
Mid 2010s	Machine learning
Late 2010s	Blokchain technology
Present	COVID-19

Source: authors' work.

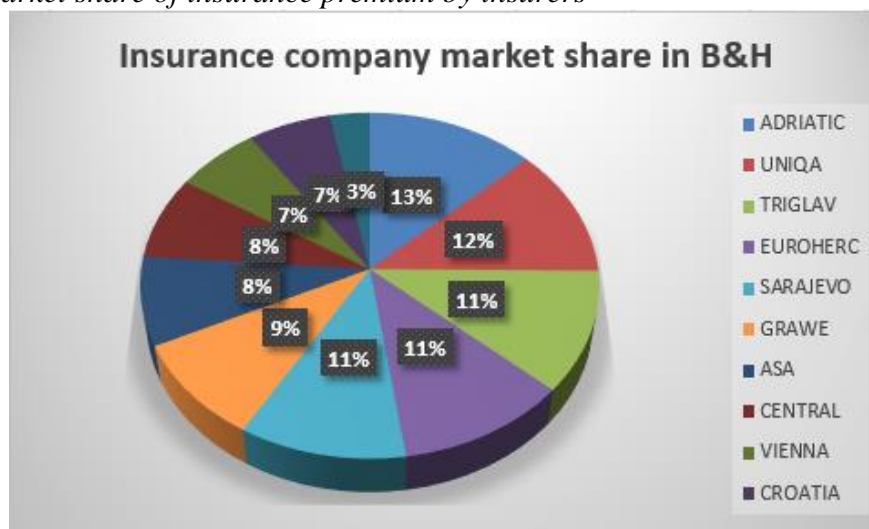
The literature offers different research for different companies and recommends different frameworks based on different business processes, but we have noticed a lack of literature on insurance and digital transformation. This is another motivation for writing this paper - to explain the importance of following current trends even in conservative industries like insurance.

Prerequisites and reasons for transformation

There are various initiatives and motivators for digital transformation that can be found in the literature (Petrova & Fustik, 2021), and we also recognized what are initiators of change in our company: market pressure, customer behaviors and expectations, network effects, increased efficiency and productivity, regulatory compliance.

First, we will analyze market position of insurance company that we observe for this paper (Agencija za nadzor osiguranja Federacije Bosne i Hercegovine, 2022).

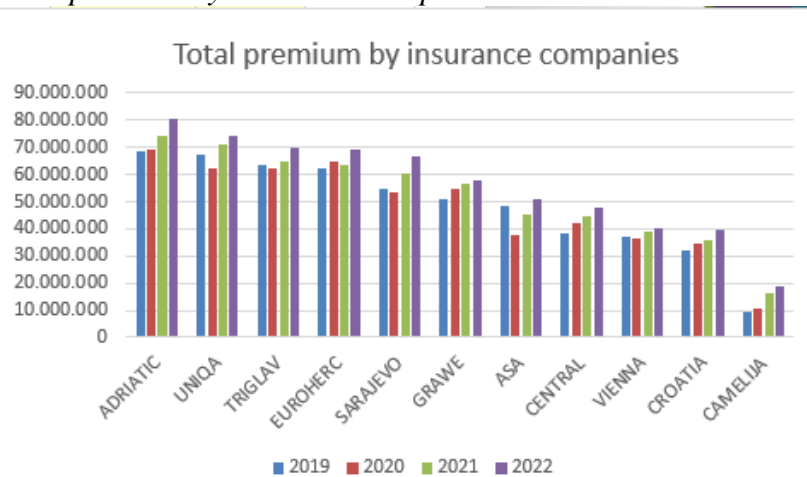
Figure 3: Market share of insurance premium by insurers



Source: Agencija za nadzor osiguranja Federacije Bosne i Hercegovine, 2022.

Observed company has 11% of market share. The regulator has imposed mandatory insurance for certain types of insurance, but we recognize voluntary insurance as a sector for business improvement and the first building block for digital transformation. First insurance we decided to transform was the travel insurance. There is also a limitation of the regulator to allow more flexibility of compulsory insurances. In the graph, we can see that some companies, including one we observe in this paper, have lower premiums in 2020 than in 2019. This is caused by COVID-19 pandemic, where we had less travel insurance and other voluntary insurance policies. Yes, the claim share was also reduced, but there was lack of income.

Figure 4: Insurance premium by insurers – comparison 2019-2022



Source: Agencija za nadzor osiguranja Federacije Bosne i Hercegovine, 2022.

If we analyze available reports (Agencija za nadzor osiguranja Federacije Bosne i Hercegovine, 2022) we can see that premium of travel insurance doesn't vary between insurers in a way that some insurance company assumed primacy at some point. What we observed, and what can also be found in the literature: market pressure here is the competition or the threat of competition (Petrova & Fustik, 2021). The competitive landscape is changing in many industries due to business digitalization (Kim et al., 2021), and insurance is no exception. With a final goal of avoiding the risk of losing competitiveness and market share – company recognized market pressure as an initiator of digital transformation. We recognized improvement in higher process efficiencies enabling lower pricing to customers (Petrova & Fustik, 2021). COVID-19 showed itself as a framework that has spurred digital transformation as accelerator of digital adoption, where it shortened period of adoption from three to seven years to period of just few months (Rupeika-Apoga et al., 2022). It helped in creating a sense of urgency, and helped in guiding company toward focusing on its most critical needs. The first step for the company was to make it possible to purchase travel insurance online. Legal prerequisites were that it was optional (voluntary) insurance, and minimal network and payment security settled. The payment was realized through external service used by numerous companies in the country.

In evaluating the business model (Rupeika-Apoga et al., 2022), it is suggested that two dimensions be examined: customers and financial viability, with revenue being the most appropriate to measure the financial viability of companies of this size. There are three metric parameters in a study (Rupeika-Apoga et al., 2022): number of employees and assets; secondly, revenue is a subjective measure of how well a company can use its core business assets and make a profit; and, thirdly, revenue is the total amount of income received from the sale of services related to the main activities of the company.

The organization we analyzed in this paper was an insurance company from private sector in Bosnia and Herzegovina. It is a medium size organization, with total employees about 500. The main regulator for Insurances, as a part of finance industry sector, is Agency for insurance supervising. Company doesn't have corporate office abroad, and its whole market is local. Number of system users is 450, all supported by IT sector of 10, including CIO. IT structure of analyzed organization is centralized, and it has system adequate server and network infrastructure. Sales department counts number of approximately 300 system users.

The subjective measure of how well a company can leverage its core business, or the company's operational efficiency, can be assessed by looking at, for example, how well the company manages its supply chain. Every company felt the lack of raw materials, where it is difficult to get some network equipment for example, even two years after pandemic started, but pause in some business was also significant – observed company improvised due the business pausing of printing houses. With increase of income, after online sale started, subjective measure of core business' assets usage is marked as adequate.

When management decided that social networks cannot meet customer requirements observed company developed mobile application. This increases options for business-customer interaction and makes it personalized. Reviews Company got from users helped improving products, making customers involved in co-creating values (Petrova & Fustik, 2021).

When discussing network effects, the quantity, quality and timeliness of information and the exponential growth of Big Data are the most important aspects (Petrova & Fustik, 2021). Corporate profiles of company were made on popular social networks. The company tries to keep up with the changes. As examples of good practice, examples of insurance companies from the environment or countries of the European Union are used.

When we talk about increasing efficiency and productivity, we must note that digital transformation is characterized by three elements (Al-Nuaimi et al., 2022):

- reviewing and redefining corporate boundaries
- opening up products and services to community input and removing ownership barriers
- redesigning organizational and product identities.

In literature (Al-Nuaimi et al., 2022) we find that from many perspectives, leadership is seen as a fundamental element of organizational values, while top management must also change and adapt. In a company we are writing about in this paper, we have observed about 450 system users distributed in 8 regional centers and more than 150 offices. IT of a company is a 10-member team, including CIO, which is not strictly divided into three departments - application support, system and technical support, software development. The role of IT in the system is to initiate and support change. By rejuvenating the team, IT can follow new technology trends, but the expertise of other colleagues is the most important thing in all change processes. IT has a direct link with senior managers in the company, to whom it presents new ideas, and senior managers provide ideas and performance approvals for tasks proposed by other departments. We can say that IT was the initiator, but it was the senior management that enabled the digital transformation of travel insurance.

Some changes are required by regulatory compliance. Making these changes challenges the business operation of the system – the system must remain operational while the changes are implemented. For example, the popular Regulation (EU) 2016/679 – General Data Protection Regulation (GDPR) (General Data Protection Regulation, 2018) has completely changed the way insurance companies share data. The most important changes in the areas of security and data protection are reflected here. Fines imposed for non-compliance with the prescribed measures can severely affect the company and its reputation.

Challenges and implementation

Digital transformation trends have evolved and changed over the years. We expect changes in business and the new normal, but also in personal life. Business performance is determined by

the capabilities of the company, but the observed company faced the need for organizational changes within IT and the sales department before the digital transformation began. IT had to change its way of working to maintain online services and automated processes (Rupeika-Apoga et al., 2022).

Discussions about data privacy, cybersecurity, and the future of work are societal challenges for any business, but when we talk about insurance companies, we cannot neglect compliance and legacy systems and procedures. In terms of cyber security (Van Veldhoven & Vanthienen, 2021) we open our system to potential risks by adopting digitally transformed system. During COVID-19 whole world of administration worked in hybrid way, many companies kept it nowadays. With new normal we are used to working and shopping online – that was the reason insurance companies provided buying policies that way. Customers were expecting it. That was transformation that could not be avoided The relationship with customers changed, which was also evident in the observed system, in the way that customers, who were passive targets of marketing, became those who gave feedback and communicated with the organization (Kim et al., 2021).

In literature (Rogers, 2016) we can find that organizations can be affected by digital transformation in five domains: customers, competitions, data, innovation and value. Competition became important item, not only between insurers, but different industries – in observed system were implemented different products for travel agencies as a sales channel. Data access must be limited, and data exchange precisely defined, with all legacy procedures respected. Economics activities we used to be face to face, are now mainly moved online what also contributed to customer relaxation – with no working hours they have to adapt to, cheaper insurance policies they feel more comfortable in communication with insurance company. Value this provided for insurer are data, where they can have more personal and correct information about their clients. That can improve sales and increase earnings, what is any business' final goal.

Enablers for digital transformation can be defined as follows (Dang-Pham et al., 2022): strategy and business models, change management, organizational culture and participation, data and IT infrastructures, human resource management, digital ecosystem. Of course, even with all enablers in place, there are examples of unsuccessful digital transformations (Lazić & Jović, 2019). With knowing what could enable transformation, we have to adopt strategy. Different strategies are recommended by literature (Lazić & Jović, 2019; Dang-Pham et al., 2022; Matt et al., 2015), but the algorithm we used in observed company is summarized as suggested in Boneva (2018):

- digital audit
- creating digital transformation strategy
- setting measurable aims
- prioritization
- measurement of achieved results
- prescribe of improvement measures.

The reason why we have chosen this particular algorithm, among others, is that it leads to the goal with a series of steps that we consider appropriate for the observed company. What is especially convenient for us is the possibility to repeat the algorithm iteratively

Before taking any action, we need to conduct a digital audit. In the case of the observed company, the digital audit was conducted by the team leader of the travel insurance service and two members of the IT team. We found that by improving the sale of travel insurance, an effect

can be obtained in the short term. These changes will be used as a platform to sell other types of insurance where possible. The audit was performed in the end 2019. Strategic framework was supposed to describe business development. In order to enable online sales, we divided the parts of the development and concluded that for the development of the online application we are going with the engagement of an outsource company that would write the application according to our project requirements. Outsourcing company just did the coding, and our team was engaged to monitor the application design, application of business logic to the application, solve security challenges, test the application, and most importantly to protect clients at the time of sale so that there is no misuse of data essential to the performance payments. Methodology used for project guidance was scrum.

Setting measurable goals was easy – we wanted to increase our sales and target more young people – people who are used to buying products and services online. We were aware of how many insurance policies we sold in 2019, around 53000, and wanted those numbers higher. In prioritizing, we ranked priorities by importance and assigned tasks to team members. For our team at IT, security and adequate infrastructure for online sales were the most important issues. Achieved results were even higher than expected at the beginning. Year 2019 was a record year in many aspects, but then we faced 2020 and COVID-19. People traveled only if they had to, sale of travel insurance policies got lower rates than ever. In 2021 improvement measures was adding risk of COVID-19 on insurance policy. In after COVID-19 era and new normal, company's development team made an application, not only for travel insurance, but it got easier to get a travel insurance policy. That gave us the numbers close to those in 2019, which was, as we already said, a record year and a good starting point for measurement. New application shown improvement in communication with clients, where they could directly ask questions and give their comments and suggestions. Also the age structure of portfolio turned to younger population, what was one of transformation goals.

Conclusion and further work

The future of digital transformation research in insurance in Bosnia and Herzegovina should definitely be mandatory car insurance. Comparing of the results on the local market and the experience of companies with main offices in European Union could open a whole new perspective, especially in terms of legal and other regulations.

In this paper, we presented the experience of an insurance company and the product of travel insurance and analyzed the market position of the company. We emphasized that a clear vision of the end result must guide the entire process and that digital transformation must not be a IT project, but initiated and led by management. Insurance companies must follow trends and adapt to the new normal by enabling customers to purchase their products online. The way that customers act remained after COVID-19 pandemic. We have also emphasized the importance of preparing and adopting a strategy prior the actual transformation.

We have already mentioned the there is a lack of literature on insurance and digital transformation, and that there is no standardized approach to transformation – so we propose the development of a transformation framework as future work in the chosen area.

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PERFORMANCE ANALYSIS OF TYPICAL BENCHMARK INDICES FOR EQUITY PORTFOLIO MANAGEMENT

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Abstract

The area of research are US and Eurozone stock markets. The paper contributes to better understanding of the stock market indices' movement and the influence of selected macroeconomic variables. Knowledge in this area is important not only for researchers but also for investors in the stock markets. It gives new perspective on potential for diversifying risk by investing in the US or Eurozone stock markets especially during economic crisis. Furthermore, this work provides empirical evidence to all those who observe stock markets' movements to explain some others. For example, stock market indices are often used in papers as comparable values for analysing the performance of equity portfolio management. Accordingly, this paper contributes to a better understanding of their movements, and consequently to a better understanding of the movements of portfolio performance for which the stock market indices serve as a benchmark. In the first part of this paper, the European EuroStoxx and the American S&P500 are analysed, and their movement in period from Q1 2000 to Q1 2021 is observed through convergence analysis. Stationarity testing aims to determine whether the movements of the EuroStoxx and S&P500 indices are stationary series, or whether their movements can be predicted. The existing literature is upgraded in a way that convergence analysis covers longer period than other research. Observed period include three global crises - two financial crisis from 2008 and 2013, and the recent Covid crisis from 2020-2021. In the second part of the paper, an attempt is made to explain the movement of stock market indices with variables: GDP, inflation rate and employment rate as it is already proven with recent literature how those variables have huge impact on the outcome. To determine whether and how significantly the mentioned variables affect the movement of stock market indices, a regression panel model analysis is performed on 12 European countries: Germany, France, Spain, Italy, Netherlands, Austria, Croatia, the Czech Republic, Slovakia, Slovenia, Poland and Hungary. The data of each country is taken individually - the stock market index, GDP growth rate, employment rate and inflation. The performance is observed in the period from the Q1 2010 to 1Q 2021. Panel model tests the influence of independent variables (GDP, inflation rate and employment rate) on dependent variables – stock market indices. The panel analysis is further extended with a dynamic panel model to determine the impact of stock index movements from previous periods on stock index movements in the present, and to determine whether business cycles spill over into stock markets to follow the trend. As research covers stock markets in 12 countries and observe the influence of the main macroeconomic variables on stock market indices in the same period, it improves previous research that mainly observed one regional area or influence of only one macroeconomic variable. Furthermore, this research gives scientific contribution and covers research gap by covering period in which two global crises hit the eurozone area.

Keywords: convergence analysis, panel regression model, stock markets, benchmark

JEL classification: C12, C23, G10, G15

Introduction

This paper examines the movement of the main stock indices of Europe and the United States, as well as the impact of macroeconomic variables of different countries of the European Union on the stock markets.

The first analysis tests the convergence of the growth rates of the stock indices Euro Stoxx 50 and S&P 500 using the unit root test. The Euro Stoxx 50 index is an index of Eurozone stocks. It consists of the 50 most important and most liquid stocks in the eurozone. S&P 500 is an index of the American stock market consisting of the values of 500 joint-stock companies whose shares are actively traded in the United States. Given that the Euro Stoxx 50 index was established somewhat later, in February 1998, the convergence in the period from 2000 to the end of the second quarter of 2021 will be analysed. Before the convergence analysis, the stationarity of the index movement and the growth rate of the index in the observed time period will be tested.

The second part of the paper refers to the panel analysis. A static panel analysis tests the impact of the GDP growth rate, inflation rate and employment rate variables on the stock indices of the 12 countries in the eurozone.

The dependent variable in the panel model is the growth rate of the stock market indices of the mentioned countries, and the independent variables are the growth rates of GDP, inflation and employment. The dynamic panel model tests the impact of the variables of the GDP growth rate, the inflation rate, the employment rate and the growth rate of the stock market index from the previous quarter on the same stock indices of countries in the eurozone.

The observed period covers the period from the first quarter of 2010 to the first quarter of 2021.

Literature review

Many papers use unit root tests to search evidence of stock price movements. Although there is a generally accepted opinion that stock price movements are unpredictable, some works prove that stock price movements are stationary processes. Some works that tested the convergence and predictability of stock market index movements follows in chronological order. Narayan (2008) using the unit root test of the Lagrange multiplier with structural breaks, proves that the movements of the stock indices of the G7 countries are stationary processes. Caporale, Erdogan and Kuzin (2009) test the convergence of stock markets for five EU countries, as well as the USA, applying the Phillips and Sul (2007) method. The division of the cross-section into two subgroups, including the countries of the euro area and the USA, provides evidence of global convergence. Murthy, Washer and Wingender (2015) test the stationarity and linearity of stock prices in the United States using the autoregressive unit root test proposed by Caner and Hansen (2001). Unlike traditional unit root tests, this test simultaneously tests for the presence of non-linearity and non-stationarity. The test results show that stock prices are a non-linear and non-stationary time series. With this, they indicate that it is extremely difficult to predict movements and changes in the price movements of US stock market. Dehouche (2019) analyses convergence and tests volatility and predictability of three assets – Bitcoin, Gold and S&P 500 using data of their prices from 2014 to 2021. The results show opposite effect observed for Gold and S&P 500 than for Bitcoin. In case of Bitcoin, price and log-returns are likely to change predictability, where Gold and S&P as traditional assets showed sensitivity to the time-scale.

There is room for improvement of these works in the extension of the time series in which the movement of the index is observed. The only research that covers the period of the recent Covid crisis, has a relatively short time series of seven years.

Relevant works that analysed the influence of various variables on the movement of stock market indices are also presented in chronological order. The influence of the variables of inflation, GDP, unemployment and money supply on the movement of stock prices in the US market is investigated in the work of the author Shiblee (2009) using a regression model. The research shows different effects, of which the movement of the money supply and GDP have a significant influence on the movement of stock prices on the American market, while inflation and unemployment have a smaller influence. Sukruoglu and Nalin (2013) use dynamic panels to analyse the impact of macroeconomic variables on the movement of stock markets in 19 European countries in the period from 1995 to 2011. Stationarity is also checked for each variable using unit root tests. A dependent variable with displacement is also used in the model. It is concluded that inflation has a negative impact on the movement of prices on stock markets, while the level of income, savings rate and liquidity have a positive effect on stock prices. Pradhan, Arvin and Taneja (2013) investigate the causal relationships between stock market development, economic growth and inflation in a sample of 16 Asian countries in the period from 1988 to 2012. In their work, they use the autoregressive VAR model. The Granger causality test confirms the existence of many cause-and-effect relationships between the above three variables. The results suggest that the development of stock markets can affect economic development and suggest that governments of economies should encourage the development of stock markets if they want to generate economic growth. Chen, Mantegna and Zuev (2018) observe the movement of the stock market indices S&P 500, FTSE100 and EuroStoxx 50 in the period from 1980 to 2015 based on long-term Granger causality and assesses how fluctuations in the exchange rate of the local currency affect the movement of the index. The results suggest that the potential for risk diversification by investing in US, UK and Eurozone stocks is limited in a period of economic, financial and political shocks. These works can be improved in a way to observe the impact of the main macroeconomic variables on both markets (American and European) in the same period, or if only one market is observed than is possible to widen the number of selected countries.

Data and methodology

Convergence analysis

Convergence is tested in the daily movements of the Euro Stoxx 50 and S&P 500 indices collected from Bloomberg. Data are logarithmized and differentiated. Following the Pesaran (2007) method, the difference between the logarithmic data of the two indices is calculated.

The stationarity of the Δy_t series (differences between the data of the Euro Stoxx 50 and S&P 500 indices) is tested. If the series is a stationary, then the growth rates and movements of the two indices converge.

An augmented Dickey-Fuller (ADF) unit root test without structural breaks is used, followed by the Lee and Strazicich (2003) test that controls for two structural breaks. Given that it is a period from 2000 to 2021, it includes the time of the great financial crisis from 2009 to 2012, and the global pandemic crisis of 2020 when financial markets reacted strongly. Therefore, it is important to observe structural breaks in that period.

The ADF test is one of the classic unit root tests. The regression equation consists of:

- the dependent variable - the first difference of the series y_t
- the main independent variable - the shifted value in levels, the β coefficient
- the p number of shifts of the variable y_t to solve the problem of autocorrelation in the residuals and
- the error of the relation e_t .

$$\Delta y_t = c + \beta y_{t-1} + \sum_{i=1}^p \delta_i \Delta y_{t-1} + e_t$$

Stationarity is determined by the β coefficient. The series is stationary only if the β coefficient is less than zero. If it is equal to or greater than zero, the series is not stationary. The null hypothesis claims that there is a unit root, that is, the series is non-stationary and only when this hypothesis is rejected, we can talk about stationarity.

The Lee and Strazicich unit root test is based on the Langrange multiplier procedure. It allows for two sharp structural breaks in the data set being tested. The equation consists of:

- the dependent variable Δy_t ,
- and independent variables - the deterministic vector ΔZ_t containing structural breaks, the detrended series y_t according to Langrange's principle S_{t-1} and the residuals ε_t .

$$\Delta y_t = \delta' \Delta Z_t + \phi \check{S}_{t-1} + \varepsilon_t$$

The coefficient ϕ is tested. If ϕ is less than zero, the unit root hypothesis is rejected, that is, the null hypothesis that assumes the existence of a unit root, and confirms stationarity in levels, after controlling for structural breaks.

Regression analysis – panel model

The first regression analysis is based on panel data made up of 12 European countries: Germany, France, Spain, Italy, Netherlands, Austria, Croatia, the Czech Republic, Slovakia, Slovenia, Poland and Hungary in the period from the first quarter of 2010 to the end of the first quarter of 2021. The dependent variable is the growth rate of the stock market indices of the observed countries: DAX Index, CAC Index, IBEX Index, FTSEMIB Index, AEX Index, and ATX Index, CRO Index, PX Index, SKSM Index, SBITOP Index, WIG Index and BUX Index whose values were collected from Bloomberg. The independent variables were obtained from the Eurostat database. These are the variables that explain the growth rates of stock market indices in this analysis:

- Data on real GDP from which the growth rate per quarter was calculated in such a way that the data were logarithmized and differentiated.
- Harmonized price index, i.e. annual inflation rates, quarterly averages and
- Seasonally adjusted data on employment from which the growth rate per quarter was calculated, also with the help of logarithmization and first difference.

The feature of panel model is the simultaneous analysis of the temporal and spatial components and greater precision compared to time series and ordinary regression. Panel analyses can be static or dynamic. A dynamic panel model includes the value of the dependent variable with one or more time lags. The second analysis is a dynamic panel and covers the period from the

second quarter of 2010 to the first quarter of 2021. Among the independent variables, the growth rate of the stock market indices from the previous quarter is added.

Unobservable heterogeneity is a common occurrence in large databases, where, for example, there are differences between observed countries that are not taken into account and can cause biased analysis results. In order to control for unobserved heterogeneity, fixed effects over time, and changes that occur over time in this analysis, we run each static and dynamic panel with three models.

The first model is Pooled ordinary least squares (POLS), a classic regression equation with time and space dimensions. The regression equation consists of the dependent variable y_{it} which is regressed on the independent variable x_{it} . Coefficients α and β are valid for all individuals and all time periods.

$$y_{it} = \alpha + \beta x_{it} + e_{it}$$

$$y_{it} = \alpha_i + \gamma_t + X_{i,t}\beta + W_i\delta + u_{i,t} \quad i = 1, \dots, N; t = 1, \dots, T$$

Unobservable heterogeneity in panel models is denoted by α_i , while the variable γ_t controls fixed time effects, these are events that change over time but affect all observed countries in the same way, for example a global recession that affects all countries. The variable $X_{i,t}$ is an independent variable that changes over time, for example GDP. The variable W_i is an independent variable that differs among the observed variables but does not change over time. The variable $u_{i,t}$ is the relation error.

Another model is LSDV (least squares dummy variables) or fixed effects model. This model adds time effects to classic regression analysis such as Pooled OLS, thus controlling variables that change over time. In our model, n-1 dummy variables are added, that is, for 12 EU member states, 11 dummy variables are added to control fixed effects.

$$y_{it} = (N - 1 \text{ dummy vars}) + X_{i,t}\beta + W_i\delta + u_{i,t}$$

The third model is the random effects method. This method is evaluated with the GLS (generalized least squares) estimator. The random effects method is used in panels that have a very large number of observations (N). Then the estimation of fixed effects would require the addition of many dummy variables. In a random effects model, time effects are combined with residuals. The constant c does not depend on the time component. Also, the variable $W_i\delta$ does not change over time. The composite variable $\eta_{i,t}$ consists of residuals and fixed effects, which are no longer dummy variables but are randomly assigned.

$$y_{it} = c + X_{i,t}\beta + W_i\delta + \eta_{i,t} \quad \eta_{i,t} = \alpha_i + e_{i,t}$$

To choose between the POLS method and the fixed effects method, the F test is used. The Breusch-Pagan test of the Lagrange Multiplier helps to choose between the POLS method and the random effects method. The null hypothesis assumes that the individual effects are equal to zero ($\sigma_u^2 = 0$). If this is true, then we prefer POLS. The Hausman test assumes in the null hypothesis that the random GLS estimator is unbiased. In this case, both estimators are unbiased because GLS is more efficient than fixed effects. In the case when we cannot reject the null hypothesis $cov(X_{i,t}, \alpha_i) = 0$, the random effects method is chosen. If we reject it, we choose fixed effects.

$$H_0: \text{more efficient random effects estimator is unbiased}$$

$$\text{cov}(X_{i,t}, \alpha_i) = 0$$

Results and acknowledgments

Convergence analysis

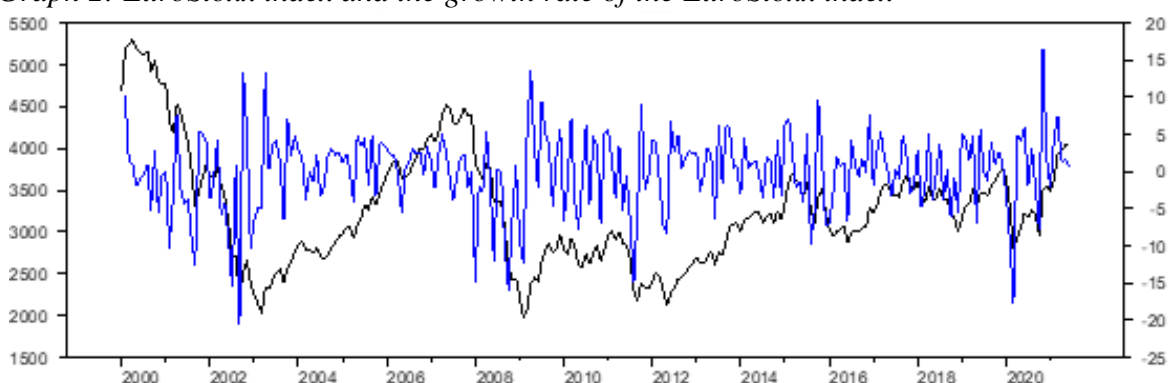
The graphic presentation of stock price index movements in Europe and the USA shows the trend of falling prices in the periods between 2000 and 2002, then from 2008 to the end of 2009, and at the beginning of 2020. During the other periods, movements of both indices recorded an increase. We can conclude that global crises affect both stock markets. However, the growth rates differ and suggests greater volatility of shares in the European market.

Graph 1: S&P index and the growth rate of the S&P index



Source: Bloomberg.

Graph 2: EuroStoxx index and the growth rate of the EuroStoxx index



Source: Bloomberg.

Before the convergence analysis, using the ADF unit root test, it is concluded that the movements of the stock indices S&P and Eurostoxx are not stationary series. Also, it is confirmed that even the logarithmic values of the index are not stationary series. However, growth rates calculated as logarithmic and differentiated values of both indices confirm that these movements are stationary series because the t-value is lower than all critical values at all levels of significance.

Table 1: Dickey-Fuller Unit Root Test for series S&P in Rats

Sig Level	Crit Value
1%	-3.45748
5%	-2.87297
10%	-2.57281
T-Statistic	-8.46154

Source: author's analysis.

Table 2: Dickey-Fuller Unit Root Test for series EuroStoxx in Rats

Sig Level	Crit Value
1%	-3.45748
5%	-2.87297
10%	-2.57281
T-Statistic	-8.77881

Source: author's analysis.

To determine whether European and American stock indices converge, the stationarity of the y_t series is confirmed with the help of the ADF unit root test. The series y_t is the difference between the logarithmic and differentiated prices of the observed stock indices. This concludes that European and American stock indices are converging.

Table 3: Lee Strazicich for series y_t in Rats

Variable	Coefficient	T-stat
S(i)	-1.1849	-19.0640
Constant	0.1172	15.1692
D(2003:04)	0.1627	5.4410
DT(2003:04)	-0.1787	-16.4857
D(2012:04)	-0.0284	-0.9544
DT(2012:04)	0.0460	9.7944

Source: author's analysis,

Table 4: Dickey-Fuller Unit Root Test for series y_t in Rats

Sig Level	Crit Value
1%	-3.9970
5%	-3.4286
10%	-3.1374
T-Statistic	-19.5564

Source: author's analysis.

The Lee and Strazicich unit root test rejects the null hypothesis and confirms stationarity after controlling for two structural breaks. This test also concludes the existence of convergence in the changes in the values of the S&P and Eurostoxx stock market indices. This analysis proves that there is a link in the reactions and movements of the growth rates of stock market indices over time, which implies that in conditions of global influences such as economic crises, the indices react in a similar way.

Panel model

To determine the influence of inflation, GDP and employment variables on stock market indices in 12 selected countries of the European Union we use a panel regression model, namely POLS. By adding dummy variables, we use the fixed effects method and the random effects method. To choose the most appropriate assessment method, the Breusch-Pagan test of the Lagrange Multiplier (1979) and the Hausman test (1978) are used.

Dynamic panel model determines the influence of the variables inflation, GDP, employment and the growth rate of stock market indices from the previous quarter on the growth rates of stock market indices in 12 selected countries in the observed period.

In the panel model with POLS we conclude that the variable Employment is not statistically significant due to the high p-value. On the other hand, the GDP and Inflation variables are significant at a significance level of 1%. The estimate for fixed effects of variation between individuals is a positive relationship (R squared = 0.0889). According to the results of the F test, we conclude that the fixed effects are significant in the model (Prob > F = 0.0011). The result of the significance of the independent variables is the same because the Employment variable is not significant due to the high p-value. On the other hand, the GDP and Inflation variables are significant at a significance level of 1%. Using the random effects method, we conclude the Employment variable is not significant.

With the Breusch and Pagan test, we choose between the Pooled OLS method and the random effects method. The test showed that the model with random effects should be used (Prob > chibar2 = 0.0004). With the Hausman test, we decide between fixed and random effects methods, and reject the null hypothesis, thus concluding that the model with fixed effects is more appropriate than the model with random effects (Prob > chi2 = 0.0423).

Using the Wooldridge test for autocorrelation, we reject the null hypothesis of no autocorrelation among variables (Prob > F = 0.0000), which suggests that the panel model should be estimated using a method that controls for the existence of autocorrelation.

Based on the fixed effects method carried out in Stata, it is concluded that the movements of stock indices in the selected countries are statistically significantly influenced by GDP growth rates and inflation rates, while the impact of employment was estimated in the model, but it is not statistically significant. Also, the analysis is statistically significant because the Significance F factor is less than 0.05.

The regression equation is as follows:

$$y = 0,1043 + 1,307 * BDP - 0,016 * Inflation - 0,639 * Employment$$

It is concluded that there is a positive relationship between the variables of the growth rate of stock market indices and the growth rate of GDP, a negative relationship between the variables of the growth rate of stock market indices and the growth rate of inflation, and a negative relationship between the growth rate of stock market indices and the growth rate of employment. The negative sign of the relationship between employment and the value of the stock market index is not in accordance with economic intuition, which is confirmed by the fact that the variable is not statistically significant in the model.

Table 5: Panel model – fixed effects method in Stata

BIndex	Coefficient	Std.err.	t	P>t	95% conf. interval	
GDP	1.307589	0.2143896	6.10	0.000	0.8864219	1.728756
Inflation	-0.0159528	0.0051325	-3.11	0.002	0.0260356	-0.00587
Employment	-0.6396465	0.4630864	-1.38	0.168	-1.549376	0.2700833
_cons	0.0373044	0.0104229	3.58	0.000	0.0168288	0.0577801

Source: author's analysis.

Dynamic panel model

In the dynamic panel model, by adding a new independent variable, we conclude by POLS analysis that the variables Inflation and Employment are not statistically significant due to the high p-value. On the other hand, the variables GDP and the value of the stock market index from the previous quarter are significant at a significance level of 1%. The estimate for fixed effects of variation between individuals shows a strong positive relationship (R square = 0.6072). A large increase in value is noticeable compared to the analysis without the value of the stock market index from the previous quarter, which points to a large influence of this value. According to the results of the significance of the fixed effects test, we can also use POLS since it is not significant (Prob > F = 0.8640). Inflation and Employment are not significant due to the high p-value. On the other hand, the variables GDP and the value of the stock market index from the previous quarter are very significant because the p-value is equal to zero. Using the random effects method, we arrive at the same results about the significance of the independent variables in the model.

Breusch and Pagan test for choosing between the POLS method and the random effects method resulted with POLS (Prob > chibar2 = 1.0000). The Hausman test to decide between fixed and random effects methods resulted with random effects method (Prob > chi2 = 0.3976).

Using the Wooldridge test for autocorrelation, we reject the null hypothesis of no autocorrelation between variables (Prob > F = 0.0000).

Based on the POLS method implemented in Stata, it is concluded that the movements of stock indices in selected countries are influenced by GDP growth rates, inflation rates, employment and movements of stock market indices from the previous period. The analysis is statistically significant because the Significance F factor is less than 0.05. The p-value is less than 0.05 for the variables GDP and the value of the index from the previous quarter. The variables Inflation and Employment are not statistically significant because the p-value is greater than 0.05. The regression equation is as follows:

$$y = 0,0606 + 0,512 * BDP + 0,0002 * Inflation + 0,158 * Employment + 0,699 * LagBIndex$$

It is concluded that there is a positive relationship between the growth rate of stock market indices and all independent variables. In the case of inflation this conclusion has no economic logic, but that is confirmed by the fact that the variable is not statistically significant.

Table 6: Dynamic panel model – POLS method in Stata

BIndex	Coefficient	Robust std. err.	t	P>t	95% conf. interval	
GDP	0.5120637	0.1439827	3.56	0.000	0.2292082	0.7949193
Inflation	0.0002274	0.0032503	0.07	0.944	0.0061578	0.0066126
Employment	0.1575018	0.322025	0.49	0.625	0.4751196	0.7901232
LagBIndex	0.6990998	0.0264311	26.45	0.000	0.6471757	0.751024
_cons	0.0048802	0.0060576	-0.81	0.421	0.0167803	0.0070199

Source: author's analysis.

Based on the fixed effects method, it is concluded that the movements of stock indices in the selected countries are influenced by GDP growth rates, inflation rates, employment and movements of stock market indices from the previous period. The analysis is statistically significant because the Significance F factor is less than 0.05. The p-value is less than 0.05 for the variables GDP and the value of the index from the previous quarter, and the variables Inflation and Employment are not statistically significant because the p-value is greater than 0.05. The regression equation is as follows:

$$y = 0,0672 + 0,546 * BDP - 0,000185 * Inflation + 0,09 * Employment + 0,687 * LagBIndex$$

It is concluded that there is a positive relationship between the growth rate of stock market indices and all independent variables except inflation, which is in accordance with economic logic.

Table 7: Dynamic panel model – fixed effects method in Stata

BIndex	Coefficient	Std.err.	t	P>t	95% conf. interval	
GDP	0.5465624	0.1380447	3.96	0.000	0.2753587	0.8177661
Inflation	-0.0000185	0.003303	-0.01	0.996	-0.0065075	0.0064705
Employment	0.0836616	0.2983471	0.28	0.779	-0.5024734	0.6697967
LagBIndex	0.687446	0.027225	25.25	0.000	0.6339595	0.7409325
_cons	-0.0042952	0.0067213	-0.64	0.523	-0.0174999	0.0089095

Source: author's analysis.

What should be emphasized in the dynamic panel model compared to the previous panel model is the great significance of the movement of the stock market index from the previous quarter in relation to the dependent variable, which was confirmed with a large increase in R square compared to the model without the index value from the previous quarter. This means that a large percentage of the movement in the quarterly growth rates of stock market indices can be explained by the growth rate of that stock market index from the previous quarter, which is in accordance with the business cycle in which positive economic developments follow positive ones, and negative follow negative ones.

Conclusion

In the first part, the convergence analysis was conducted to determine the link in reactions and movements of the stock market indices Euro Stoxx 50 and S&P 500. S&P is the most important stock market index in the USA, and Euro Stoxx in Europe. The observed period was from 2000

to 2021.

Before the convergence analysis, using the ADF unit root test, it is proved that the movements of the stock indices S&P and Euro Stoxx are not stationary series. Also, it is confirmed that even the logarithmic values of the indices are not stationary series. However, the growth rates calculated as logarithmic and differentiated values of both indices confirm that these movements are stationary series, which can easily be concluded from the graphs showed.

With the help of the unit root test ADF and Lee and Strazichich, the existence of convergence in the changes of the indices values is concluded, which proves the existence of a connection in the reactions and movements of stock market indices growth rates over time. This analysis proves that in conditions of global influences, such as global economic crises, stock market indices in America and Europe react mostly the same.

In the second part of this paper, two regression analyses are conducted on 12 European countries panel data. The dependent variable in the model is the growth rate of the stock market indices of the observed countries, and the independent variables are data on the growth rate of real GDP, inflation rate and employment rate. In the second panel analysis, the value of the stock market indices from the previous quarter are added, which makes the panel dynamic. For each analysis, three models were conducted – POLS, fixed effects model and random effects model. The Breusch-Pagan Lagrange Multiplier (1979) and Hausman (1978) tests were used to select the most appropriate estimation method.

In the case of the first panel model, it is concluded that the movements of stock indices in the selected countries are statistically significantly influenced by GDP growth rates and inflation rates, while the impact of employment was estimated in the model, but it is not statistically significant. The analysis shows that there is a positive relationship between the growth rate of stock market indices and the growth rate of GDP, and a negative relationship between the growth rate of stock market indices and the growth rate of inflation and employment. The negative relationship between employment and the value of the stock market index is not in accordance with economic intuition, which is confirmed by the statistical insignificance of this variable.

In the dynamic panel model, we conclude that the POLS method is the most appropriate. However, the fixed effects method gives a very similar result, and both are interpreted as suitable methods. It is concluded that the movements of the stock indices in the selected countries are statistically significantly influenced by GDP growth rates and the rates of movement of stock market indices from the previous quarter, while inflation rates and employment rates are estimated in the model but are not statistically significant. In the POLS model, there is a positive relationship between the growth rate of the stock market indices and all independent variables, which in the case of inflation has no economic logic, but this is confirmed by the fact that the variable is not statistically significant. In the fixed effects model, there is a positive relationship between the stock index growth rate and all independent variables except inflation, which is in line with economic logic.

Results of both panel analyses contribute to a better understanding of the impact of observed variables on stock market indices which are also used as a benchmark for equity portfolio management. The contribution of this analysis is also conclusion how business cycles spill over into the stock markets and follow a positive or negative trend that then lasts for several quarters in a row.

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DIGITAL SOURCING NETWORKS – IMPACT ON THE PROCUREMENT MARKET

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Abstract

The impact of suppliers on value creation of products and services increased steadily in the last decade. This is the consequence of flat manufacturing depth to avoid sticky overhead cost. Although, it results in vast and complex supply chains; it poses major challenges for strategic, tactical, and operational procurement. Simultaneously, a broad range of new technologies - Artificial Intelligence, Big Data cloud solutions, and Internet of Things, to name a few but significant ones – becomes available but is yet hardly used in day-to-day operations in the industry. Nevertheless, the advantage is clearly understood to manage more efficiently the steadily growing complexity, enable information symmetries among the market participants, and create resilient, cybercrime-safe digital processes. An empirical qualitative research approach has been chosen to explore within a well-defined sample of industries the current state of obstacles against the digitalization of supplier networks and to learn about recommendations how to overcome them. In order to achieve this aim, twelve experts from different fields of purchasing – strategic, tactical, and operational - at nine companies in the manufacturing sector were interviewed with semi-structured expert interviews using an interview-guideline in the genre of qualitative research. Their responses reflect their experiences, which were aggregated by using Mayring's content analysis to draw further conclusions out of it. The results unveiled, that essential prerequisites for a successful transformation to digital supplier networks are inadequately obtainable in most cases; many corporations do not have sufficient capable resources available to perform the transition. Additionally, it was discovered that the opportunities of digital supply networks in procurement are leveraged by a minority only; most of the practitioners still contemplate about the potential of digital supply network in their enterprise. The study delivers far-reaching recommendations for (1) the successful implementation of digital supplier networks, (2) the development of stronger cooperation among the business partners, and (3) the installation of capability and trust. The study concludes with further research recommendations beyond the scope of the subject matter.

Keywords: data hubs, digital network systems, procurement, sourcing

JEL classification: L52, O31, P41, R42

Introduction

Digital technologies such as Artificial Intelligence (AI), Big Data Analysis (BDA), and Internet of Things (IoT) have found their way into supply chain processes and are a prerequisite for the networking of the participants within a value chain. Sourcing networks not only consider the dyadic relationships between suppliers and buyers, but also connect several supply chains or their components through vertical, horizontal, or diagonal (or lateral) cooperation. Due to the large number of companies involved, networks are characterized by a high degree of

complexity, which makes it difficult to control processes. This is also due to the fact that the share of value added to the end product by suppliers continues to increase (Gurtu & Johny, 2021). To enable far-reaching efficiency improvements, the involvement of all actors, from TIER-X suppliers to end customers, is necessary. Such a network consists of five basic elements: (1) Suppliers that provide the company with different services, materials, and goods, (2) production sites, (3) distribution centres, (4) sales territories and (5) means of transportation (Klibi and Martel, 2012). Collaboration within the network is supported using appropriate IT networks or application systems (Durugbo, 2016). Business relationships, supported by information and communications technology (ICT), who act as inter-connected in multiple supply chains constitutes a digital supplier network.

Literature research

Weinelt (2016) presents a reference model for the digital transformation of procurement and supplier management. Furthermore, a multi-stage maturity model for the digitization of corporate processes and a series of recommendations for action are set out which enable the successful implementation of digitization strategies. Giri & Glock (2022) set out practice-oriented approaches within which the digital transformation of supplier management is presented. In this context, forecasts and theses are drawn up on how supplier management will change by the year 2030 and which technologies will become more relevant in the process. Bienhaus and Haddud (2018) examine hurdles and risks as well as the influence of digitalization on strategic purchasing. Furthermore, the impact of the successful use of digital technologies on the strategic importance of procurement within the corporate organization is highlighted. The authors point out that no interview study has yet been published with experts who have practical experience with digital transformation in companies. In an extensive systematic literature review, Frederico et al. (2019) present the fundamental characteristics of digital supply chains and show that both the strategic alignment and relevance as well as the hurdles in this area require further research. George et al. (2019) state that the influences of the developments within Industry 4.0 on the supply chain and its components need to be explored in more detail and that so far a gap exists between theory and practice in the implementation of digital supplier networks.

Research questions

In order to address the identified research gap, a case study is conducted by means of guided interviews in the genre of qualitative research. Twelve procurement experts from nine companies of different sizes and industries were interviewed to answer the following two research questions (RQ):

RQ1: How are obstacles to digital supplier networks evaluated by companies?

RQ2: What recommendations for action can be made for the implementation of digital supplier networks?

To answer the research questions, the next chapter presents the research design of the empirical study, followed by a chapter to discuss the obstacles to the introduction of digital supplier networks in the companies surveyed. Then, the next chapter is devoted to recommendations for the practical implementation of digital supplier networks, and the final chapter concludes the study with an assessment, limitations, and the need for further research.

Research design of the empirical study on digitalization in procurement and digital supplier networks

In order to achieve the research objective and answer the research questions posed, a case study was conducted, which is suitable for exploratory, descriptive, and explanatory research projects. According to Yin (2018), this approach is divided into the following four steps: (1) design and planning, (2) data collection, (3) data analysis, and (4) evaluation. In step 1, the research objective and research questions were defined, and interviewees were selected. Employees of strategic and operational purchasing of manufacturing companies were selected as interview partners to understand and explain the facts for the development of digital supplier networks from within the company (Moser & Korstjens, 2018). Information on the companies' industry and key figures as well as the interviewees' positions and experience are summarized in Table 1. The data collection in step 2 was conducted in the form of a semi-structured and guided interview study. The guide provides the interview partners with an overview of the topic in advance, and this serves to ensure the comparability of the data collected. The guideline does not contain any predefined answer options, so that ad hoc questions or questions for further clarification are possible during the interview. The interviews were conducted in German and English and lasted between 50 and 70 minutes. The structured and qualitative content analysis of the transcripts in the third step followed Mayring (2022) and was supported by the analysis software ATLAS.TI. This software allows coding of the interview transcripts to structure the data analysis. The category system was developed deductively based on theoretical preliminary considerations and the structure of the guideline and was oriented towards the research questions and the research topic (Mayring, 2022). The inductive categories were developed during the analysis process. The resulting deductive-inductive approach prevented the omission of relevant information and ensured openness by allowing for the development of codes during the analysis. The interviews served as the primary source for the conducted study; secondary sources were financial statements websites to be consulted for triangulation and verification of the results.

Table 1: Interview partners of the empirical study

Abbreviation	Industry	Size	Position interviewee	Job experience
AUT_T1	Automotive tier1	Large	Manager procurement	More than 15 years
CON	Construction	Small	Project Manager	10 to 15 years
ELEC-1	Electronics	Mid	VP Purchasing	5 to 10 years
ELEC-2	Electronics	Large	Supply Chain Management	5 to 10 years
SEMI-1	Semiconductor	Mid	Managing director	10 to 15 years
SEMI-2	Semiconductor	Large	SVP Purchasing	More than 15 years
SEMI-3	Semiconductor	Large	Business Unit manager	10 to 15 years
TECH-1	Technology	Small	Chief Operations Officer	More than 15 years
TECH-2	Technology	Large	Manager purchasing	5 to 10 years

Source: own research.

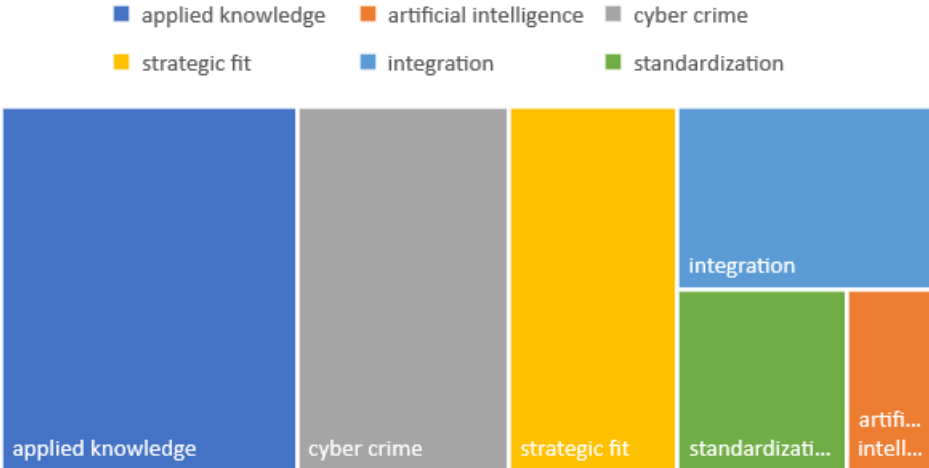
To ensure a high quality of the case study, the quality criteria according to Yin (2018) for conducting qualitative case study research were applied. These include objectivity, reliability, and internal, external, and construct validity. Objectivity and reliability are prerequisites for the reproducibility of a case study. The associated avoidance of errors and biases is ensured by a transparent and controllable procedure. To this end, a research protocol was prepared in advance, the conduct of the case study was documented in detail, and the data collected was archived. Construct validity is ensured when the correct procedures are used to answer the posed research questions. To this end, a summary of the interview guide was sent to the

interviewees in advance for preparation. In addition, anonymization of the persons and companies was assured so that the interviewees could also express themselves critically about facts without having to reckon with consequences. External validity describes the generalizability and transferability of the study results. For this purpose, interview partners were selected from different industries and different company sizes. In addition, the views of both customers and suppliers were considered. Internal validity is characterized by the logical representation of cause-effect relationships in research data (Yin, 2018). Patterns in the data needs constant comparison against a reference system in a systematic and transparent manner. This was guaranteed in the research project by structured data analysis applying a careful developed category system with ATLAS.ti. Further, internal validity was observed by looking out for inconsistency of the research data and if discovered it was counteracted immediately. The evaluation of the interview results with respect to the research questions posed is now in the following chapters.

Obstacles of digital supplier networks

The following section discusses both internal and cross-company obstacles to the successful implementation of digital supplier networks from the perspective of the experts surveyed. The most frequently cited critical aspects are listed in Figure 1.

Figure 1: Most frequently cited critical aspects



Source: own research.

The figure above indicated that applied knowledge is the number one concern, followed by cyber-crime and the strategic fit between the partners. Interestingly, artificial intelligence is rather seen as a low-ranking concern.

Internal company obstacles

One hurdle most frequently cited by companies is the lack of employees who can take a leading position with regard to the digitization of procurement. It proves problematic that these employees are usually expected to structure and manage the digital transformation in addition to their daily business (AUTO, ELEC-2). In many cases, this situation means that progress is slow because a dedicated resource cannot be made available for the digitization of procurement. A further obstacle represents a missing change management, in order to change the procurement

deeply in the direction of digitization. A lack of knowledge on the part of the responsible purchasing managers surveyed about possible areas of application for disruptive technologies is also seen as an obstacle. This suggests that the purchasing managers have not yet gathered any information on how disruptive technologies can positively influence their own department and cannot cite any examples of use, nor do they know any providers (ELEC-3). In some cases, department heads do not see a strategic application area, which is illustrated by the following quote: "From my perspective as strategic procurement, I'm not really interested in all of this at all, yes?" (SEMI-1) It can be seen in some companies that the attitude and behaviour of employees in strategic positions can also hinder the progress of digital supplier networks (SEMI-3, ELEC-3). "But at the present time, even from an economic point of view, there is no reason to do that at all" (ELEC-3). This view from the perspective of a strategic position is particularly problematic because a digitization project of a department should be linked in close cooperation with the strategic divisional management. The necessary support of top management is important in order to be able to implement projects and plans successfully. The management level must actively deal with the opportunities and risks of new application systems and their evaluation. As already highlighted in the literature, the complexity of digitization and the impact on the company's own as well as for affiliated companies are still mostly unclear (Pagani and Pardo, 2017). It becomes clear that those companies refrain from using technology that exclusively use economic aspects as a criterion. This is due to the fact that the application of conventional investment costing methods leads to a negative cost-benefit ratio, as positive effects only materialize in the medium to long term. As a result of the analysis of internal obstacles, it can be concluded that the digital transformation of procurement requires a high level of expertise and is a time-consuming and resource-intensive process. This digitization process must be supported by top management and change management.

Cross-company obstacles

For AUT_T1, CON, ELEC-1 and ELEC-2, the technologies used only include an exchange of business documents via EDI system connected through the existing ERP system. At ELEC 1 and ELEC-3, information is only made available via a supplier portal. One hurdle here is the low level of standardization for suppliers, who have to log on to different customer portals to view order or invoice status (ELEC-1, ELEC-2, SEMI-3). "Standardization - certainly, that would be helpful. I must say for us standardization is such a huge issue" (SEMI-2). The view from the supplier perspective shows that the decisions in the company with regard to digitization are predominantly customer-driven (ELEC-1). The interviewee describes that registration on supplier portals is mandatory in order to persist as an order qualifier in the marketplace. In the majority of the companies interviewed, it is apparent that there are no or only minor approaches to cooperation with associated companies. The focus is on presenting data transparently for their own company. Within a digital supplier network, however, necessary data must be available to both companies. In addition, the majority of companies have no intention of communicating end-customer requirements across companies in order to drive innovation within the network. A faster and more efficient product innovation cycle cannot be realized as a result. Another relevant factor is data security in terms of maintaining the integrity of the data, which must be assessed and ensured by the IT department in the company in any case. This is made more difficult by the fact that the conditions of the digital systems and thus also of further market participation are often defined by the customer: "Ultimately, it is like this: The customer makes it a condition for remaining in business that you participate [in the supplier portal]. They actually always agree to the digital terms of the platform operator. I.e., that the data, first of all, belongs to the company" (ELEC-1). With regard

to organization and processes, there is no integration of the supplier and no joint planning and control of processes. One hurdle is that the majority of interviewees do not see a need in building trust between suppliers and their own company, which in turn reinforces information asymmetries, opportunistic behaviour, and inefficiencies in the network (Um & Kim, 2018). From the analysis of cross-company barriers, it can be concluded that a lack of standards in the area of procurement leads to preventing the network-wide implementation of digital application systems. Furthermore, it can be seen that the introduction of digital systems is unilateral and that customers, who are often more powerful in the market, dictate the conditions for this. In order to drive forward the lack of further development of the digital supplier network and to offer companies assistance in driving forward supplier, information and knowledge integration, recommendations for action based on the evaluation of the expert interviews are explained in the following section.

Risk management and transparency

Another goal of ELEC-3 is to identify risks on the supplier side more quickly in the future. to be able to recognize risks on the supplier side more quickly. Certain tools are to analyse the default risks of a supplier of a supplier or an individual order and, if necessary, send out warnings. BDA is today in a position to perform such risk analyses within the supply chain and to provide a detailed subsequently provide a detailed basis for decision-making. For the companies AUT_T1, CON, ELEC-1, ELEC-2 and ELEC-3 the main focus is the reduction of manual activities in order to avoid human errors. Also, the availability of information and the associated transparency of business processes. be ensured. For example, information is to be transferred to the existing ERP system via EDI.

Recommendations for action to build digital supplier networks

The preceding analysis of the individual interviews makes it possible to gain insights into the structures of procurement and to specifically analyse hurdles that influence the development of digital supplier networks. Based on this, recommendations for action can be derived consequently to lower the hurdles for the enhancement of the supplier network. Against the backdrop that the majority of the companies surveyed already pursue rudimentary approaches to digital supplier integration. In particular, recommendations for action are to be formulated that can be applied to the transition to a digital supplier network. There is a fundamental need to formulate a clear corporate strategy with regard to digitization. This forms the foundation for any success. Based on this, goals and measures must be developed that allow progress to be scaled. From the responses of companies with successful implementations, it can be seen that lighthouse projects have a positive effect on the development of digital supplier networks. Based on this, within the first stage, the recommendation can be made to evaluate and gain experience with technologies such as blockchain or IoT in small projects and network-related use cases, together with the supplier. "The proof-of-concept with Blockchain for Airfreight we just did for a certain defined area. [...] We assume that blockchain technology has a huge potential, and therefore we simply want to participate without really expecting an outcome afterwards in the short term. But we wish to stay in contact and to build up a certain know-how, a feeling for the technology, what is it anyway and how can it serve our purpose?" (TECH-1) Furthermore, it is also critical to focus only on economic aspects in the early stages of evaluating new technologies.

Table 2: Digitalization strategy of the companies of the interviewees

Abbreviation	Coordination design	Digitalization strategy	Applied technology
AUT_T1	Central coordination at headquarters	Company-wide strategy available	SAAS
CON	No central coordination, affiliates-specific	None	Supplier-hub (passive)
ELEC-1	Central coordination	Company-wide strategy available	ERP/EDI Blockchain
ELEC-2	Company-wide coordination and location-specific alignment	Well-defined business strategy with SMART goals	ERP/EDI
SEMI-1	De-centralized process optimization (holding concept)	Company-wide strategy available plus local roadmaps	SCM app
SEMI-2	Central coordination by senior management	Strategy somewhat unclear with regards to technology	ERP in the cloud
SEMI-3	Central coordination of procurement activities only	Vague strategy without link to fulfilment	Supplier-hub (active)
TECH-1	Central coordination	Company-wide strategy available	ERP/EDI Blockchain
TECH-2	Cross-company coordination and internal task definition	General placeholders available (to be filled out locally)	SAAS

Source: own research.

Table 2 explains for the interviewees the coordination design, the digitalization strategy, and the applied technology. Positive effects can usually only emerge after several years and are not always directly measurable by economic factors. Quantification is therefore difficult, which is why more long-term evaluation methods and horizons must be used. The benefits of digital supplier networks generally do not materialize in the short term but must be evaluated over a longer period than that of conventional investment calculations. Further positive effects, which often cannot be directly evaluated in monetary terms, lie in greater flexibility and responsiveness. This is due to the fact that companies in a digital supplier network can react more quickly to risks, have access to alternative suppliers and necessary information, and thus significantly increase resilience. The results of the interview study imply that procurement receives a subordinate prioritization in the implementation of digitization projects. It seems advisable to view suppliers not only as a source of goods and merchandise, but rather the supplier should be viewed as a driver of innovation in a digitized and networked economic structure. To this end, management must recognize and promote the strategic relevance of alliances within the supply chain. This includes both the development of alliance capabilities and the targeted use of suitable IT systems. In order to achieve strategic use of disruptive technologies, it is necessary for top management to have a sufficient knowledge base regarding possible application systems. This in turn requires strategic management to comprehensively examine which technologies can be applied to its own processes in a way that is beneficial and to identify potential for optimization. In a corporate culture in which, however, employees and managers have hardly any capacities besides their daily business, such additional tasks will not be able to be implemented with the necessary necessity. The recommendations for action that have been drawn up are directed in particular at the executive and management levels, which have a fundamental responsibility with regard to the digitization of the company and, as a result, individual areas of the company. The further development of a digital supplier network is essentially a matter for the company to decide. Nevertheless, open issues relating to

standardization and data protection also play a role and must be addressed by research and legislation. be addressed by research and legislation.

Conclusions, limitations and need for further research

Digital supplier networks have great potential to counter increasingly complex structures in procurement and to design purchasing processes efficiently. However, the case study conducted shows that the gap between theory and practice in this area is glaring. While the benefits of digital technologies are widely known, the implementation of digital transformation in procurement is still at the beginning of the process at many companies. The reasons for this lie predominantly in a lack of resources and know-how. It follows that the introduction of cross-company solutions for digital supplier networks is not yet feasible for many companies in the short to medium term. Although strategic considerations and digitization goals are generally in place in the companies, their implementation has often not yet taken place. The interview study also reveals that digital solutions such as supplier portals generally only bring benefits on the customer side, while suppliers must accept increased effort in order to be able to supply corresponding customers. Further hurdles lie in a lack of standardization coupled with many individual solutions that contradict the network concept. The recommendations for action made contribute to the digital transformation as a basic prerequisite for the implementation of digital supplier networks and address in particular the management, which must set up and clearly communicate strategic goals and strategies for this. The present case study was conducted with the highest possible degree of objectivity and in accordance with the usual quality criteria. Nevertheless, the results have limitations. While interview studies make it possible to obtain detailed information from experts from different perspectives, the generalizability and transferability of the results is limited due to the number of interview partners. Nevertheless, qualitative saturation has been reached with the size of the sample as the given answers started to become redundant. Case studies such as this one contributes to establishing new theoretical constructs and providing detailed insights into problems and approaches (Yin, 2018). The findings of this study highlight further research needs in the area of digital supplier networks. Following on from this qualitative study, a quantitative empirical study on the implementation of and obstacles to digital supplier networks should be conducted. The interviews reveal a variety of causes for the low level of implementation of the digital transformation, which need to be investigated further and from which practical solutions and structured process models (especially for SMEs) should be developed. There is also a need for approaches to standardized implementation of cross-company digital technologies. With regards to the tendency toward unilateral introduction of technologies, there is a lack of studies on governance mechanisms that are applied when different partners in the supplier network cooperate and approaches to solutions for reducing unilateral advantage-taking.

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THE FISCAL CONSEQUENCES OF EMIGRATION: EVIDENCE FROM CROATIA

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Abstract

This article examines how the large shock in emigration following Croatia's accession to the European Union affected local public finances. To do so, a difference in differences research design has been used on a balanced panel dataset of municipality level observations over a ten-year period. The areas that experienced the largest emigration in the post 2014 period saw a large negative decrease in total tax revenue over the subsequent years, mainly driven by income tax revenue decrease. The results of this research warn that large emigration flows can lead to a cycle of economic degeneration as local areas lose fiscal revenue to spend on local services, in turn making them less likely to attract citizens.

Keywords: Croatia, migration, local public finance, difference in differences design

JEL classification: H71, F22

Introduction

According to the 2021 Census, the Republic of Croatia has a population of 3.87 million people. This means that during the past decade (as compared to the 2011 Census), the number of inhabitants decreased by close to 0.5 million or almost 10% of the population. The last decade in Croatian history overlaps with the accession to the European Union, which led to many demographic, economic, social, and judicial changes across the country. It allowed Croatian citizens to freely emigrate and gain access to labour markets in other European Union members which has led to a large emigration wave post 2014 (Ivandic, 2022) with the relative economic prosperity of the Western Member States having had a large pull effect on immigrants. The study of Croatia, as a predominantly labour net exporting country, invites a closer understanding of the regional divide in emigration and its economic consequences.

A number of studies have estimated the economic consequences of the accession to the European Union at the aggregate level (Becker, Egger and Von Ehrlich, 2012; Lejour, Mervar, and Verweij, 2008, Black et al, 2010). However, there is less understanding about the economic consequences of this large emigration shock how it affected different local areas across Croatia. Therefore, it is important to understand whether, despite its positive effects at the aggregate level in promoting a series of socio-economic reforms, it has had negative effects on regions who experienced the largest emigration flows.

The following article aims to fill this gap in the literature by asking whether the shock in migration flows following EU accession affected local public finances. To do so, a detailed and newly matched dataset at the municipality level over the period of almost two decades is used. First, this research describes the heterogeneous effects of the accession to the European Union on migration flows across municipalities following results from Ivandic (2022). Next, this

heterogeneity is used to examine how this exogenous shock in migration flows affected local public finances. The analysis uses an econometric research design known as the Difference-in-Differences that studies the causal differential effect of a treatment by comparing the average change over time in the outcome variable for the treatment area, compared to the average change over time for the control area. This method allows causal identification when using observational data by assuming that in the absence of treatment, the unobserved differences between treatment and control groups are the same over time.

The starting point of the analysis builds on the results from Ivandic (2022) showing that regions of Slavonia and regions bordering Bosnia and Herzegovina experienced a sharp increase in international emigration to EU Member States, having been granted access to the EU labour markets. Next, the research examines what were the fiscal effects in these 'hard-hit' areas. In areas that experienced high levels of emigration on average the total tax revenue dropped by around 40 percent yearly in the period after the EU accession. The fact that there are no differences in local finances in areas that experience high migration and areas that don't in the years preceding EU accession, confirms the internal validity of the research design. Specifically, this drop is driven primarily by a decrease in total income tax revenue. These results offer evidence that regional inequalities could lead to different migration patterns that in turn lead to a large loss in productivity at the local level and further exacerbate the inequality across regions.

The rest of the paper is structured as follows. The second section reviews the literature on this topic. The following section provides a detailed discussion of emigration patterns following the accession to the European union. The fourth section discuss the data and the research design used to estimate the causal findings, while the fifth section discusses the findings of the paper. Finally, the last section concludes by summarising the main findings and opening the discussion on further work in this area.

Literature review

This research contributes to several strands of literature. First, it provides an insight into the positive and negative economic effect of accession to the European Union. The vast majority of articles about EU integration point out that the major success of the EU accession are the political and economic aspects, with an emphasis on macroeconomic stability and political security (Baldwin, Francois and Portes (1997), Breuss (2001)). Breuss (2001) concludes that the shortcoming of all these calculations is either that they did not include all possible integration effects which one can expect in case of EU enlargement as a specific kind of regional integration of a rich EU region with a poor Central and Eastern European Countries (CEEC) region, and on the other hand, they mostly analysed the consequences only for the blocks of CEECs, but not for all countries involved in this enlargement process.

Lejour, Mervar and Verweij (2008) calculated the potential economic effects of Croatia's Accession to the European Union and estimated Croatia will gain additional annual welfare benefits in the total of 1.1 billion euros and that GDP will increase by 1.1%, but that these effects are dependent on whether the quality of institutions improves in the meantime. The academic debate about the motivation for the EU integration is still ongoing and suggests that there are other considerations besides a material cost-benefit calculation (Sedelmeier, 2014). Although most studies focus on the effect on economic growth, some research shows insights into how particular reforms led to occasionally negative effects. Tomić (2020) finds that the

liberalisation, pushed by EU accession, of employment protection for temporary and permanent contracts led to a rise in temporary employment. This article further develops these arguments empirically. These results give a detailed understanding that while many regions experienced economic growth due to EU accession, other local areas are losing a significant amount of their working age population which is further exacerbating their local finances.

Second, this research relates to the academic literature in economic effects of migration flows. Most of this research examines the effects of immigration on wages and employment rates for non-immigrant workers (Dustmann, Hatton and Preston, 2005). This literature is far more abundant in looking at the effects of immigration on economic outcomes (Aksu et al. (2018); Manacorda et al (2012)), and scarce on the effects of emigration on economic outcomes in the origin country. Škuflić and Vučković (2018) use cross-country comparisons to find that emigration could also have an adverse effect on emigrant countries' labour markets by increasing the unemployment rate. Barrell, Ray and Riley (2007) highlight the impacts in the receiving and sending countries and pointed out that the workers emigrating from the poorest New Member States (NMSs) from the 2004 enlargement predominantly went to Ireland and the UK partly due to their liberal immigration policies adopted and restrictive policies adopted elsewhere in the EU. Franc, Časni and Barišić (2019) using a cross-country comparison show that the increase in the overall unemployment rate in the emigration country will increase the emigration rate. This article overcomes the issues of other confounders leading to an omitted variable bias by focusing on within country variation rather than across countries comparisons and by using a difference-in-differences research design. Moreover, it allows overcoming the measurement error by focusing on within country variation across municipalities. While Draženović, Kunovac and Pripuzić (2018) discuss that existing annual statistics underestimate the extent of emigration by 2.5 times which is in line with the newly released 2021 Census, note that as long as that measurement error is constant across municipalities (which it plausibly should be), the results in this research would not be affected.

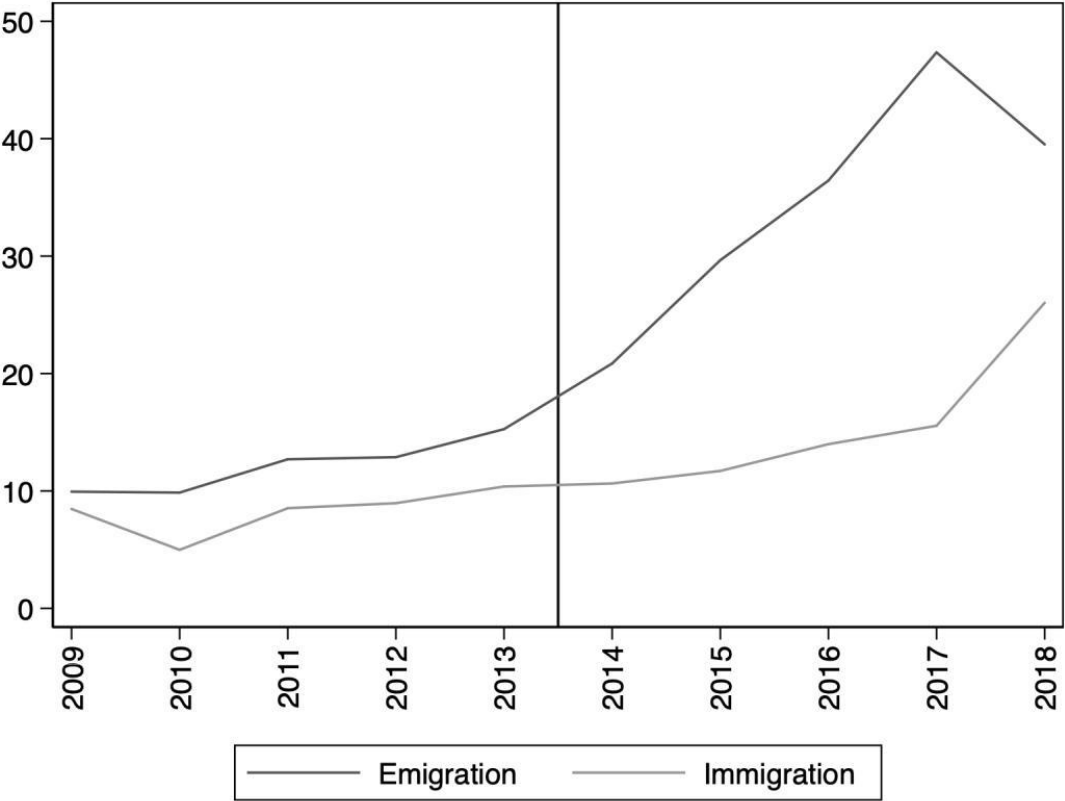
Emigration patterns following EU accession

The access to the European Union labour markets occurred in a staggered timeline. Even though the Republic of Croatia became a member of the European Union in July 2013, the Freedom of movement and labour rights for Croatian citizens workers in the European Union were granted over the following seven-year period. In July 2013 half of the 27 member states allowed Croatian citizens to work without restrictions in the labour market. In July 2015, two years after the accession, another seven countries, including Germany, allowed Croatian citizens to work without restrictions in the labour market. Malta, Netherlands, Slovenia and the United Kingdom extended their labour market in July 2018, and finally Austria did so in July 2020.

In Figure 1, one can observe that the liberalisation of labour markets to Croatian citizens in the period post 2013 had an immediate effect on international migration flow as discussed in Ivandić (2022). The black line on the Figure 1 marks July 2013 when Croatia entered the European Union. While immigration of foreign nationals to Croatia remains stable in the period 2011 to 2017 (with a first significant increase in 2018), yearly international emigration remains stable around 12 thousand in the period between 2011 and 2013 and soars up almost immediately from 2013. In the period 2016-2017, the international emigration quadrupled from its pre-2013 numbers to around 45 thousand people emigrating each year.

However, there is substantial variation in the level of emigration across the 576 Croatian cities and municipalities. To test whether there are inequalities in the extent of emigration, a measure of Exposure to emigration is calculated for each of the municipalities. Exposure to emigration is calculated as the total of international emigration in the period from 2011 to 2018 as a share of the average yearly population during that period.

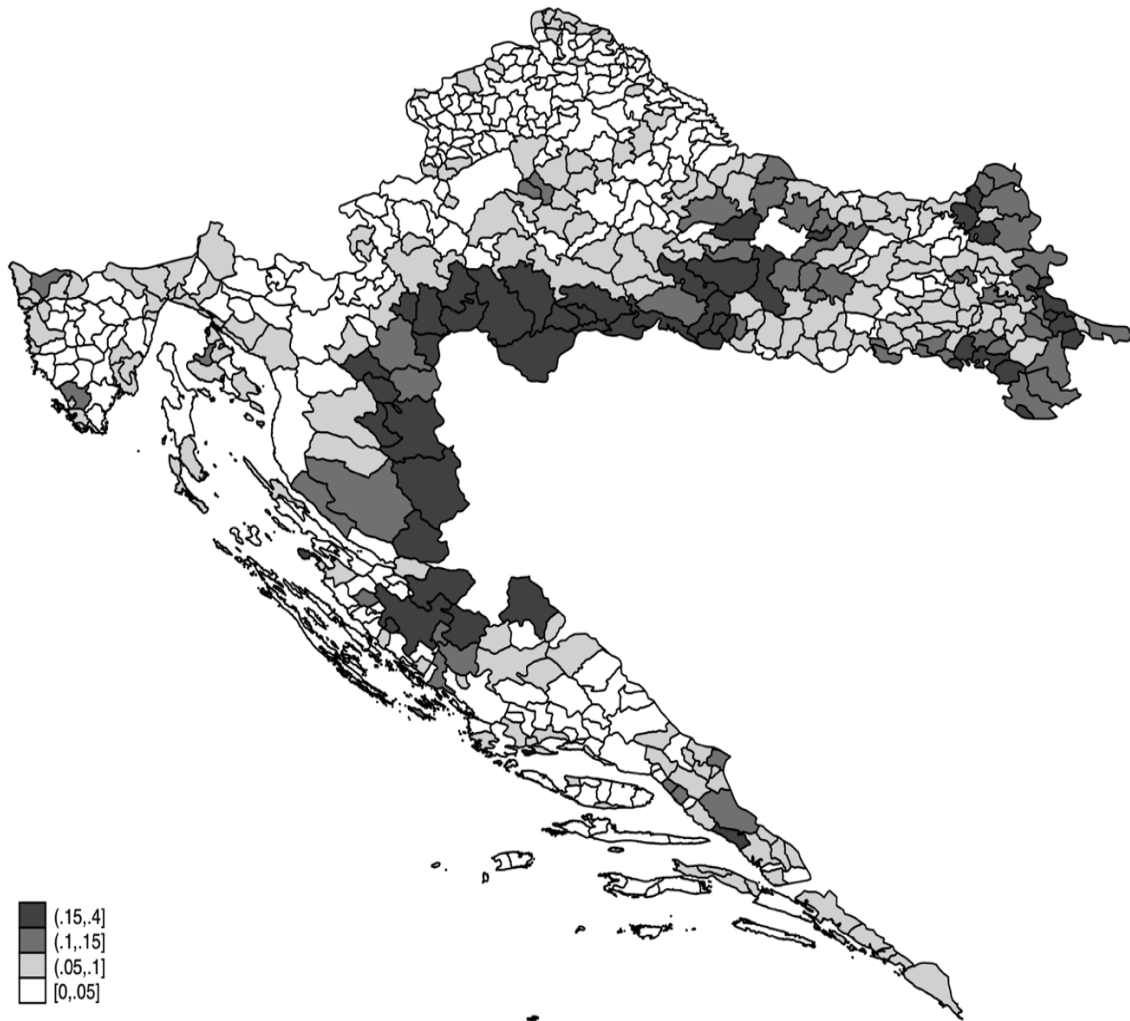
Figure 1: International emigration and immigration flows (in thousands), 2011-2018



Note: The black line marks July 2013 when Croatia entered the European Union.
 Source: Ivandic (2022).

This is visualised in Figure 2. A substantive part of Croatia coloured in white on the Figure experienced almost no emigration during this period. However, there are pockets of geographical areas with very high levels of emigration. Almost all of the region Slavonia and the inland municipalities of Dalmatia coloured in grey experienced a loss of 5 to 15% of their existing population as a result of international immigration to the European Union. Even more, municipalities in black, around the inland North West border to Bosnia and Herzegovina experienced a loss of 15 to 40% of their population due to international emigration. This numbers are very large in magnitude especially when most of the emigrants are known to be working-age population, hence the loss in productivity and labour in these areas is huge.

Figure 2: Total emigration as share of population across municipalities



Source: Ivandic (2022).

One thing becomes clear, emigration is not the comprehensive story of the whole of Croatia, it is a phenomenon present in concentrated areas across the country. As the goal is to capture local geographical areas that were strongly affected by the post-EU emigration, it is appropriate to use the right tail of the distribution of exposure in the next analysis. A municipality is defined as being Treated with post-EU emigration if 10% or more percent of its population emigrated abroad in the period 2014-2018. This operationalisation is used in the analysis of the economic consequences of high post-EU emigration.

Data and methodology

Data

This research constructs a novel and unexplored dataset matched from several sources of data at the municipality level. In Croatia, the local government sector consists of counties as units of regional governance and municipalities and cities as units of local governance. Local governance consists of 428 municipalities and 127 cities. The first set of data comprises of series of yearly administrative records on internal and international migration, balanced at the municipality level in the Republic of Croatia. The main source of data is the Population and

Migration Data at the municipal level collected by The Ministry of Interior of Croatia at the annual level from 2002 to 2018. The international migration statistics collects and processes data on international migration flows, i.e. the data on number and characteristics of persons who changed their country of residence in a given calendar year (this is captured in the variables *Emigration* and *Immigration* as the total number of people who emigrated/immigrated in the given year from/to the municipality). Data on migration encompass Croatian citizens and foreigners who have been granted temporary or permanent stay in the Republic of Croatia, however when the emigration numbers are broken down, a majority (around 95%) are Croatian citizens emigrating abroad. This data is complemented with total populations statistics from the Population and Migration Data from Croatian Bureau of Statistics at the annual level from 2002 to 2018 at the municipal level (variable *Average Population*). Table 1 shows the summary statistics of the main variables. It also contains averages of the variables *Emigration, Relative* and *Immigration, Relative* which is the total Emigration/Immigration in the given year and municipality divided by the recorded level of population living in that municipality in the year. The variable *Treated* is defined at the municipality level if 10% or more percent of its population emigrated abroad in the period 2014-2018

This data sources are complemented with the Local Finance Data from the Ministry of Finance at the annual level from 2002 to 2018 for every municipality and town (Šinković, 2019; Ott & Bajo, 2001). In Figure A.1. the total collected tax revenue per capita is plotted for each municipality for the year 2018 to demonstrate the wealth of the data. The variable *Tax Revenue* is the total collected tax revenue across municipalities, while the variable *Income Tax Revenue* denotes the total collected tax revenue from income tax across municipalities. The functions, scope and organization of local units in Croatia are prescribed by the Law on Local and Regional Self-Government. Municipalities are established along the area of several populated places that represent a natural, economic, and social whole, and are connected by the common interests of the population. Municipalities and cities perform activities of local importance that directly meet the needs of citizens: landscaping and housing, spatial and urban planning, utilities, childcare, social welfare, primary health care, education and primary education, culture, physical education and sports, consumer protection, protection and improvement of the natural environment, fire and civil protection, traffic in its area and other activities in accordance with special laws.

Table 1: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Treated	0.173	0.378	0	1	9435
Treated x After	0.051	0.22	0	1	9435
Average Population	7,662	35,649	241	788,554	9,435
Emigration, Relative	0.005	0.008	0	0.2	9,328
Immigration, Relative	0.003	0.005	0	0.107	9,328
Emigration	29	146	0	6,814	9,328
Immigration	22	112	0	6,398	9,328
Log(Tax Revenue)	15.002	1.367	10.175	22.436	9,315
Log(Income Tax Revenue)	14.764	1.378	9.523	22.371	9,314
Tax Revenue	17,890,184	193,833,111	0	5,542,587,995	9,358
Income Tax Revenue	15,048,497	171001768	0	5,192,919,535	9,358

Source: authors' calculation.

Methodology

The aim of the analysis is to isolate the effect of migration following the accession to the European Union on local public finances. However, there are many observable and unobservable factors that might lead different municipalities to be differently affected by reforms during the accession process and have different levels of economic development. At the same time the distance to the border might affect levels of economic development but as well can differently affect migration preferences, and economic development certainly changes the state of local finances. In sum, isolating the causal effect requires a research design that can control for observable and unobservable confounders. For this reason, this research uses a difference in differences research design.

The main results of this research are obtained using a difference in differences research design (for a methodological overview, see Angrist and Pischke (2008), Lozano and Steinberger (2012)). Difference in differences (DiD) research design looks at the differential effect of a treatment by comparing the average change over time in the outcome variable for the treatment group, compared to the average change over time for the control group. Croatia's EU accession is a natural experiment which led to a huge, geographically heterogenous spike in emigration, and this shock allows to identify the effect of emigration on an outcome of interest, namely on local public finances. The accession to the European Union is treated as an event assuming that in absence of this event the time series data would have continued the same trend as until the event occurred.

The difference-in-differences (DiD) equation:

$$Y_{i,t} = \beta_1 [Treated_i \times Post_t] + \delta_t + \alpha_i + u_{i,t} \quad (1)$$

where $y_{i,t}$ is the dependent variable of the analysis, namely local public finance outcomes for in a municipality i at time t ; α_i is a dummy for every municipality i ; *Treated (with EU emigration)* is defined at the municipality level if 10% or more percent of its population emigrated abroad in the period 2014-2018; *Post_t* is a dummy variable indicating that the year t is equal or larger than 2014 denoting the period of EU membership; and δ_t is a dummy for every year t . Standard errors have been clustered at the municipality level throughout all specifications.

The temporal effects and parallel trends are estimated by including the yearly leads and lags into the previous Equation 1:

$$Y_{i,t} = \sum_{t=-3}^3 \beta_{i,t} [Treated_i \times Post_t] + \delta_t + \alpha_i + u_{i,t} \quad (2)$$

There are two points worth noting, First, this research design exploits regional variation in the impact of the emigration following accession. It does so by comparing the trends in areas that experiences high levels of emigration (if 10% or more percent of its population emigration abroad in the period 2014-2018) to areas that experience smaller level of emigration. In the robustness analysis reported in Table A.2. this definition of *Treated* has been altered to different definition of the treatment and control group, where the top 25% of municipalities by emigration levels are coded as the treatment group while the bottom 25% of municipalities by emigration levels have become the control group. Moreover, in a further robustness check in Table A.1., the binary definition of *Treated* is replaced by the continuous measure of the treatment as defined by the share of total emigration in the population.

Second, the dependent variables of interest are local public finance outcomes for municipality i in year t from the Ministry of Finance. In Figure A.1. the absolute levels of the total local tax revenue per capita are visualised across the country. As the variation in the levels of local finances (revenue and spending) vary substantially across municipalities and the distributions of local finances have a very right skewed distribution, the dependent variable is transformed to the log. This allows the distribution of the log variable to be more symmetric, reduce the influence of outliers and the residuals of the regression will also follow a normal distribution. In Figure A.2., the log-transformed distribution of the two main variables (total tax revenue and total income tax revenue) is visualised. More intuitively, the log transformations of the dependent variable allow to evaluate the percentage change in the outcome variable which is especially important as levels of the variables vary substantially across municipalities.

The key identifying assumption here is known as parallel trends, i.e. the assumption that fiscal revenue trends would be the same in both areas in the absence of treatment (Angrist and Pischke (2008)). Treatment induces a deviation from this common trend. The difference-in-differences research design allows the treatment and control areas to differ in characteristics that effect the treatment, as this difference is captured in the municipality fixed effect α_i . Moreover, general changes in time or policy that followed the accession but affected all the areas equally are captured in the δ_t that control for unobserved but area-invariant reforms and changes across time. The parallel trends assumption can be investigated by using data on multiple periods before the event (European Union accession).

In sum, this method allows causal identification when using observational data by assuming that in the absence of treatment, the unobserved differences between treatment and control groups are the same over time. The approach removes biases in post-intervention period comparisons between the treatment and control area that could be the result from permanent differences between those areas, as well as biases from comparisons over time in the treatment area that could be the result of trends due to other causes of the outcome. More intuitively, it controls for many potential threats to causal estimation. For example, if we consider that potentially different areas received different EU regional or project funding that eventually caused different emigration patterns and affected local finances, this would be controlled for in this design as we observe no differential pre-trends across the treatment and control areas in the years preceding 2014 when pre-accession funding was occurring. On the other hand, if we assume that areas bordering the Member states would have both had differential emigration patterns, but also benefited differently in tax collected (e.g. through tourism), this would be captured by the fixed effect for each municipality.

Results: Emigration effects on local public finance

The main outcome of interest is the total collected tax revenue at the municipality level. The results of the difference in differences estimation on total tax revenue (log transformed) are reported in Table 2. A municipality is defined as being *Treated with EU emigration* if 10% or more percent of its population emigration abroad in the period 2014-2018. In total this is 96 municipalities, or 17% of the total number of municipalities. Column 1 reports the standard difference in differences coefficient from Equation 2, while column 2 reports the full leads and lags from Equation 3. In Column 3, the period of analysis is extended back to 2002 capturing almost two decades of data. This allows controlling for a longer time-period in the possible pre-trends.

For easier interpretation, the results in column 2 (the preferred specification) are visualised in Figure 4. In areas that experienced high levels of emigration on average the total tax revenue drops by 30-40 percent yearly in the period after the EU accession. It is worth stressing that there are no differences in local finances in areas that experience high migration and areas that don't in the years preceding EU accession as shown by the result that the coefficients on the pre-trends are not jointly significant. Moreover, the inclusion of the municipality dummies controls for any time-invariant differences across the treatment and control areas such as the structure of their local economies.

Table 2: Main results: fiscal outcomes

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	L(Tax)	L(Tax)	L(Tax)	L(Inc.Tax)	L(Inc.Tax)	L(Inc.Tax)
Event, t-2		-0.015	-0.048**		-0.018*	-0.070***
		(0.012)	(0.020)		(0.010)	(0.021)
Event, t-1		-0.034**	-0.068***		-0.035***	-0.087***
		(0.014)	(0.022)		(0.013)	(0.024)
Event		-0.070***	-0.104***		-0.078***	-0.130***
		(0.017)	(0.023)		(0.016)	(0.027)
Event, t+1		-0.330***	-0.363***		-0.392***	-0.443***
		(0.039)	(0.044)		(0.045)	(0.052)
Event, t+2		-0.284***	-0.317***		-0.327***	-0.378***
		(0.035)	(0.040)		(0.038)	(0.047)
Event, t+3		-0.364***	-0.397***		-0.443***	-0.494***
		(0.044)	(0.050)		(0.053)	(0.059)
Event, t+4		0.230***	0.197***		0.249***	0.198***
		(0.059)	(0.065)		(0.065)	(0.070)
Treated x After	-0.147***			-0.180***		
	(0.024)			(0.028)		
Observations	4,400	4,400	9,315	4,400	4,400	9,314
R-squared	0.965	0.967	0.964	0.957	0.960	0.958
Municipality Fixed Effect	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Period	2010-2018	2010-2018	2002-2018	2010-2018	2010-2018	2002-2018

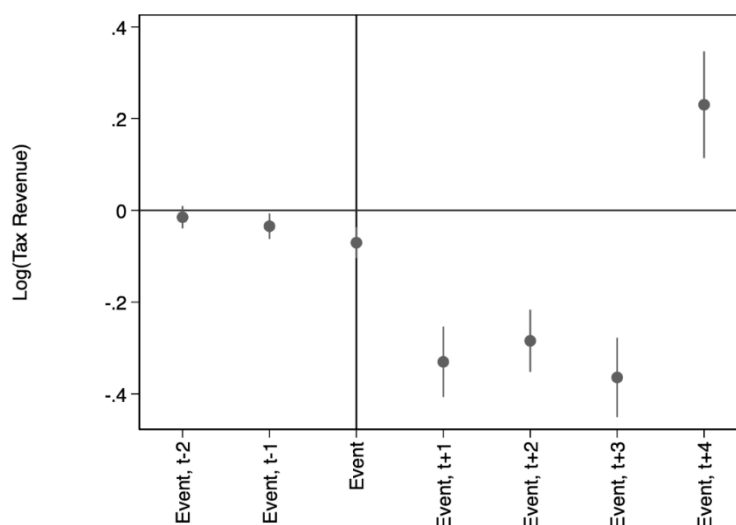
Clustered standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Source: author's calculation. Source of data is the Croatian Bureau of Statistics (CBS) and Ministry of Finance (MoF).

The negative and sizeable effect in collected tax revenues following EU accession comes from the effect of emigration. There is also considerable variation in the magnitude of the estimates by each year. We observe that in the first year the total tax revenue decreased by on average 7 percent, up to 28-33 percent decrease in the following three years. We also observe that in the fifth year the effect becomes positive, although this is somewhat unexpected, it also does mirror the overall emigration trends as shown in Figure 1 where in the last year, emigration starts to decrease. There could be additional factors administered at the local level that are further changing this trend in the long run, or a mechanical regression to the mean effect could be present. Next, I explore specifically what is driving most of this effect when the total tax revenue is disaggregated across categories.

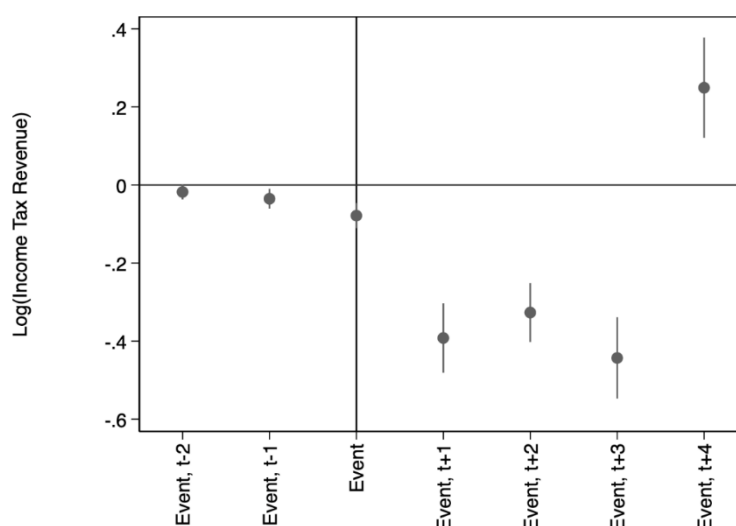
Figure 4: Difference in differences: effect of emigration on tax revenue



Source: author's calculation. Source of data is the Croatian Bureau of Statistics (CBS) and Ministry of Finance (MoF). The black line marks the year 2014, the first full year of Croatian EU membership.

In Figure 5, the results of the difference in differences estimation on the total income tax revenue (log transformed) are shown. When total taxes are disaggregated across its main categories, one can observe that the main effect is driven by a drop in income tax revenue. On average the total income tax revenue drops by around 40 percent yearly in the period after the EU accession. Similarly, the insignificance of pre-trends shows there are no differences in local finances before EU accession in areas that will experience high migration and areas that won't.

Figure 5: Difference in Differences: Effect of Emigration on Tax Revenue



Source: author's calculation. Source of data is the Croatian Bureau of Statistics (CBS) and Ministry of Finance (MoF). The black line marks the year 2014, the first full year of Croatian EU membership.

In the robustness analysis reported in Table A.2. the definition of *Treated* has been altered to different definition of the treatment and control group, where the top 25% of municipalities by

emigration levels are coded as the treatment group while the bottom 25% of municipalities by emigration levels have become the control group. Moreover, in a further robustness check in Table A.1., the binary definition of Treated is replaced by the continuous measure of the treatment as defined by the share of total emigration in the population. Finally, in Table A.3. county by year fixed effects are included to account for differential economic outcomes through time across regions. In these additional analyses, the results remain unchanged in magnitude and direction.

Conclusion

Understanding local differences at the municipality level is very important in understanding the consequences of emigration across Croatia. A newly merged dataset combining various data sources to explore the effects of heterogeneity of emigration flows on local public finances is used in this study. The research shows that the areas that experienced the largest emigration in the post 2014 period saw a large negative decrease in total tax revenue over the subsequent years, mainly driven by income tax revenue decrease. As a significant proportion of the working age population emigrated, on average the total income tax revenue decreased by around 40 percent yearly in the period after the EU accession. The results of this research warn that large emigration flows can lead to a cycle of economic degeneration as local areas lose fiscal revenue to spend on local services, in turn making them less likely to attract citizens.

Further research can tackle other dimensions of this phenomenon – understanding how emigration varies geographically allows a deeper understanding in what are the 'push' and 'pull' factors in these areas. Are there factors beyond economic opportunity that can explain this variation? For example, do childcare provision and child allowances act as a 'pull' factor in retaining working age populations? Can other instruments such as childcare, social welfare, and education provision that are under the local jurisdiction counteract the negative economic opportunities? Although these questions remain open for further analysis, this newly merged dataset could allow preliminary analysis of these hypotheses.

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Appendix

Table A.1: Robustness: Continuous treatment

	(1)	(2)	(3)	(4)
VARIABLES	L(Tax)	L(Tax)	L(Inc. Tax)	L(Inc. Tax)
Event, t-2		-0.040		-0.239
		(0.198)		(0.230)
Event, t-1		-0.148		-0.321
		(0.213)		(0.224)
Event		-0.285		-0.489**
		(0.215)		(0.226)
Event, t+1		-1.868***		-2.539***
		(0.306)		(0.289)
Event, t+2		-1.394***		-1.879***
		(0.421)		(0.447)
Event, t+3		-1.961***		-2.731***
		(0.435)		(0.506)
Event, t+4		1.655***		1.573***
		(0.463)		(0.493)
Emigration x After	-0.762***		-1.026***	
	(0.152)		(0.163)	
Observations	4,400	9,315	4,400	9,314
R-squared	0.965	0.964	0.957	0.959
Municipality Fixed Effect	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES
Period	2010-2018	2002-2018	2010-2018	2002-2018

Clustered standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The black line marks the year 2014, the first full year Croatia was an EU Member State.

Source: author's calculation. Source of data is the Croatian Bureau of Statistics (CBS).

Table A.2: Robustness: New definition of treatment and control municipalities

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	L(Tax)	L(Tax)	L(Tax)	L(Inc.Tax)	L(Inc.Tax)	L(Inc.Tax)
Event, t-2		-0.024	-0.038*		-0.024*	-0.068***
		(0.016)	(0.022)		(0.014)	(0.023)
Event, t-1		-0.045***	-0.059**		-0.039**	-0.083***
		(0.017)	(0.023)		(0.017)	(0.025)
Event		-0.073***	-0.088***		-0.062***	-0.106***
		(0.019)	(0.026)		(0.019)	(0.028)
Event, t+1		-0.326***	-0.341***		-0.386***	-0.430***
		(0.044)	(0.048)		(0.049)	(0.055)
Event, t+2		-0.265***	-0.279***		-0.307***	-0.351***
		(0.039)	(0.045)		(0.043)	(0.051)
Event, t+3		-0.335***	-0.349***		-0.416***	-0.460***
		(0.048)	(0.052)		(0.055)	(0.060)
Event, t+4		0.247***	0.233***		0.266***	0.222***
		(0.063)	(0.069)		(0.069)	(0.075)
Treated x After	-0.130***			-0.159***		
	(0.022)			(0.026)		
Observations	4,400	2,196	4,659	4,400	2,196	4,658
R-squared	0.965	0.961	0.955	0.957	0.952	0.948
Municipality Fixed Effect	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Period	2010-2018	2010-2018	2002-2018	2010-2018	2010-2018	2002-2018

Clustered standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source: author's calculation. Source of data is the Croatian Bureau of Statistics (CBS).

Table A.3: Robustness: Including county by year fixed effects

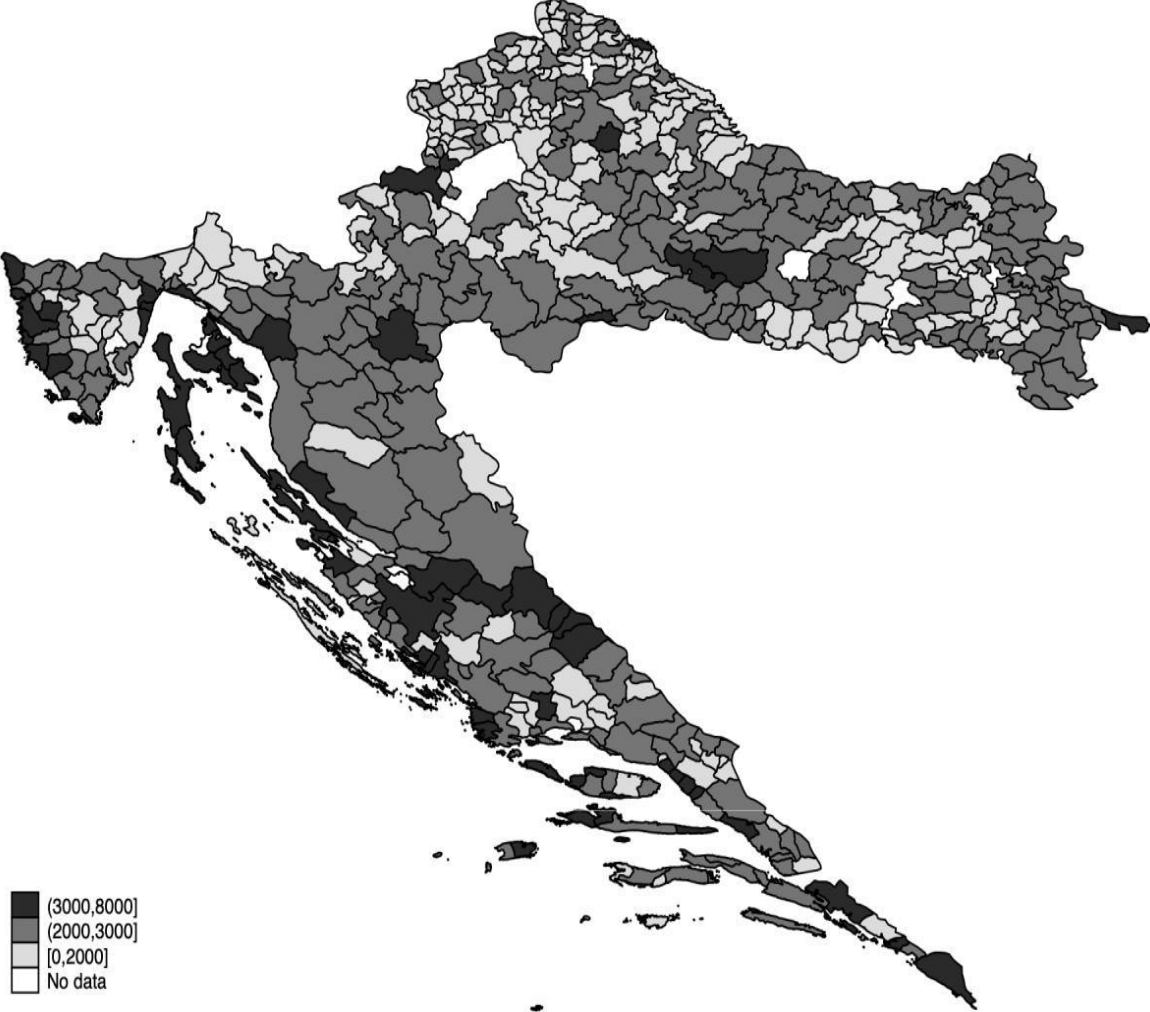
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	L(Tax)	L(Tax)	L(Tax)	L(Inc.Tax)	L(Inc.Tax)	L(Inc.Tax)
Event, t-2		0.006	-0.037		0.004	-0.036
		(0.017)	(0.024)		(0.014)	(0.026)
Event, t-1		-0.013	-0.056**		-0.018	-0.058**
		(0.017)	(0.026)		(0.015)	(0.029)
Event		-0.031	-0.074***		-0.034*	-0.074**
		(0.019)	(0.029)		(0.018)	(0.033)
Event, t+1		-0.185***	-0.229***		-0.241***	-0.281***
		(0.046)	(0.051)		(0.052)	(0.061)
Event, t+2		-0.187***	-0.231***		-0.223***	-0.264***
		(0.042)	(0.049)		(0.046)	(0.057)
Event, t+3		-0.228***	-0.271***		-0.303***	-0.344***
		(0.050)	(0.056)		(0.060)	(0.068)
Event, t+4		0.061	0.017		0.057	0.017
		(0.062)	(0.069)		(0.069)	(0.075)
Treated x After	-0.111***			-0.143***		
	(0.028)			(0.032)		
Observations	4,392	4,392	9,298	4,392	4,392	9,297
R-squared	0.973	0.973	0.968	0.967	0.968	0.963
Municipality Fixed Effect	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
County x Year Fixed Effects	YES	YES	YES	YES	YES	YES
Period	2010-2018	2010-2018	2002-2018	2010-2018	2010-2018	2002-2018

Clustered standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

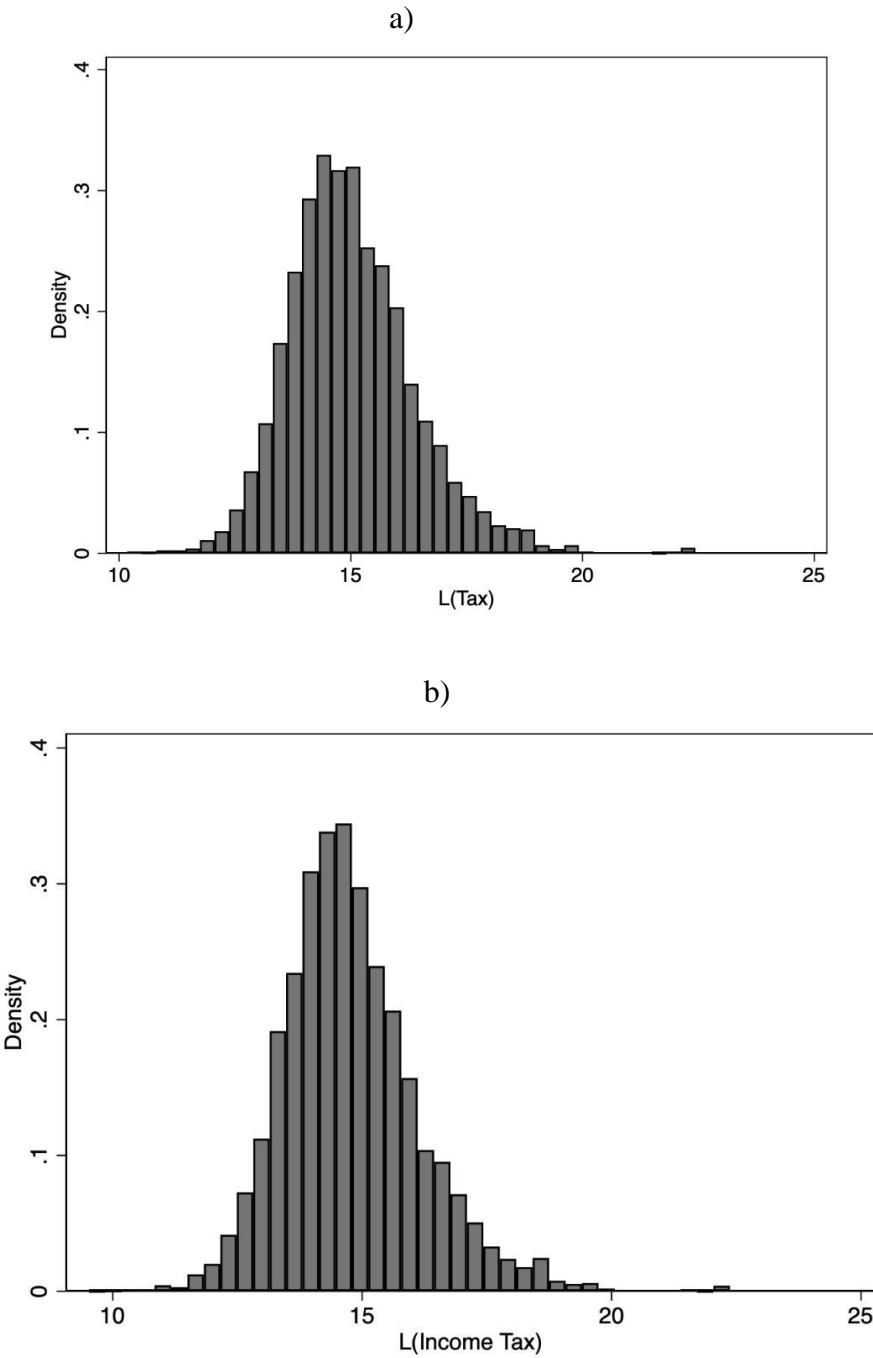
Source: author's calculation. Source of data is the Croatian Bureau of Statistics (CBS).

Figure A.1: Geographical distribution of taxes collected (per capita), 2018



Source: author's calculation. Source of data is the Ministry of Finance (MoF).

Figure A.2: Distribution of the log transformed total tax and income tax revenue



Source: author's calculation. Source of data is the Ministry of Finance (MoF).

RELATIONSHIP BETWEEN DIGITALIZATION LEVEL AND MODERN HRM PRACTICES

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Abstract

The purpose of the study is to examine the relationship between the use of modern practices in human resource management and the level of digitalization of the enterprise. To determine the level of digitalization, authors have included innovative technologies oriented on employees as we as customers, that enable the digital transformation of business practices. The focus of the study is on both parameters, currently implemented and the desired level of digitalization and the use of modern HRM practices. Subsequently, the correlation between the level of digitalization and the implementation of modern practices in HRM is also examined. Data were collected by a questionnaire survey among managers of enterprises in Slovakia (132 respondents) was used for data collection. Principal component analysis (PCA) and analysis of variance (ANOVA) were used to test the theoretical research model. The findings show that the implementation of modern HRM practices is not directly related to innovative technologies. The relationship between the level of digitalization of the enterprise and the use of modern HRM practices is not significant. This implies that modern HRM practices can be applied in enterprises regardless of the level of digitalization. One of the findings in this study suggests that modern HRM practices can be implemented also by companies, that are not leaders in digital transformation. The results of the study, have also shown two approaches in the application of modern HRM practices. One is the implementation of individual-oriented practices promoting individual development, feedback, and autonomy. The second approach involves collectively oriented practices promoting employee loyalty and teamwork tools.

Keywords: innovations, HRM practice, digitalization, Industry 4.0, employees

JEL classification: M12, M54

Introduction

Companies that want to be successful need to be competitive employers. The fight for talent

forces them to be attractive to employees and to provide a positive employee experience. Today, excellence is becoming a source of attraction. This implies using modern approaches and people management tools that on the one hand support performance acceleration, but at the same time provide a personalized approach, build rapport and meet employee expectations.

Literature review

As the Fourth Industrial Revolution is a concept based on the German Industry development concept (Daňo & Lesáková, 2018), and Slovakia has an open economy with tight industrial bonds to Germany, we find it relevant to introduce the regional-related context of our research. A comparative study on building competence for 4.0 in companies in countries with high ratings on European Innovation Scoreboard (Austria, Germany, Switzerland) and moderating innovators (Czech Republic, Slovakia), has proven retrieving new knowledge through interactions with the external environment depends on R&D and HRM (Stachová et al., 2019). The authors imply the importance of innovation pushes Slovak companies into fast solutions regarding future development to sustain their competitiveness.

Modern HRM practices

The positive impact of digitization is prevalent in companies that can take advantage of ICT opportunities. Out of many studies contributing to HRM in the 4.0 Industry Era, the impact of digitalization on HRM tools has been intensively researched. The impact of digitalized environment is not limited to companies operating online or in the IT industry; since it changes how entire societies function (Ngoasong, 2017). Digitalization of HRM proceeds in four stages defined by digital transformation at the strategic and operational levels (Strohmeier, 2020). The study implies ideal types, whereas the digitalization of HRM starts with the second ideal type and gradually intensifies to the fourth ideal type. Digitalization of HR practices at the operational level includes a set of HR activities performed to afford employees abilities, motivation, and opportunities to perform (Ostroff & Bowen, 2012). The operational application of digital technologies implies relieving HR professionals from operational burdens and supporting their strategic focus (Grant & Newell, 2013; Shrivastava & Shaw, 2003).

To address the relationship between HRM and digital transformation, we identified the trends in HRM which have been recognized by published research and HR business practice as innovative approaches. The study includes innovations in HRM practices at the operational level oriented to people (staffing, training, and career), performance (feedback and reward), and work (work design and working conditions).

Congruence in innovative technologies

Implementation of the 4.0 Industry concept is the only way for sustainable growth to maintain an increase in labor productivity due to the replacement of human work by technology, despite the decline in the economically active population, which will be relatively significant (Grenčíková et al., 2020). Realization of value creation by organizations is happening as a collaborative process through network cooperation in ecosystems (Krotov, 2017); while digital technology is an important criterion for value creation (Sjödín et al., 2018). The ability to deliver business model innovations to respond to customer needs has been already liked to

employees' competence maturity (Parida et al., 2015). The integration of innovative technologies to support the digital transformation of enterprises has been identified and described (Bolek, 2020). This study implies there is a gap in the exploration of the congruence of employee-related and customer-related innovative technologies. Therefore, we have included content-oriented and process-oriented innovative technologies. Available studies more extensively examine the technical and digitalization aspects of Industry 4.0, with less attention paid to managerial approaches and tools, which are the main determinants of the success of this concept (Mohelska & Sokolova, 2018).

The primary purpose of this study is to examine relationships between the level of digitalization measured by both customer-related as well as employee-related innovative technologies and modern HRM practices. The research study focuses on the identification of the difference between currently applied and relevant for future HRM practice in Industry 4.0. Further, the object of the analysis is the level of digitalization measured by customer-related and employee-related innovative technologies in digital transformation. Consequently, the object of the research is the relationship between the implementation of modern HRM practices and the level of application of innovative technologies. The research questions were formulated as follows:

1. Which modern HRM practices are considered key to the success of enterprises in the 4.0 era?
2. What is the discrepancy between current implementation and the future importance of modern HRM practices?
3. What is the relationship between currently implemented modern HRM practices and the level of digitalization in enterprises?

Research methodology

Survey and data collection

The study included data from 132 enterprises operating in Slovakia. The research was conducted in companies in Slovakia in the period 2019-2021. The data were obtained by questionnaire method, and the return rate of the questionnaires sent out was 84.6%. The respondents of the survey were HR specialists. The research sample was enterprises without limitation on the number of employees. To answer the research questions, we consider it appropriate to survey enterprises of any size, as small or micro enterprises are often of a start-up nature and are most responsive to the opportunities that digitalization brings. In the research set, 27.6% of enterprises with more than 250 employees, 24.4% of enterprises with between 50 and 250 employees, and the remaining enterprises employing less than 50 employees were included. Approximately half of the sample (51.4%) are operating in the service sector, a quarter (24.4%) in the manufacturing sector, other enterprises in sales (15.4%), and other business areas.

Measurements

For each variable, we measured two parameters, the current application of tested items and their importance for the future of the business. A Likert scale with a range of values from 1 to 6 was used to quantify the level of digitization, importance, and satisfaction.

The questionnaire has been developed by academics with a focus on research and teaching in HRM who are members of the academic community platform, Slovak Academic Association of People Management (SAAPM). Modern HRM practice has been identified based on continuous literature review, as contemporary trends and challenges to HRM reflect the 4.0 Industry era. The questionnaire has been developed to measure the complexity of digitalization in HRM practice in Slovakia. Therefore, the questionnaire consists of sections containing a change in HRM practices and changes in innovative technologies for digital transformation. The content of the questionnaire was verified by HR leaders of companies in Slovakia in a pilot survey. After the verification authors included both employee-related as well as customer-related innovative technologies as components of digitalization in the questionnaire. The rationale behind this decision was made to capture the complexity of digitalization as well as a customer-oriented perspective.

To measure the level of digitization, the authors used a digitization index. This was created as a summary indicator of the application of innovative technologies that are frequent manifestations of digitalization in companies. The digitization index measured the level of application as well as the level of importance of innovative technologies.

Table 1: Measurement model – Components of the index of digitalization

	Customer-related (DC)		Employee-related (DE)	
Digitization of analog data (reduction of paper documentation)	Rate of importance (RIDC)	Rate of application (RADC)	Rate of importance (RIDE)	Rate of application (RADE)
Digitization of biometric data				
Digital interaction platforms, networking				
Big data analytics				
Quick analytics (e.g. feedback)				
Predictive analytics (e.g. in marketing)				
GDPR (protection)				

Source: own processing.

To measure modern HRM practices we included sixteen items (HR), and we searched the parameter of their importance (RIHR) for the future of business and current applications (RAHR). We included people-related (staffing, training, and career), performance-related (feedback and reward), and work-related (work design and working conditions) items.

Table 2: Measurement model – Modern HRM practices

	RIHR	RAHR
Employee training and development (T&D) is the responsibility of everyone in our company with key importance to our culture		HR1
We evaluate T&D and its benefits to both the employee and the company		HR2
The attractiveness of the company is defined by the content of the employee experience		HR3
The employee knows the purpose of their work to create added value for the customer		HR4
The work system includes elements of work-life balance		HR5
Employee engagement is also considered in the evaluation criteria		HR6
Employees receive feedback on their performance		HR7
We consider the freedom and personal responsibility of the employee in the choice of training		HR8
The company systematically builds an employer brand		HR9
Workplaces maximize employee autonomy in the performance of work		HR10
We use team-based remuneration		HR11

	RIHR	RAHR
We allow employees to choose the form of remuneration according to their preferences and needs		HR12
We use other tools than financial incentives in our reward system		HR13
Employee reward is linked to the company's performance		HR14
Employee selection is made at the level of executive teams		HR15
We reward employees for behavior that is consistent with our values		HR16

Source: own processing.

Data analysis methods

Data were processed using sorting methods, we used relative and absolute frequencies, mean, modus, median, and standard deviations. For the analysis of the interdependencies of individual variables and their parameters, we used the methods of second-stage sorting, namely Principal Component Analysis (PCA) and Analysis of Variance (ANOVA).

Research results

The results show that companies do not differentiate their approach to digitalization on this principle and use the different tools to a comparable extent towards employees (RIDE - 4.1) and customers (RADC - 4.2). In particular, they attach importance to rapid and predictive analytics tools, for which, however, the actual rate of implementation does not correspond to the need (the difference between the desired and actual rate of use is the highest of all tools). The importance, as well as the current application of digitization of analog data, is high, as well as platforms for digital interactions and networking, and working with big data.

Table 3: Customer-oriented and employee-oriented digitalization

Forms of digitization	RIDC	RADC	RIDE	RADE	DC	DE
					$\Delta I-A$	$\Delta I-A$
Digitization of analog data (reduction of paper documentation)	4,6	4,2	4,5	4,2	0,4	0,3
Digitization of biometric data	3,5	3,5	3,5	3,6	0,0	-0,1
Digital interaction platforms, networking	4,5	4,2	4,3	4,1	0,3	0,2
Big data analytics	4,5	4,1	4,4	4,0	0,4	0,3
Quick analytics (e.g. feedback)	4,8	4,1	4,7	4,1	0,7	0,5
Predictive analytics (e.g. in marketing)	4,6	3,9	4,4	3,8	0,7	0,6
GDPR (protection)	5,4	5,1	5,4	5,1	0,3	0,3

Source: own processing.

We measured the overall level of application of digitization using the aggregate digitization index. The importance for the future is higher than the current application level (RIDC- 4.5, RIDE- 4.5) compared to the current state (RADE- 4.1, RADE- 4.2).

Further, we tested modern HRM practices. Principal component analysis (PCA) of the dataset was used for statistical validation of components in the variable. We tested whether the set of

items can be divided into subsets with similar parameters. In this case, we assessed the RAHR parameter, i.e. the application of modern HR practices.

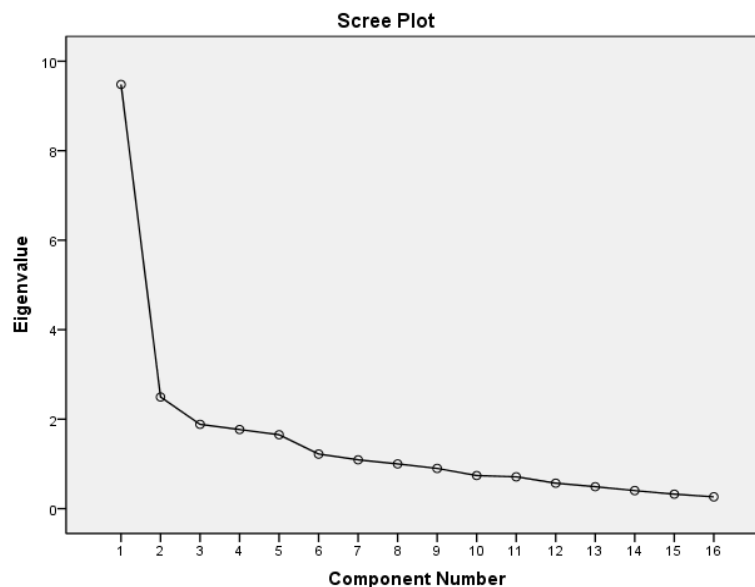
Table 4: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0,836
Bartlett's Test of Sphericity	Approx. Chi-Square	1014,173
	df	120
	Sig.	0,000

Source: own processing.

KMO criterion and Bartlett's test were used to confirm that the set of items of modern HRM practices is factorable.

Figure 1: Scree plot



Source: own processing.

Screeplot showed that in addition to the first component, a second main component stands out (very slightly), so we extract a solution with two subsets of tools. We used varimax rotation to compute the components. According to the saturation (component matrix), we interpret the two components separately. We have followed two criteria in interpreting the components viz: (a) items, which have the highest saturation with a given component (scaled component loading), b) and items, which are significantly saturated by only one of the components and almost not at all by the other.

Component 1 HR (HR_1) - these are items 1 to 10 (comprising mainly employer branding and positive employee experience tools through autonomy and development and individually focused HRM practice).

Component 2 HR (HR_2) - these are items 11 to 16 (containing collectively focused HRM practices, are mainly oriented towards performance and engagement support and employee reward). The allocation of items to the main components is shown in the table below.

Table 5: Rotated component matrix

Modern HRM practices	Rescaled/ Component	
	1	2
Employee training and development (T&D) is the responsibility of everyone in our company with key importance to our culture	0,738	0,304
We evaluate T&D and its benefits to both the employee and the company	0,710	0,346
The attractiveness of the company is defined by the content of the employee experience	0,703	
The employee knows the purpose of their work to create added value for the customer	0,669	
The work system includes elements of work-life balance	0,609	
Employee engagement is also considered in the evaluation criteria	0,595	0,308
Employees receive feedback on their performance	0,591	
We consider the freedom and personal responsibility of the employee in the choice of training	0,580	
The company systematically builds an employer brand	0,560	
Workplaces maximize employee autonomy in the performance of work	0,529	
We use team-based remuneration		0,913
We allow employees to choose the form of remuneration according to their preferences and needs		0,651
We use other tools than financial incentives in our reward system	0,382	0,624
Employee reward is linked to the company's performance	0,308	0,530
Employee selection is made at the level of executive teams	0,356	0,417
We reward employees for behavior that is consistent with our values	0,347	0,377

Source: own processing.

Further, we examined the link between DE and DC and modern HRM practices. We used an analysis of variance (ANOVA) to test the summary measure of digitalization about the two previously identified components of the HR innovations. We used these components as the dependent variable in the ANOVA analysis. We also controlled the measurement for the demographic characteristics of the sample.

Table 6: Tests of between-subjects effects (dependent variable: HR_1)

Source	Type III Sum of Squares	df	Mean Square	F	p-value
Corrected Model	19,303	7	2,758	2,949	0,006
Intercept	0,015	1	0,015	0,016	0,899
Business Type	8,799	3	2,933	3,137	0,027
DC	1,662	1	1,662	1,778	0,185
DE	0,537	1	0,537	0,575	0,450
Employee turnover rate	2,096	1	2,096	2,241	0,137
Size	10,427	1	10,427	11,150	0,001
Error	134,652	144	0,935		
Total	153,975	152			
Corrected Total	153,956	151			

Source: own processing.

The results show that in terms of HR_1, there are significant differences between enterprises of different sizes and business types (Table 6). Based on the results obtained, we can also conclude that modern HRM practices in component 1 (HR_1) are not linked to the level of digitalization. We see business type as a significant variable to HR_1. The differences between the other categories are not significant (Table 7).

Table 7: Estimates – dependent variable: HR innovations_1

Business type	HR_1	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Other	-0,756	0,268	-1,286	-0,226
Retail	0,209	0,200	-0,186	0,605
Services	0,080	0,110	-0,138	0,298
Production	-0,068	0,165	-0,394	0,258

Source: own processing.

In terms of size (Table 8), we can see that the coefficient on the size parameter is positive (B=0.00138). This means that higher levels of HR_1 were achieved by companies with more employees (i.e. there is a positive statistical dependence between size and the set of modern HR practices falling under the instrument 1 component). The relationship with the other variables was not significant.

Table 8: Parameter estimates – dependent variable: HR innovations_1

Parameter	B	Std. Error	t	p-value	95% Confidence Interval	
					Lower Bound	Upper Bound
Intercept	0,126	0,497	0,253	0,801	-0,858	1,109
DC	-0,191	0,143	-1,333	0,185	-0,475	0,092
DE	0,113	0,149	0,758	0,450	-0,182	0,408
Employee turnover rate	-0,007	0,005	-1,497	0,137	-0,017	0,002
Size	0,00138	0,000	3,339	0,001	0,001	0,002

Source: own processing.

Among the most important modern HRM practices from the HR_1 that enterprises perceive as critical to the success and competitiveness of enterprises in the emerging Industry 4.0 era are those that support the employee's perception of the meaningfulness of work. This also builds the employee's relationship with the company and also builds the employer's brand. However, these tools, which are perceived to be the most important, also have the most significant gap between expectation and reality. The orientation of companies towards a positive employee experience, the promotion of employee autonomy, and their relationship with the company through reward instruments linked to the company's performance are also among the approaches emphasized by employers. Companies rate the employee's responsibility in choosing and evaluating training as well as the work-life balance of their employees as the least important in changed conditions.

Table 9: Modern HRM practices – component HR_1

HR_1	Importance	Application	Δ I-A
Workplaces maximize employee autonomy in the performance of work	4,7	4,4	0,3
The employee knows the purpose of their work to create added value for the customer	5,2	4,4	0,8
The work system includes elements of work-life balance	4,5	4,1	0,4
The company systematically builds an employer brand	5,1	4,5	0,6
The attractiveness of the company is defined by the content of the employee experience	4,9	4,5	0,5
Employees receive feedback on their performance	5,0	4,5	0,5

HR_1	Importance	Application	Δ I-A
Employee engagement is also considered in the evaluation criteria	4,8	4,4	0,4
We consider the freedom and personal responsibility of the employee in the choice of training	4,2	4,0	0,2
Employee training and development (T&D) is the responsibility of everyone in our company with key importance to our culture	4,6	4,3	0,3
We evaluate T&D and its benefits to both the employee and the company	4,5	4,2	0,2

Source: own processing.

Further, the authors analyzed modern HRM practices in component 2 (HR_2). Table 10 shows the results of the test ANOVA.

Table 10: Tests of between-subjects effects (dependent variable: HR_2)

Source	Type III Sum of Squares	df	Mean Square	F	p-value
Corrected Model	16,666	7	2,381	2,498	0,019
Intercept	0,037	1	0,037	0,039	0,843
Business Type	8,152	3	2,717	2,851	0,040
DC	0,275	1	0,275	0,288	0,592
DE	0,858	1	0,858	0,900	0,344
Employee turnover rate	0,005	1	0,005	0,005	0,941
Size	11,177	1	11,177	11,728	0,001
Error	137,237	144	0,953		
Total	153,909	152			
Corrected Total	153,904	151			

Source: own processing.

The results show that also modern HRM practices in component 2 (HR_2), are significantly different related to size and business type. Results show that HR innovations (HR_2) are also not linked to the level of digitalization level.

Table 11: Estimates – dependent variable: HR_2

Business Type	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Other	-0,746	0,271	-1,281	-0,211
Retail	0,197	0,202	-0,203	0,596
Services	0,052	0,111	-0,168	0,273
Production	0,019	0,167	-0,310	0,349

Source: own processing.

In terms of size, we can see (Table 12) that the coefficient on the size parameter is positive (B=0.00142). This means that items of HR_2 were higher for enterprises with a larger number of employees (i.e., there is a positive statistical dependence between size and the set of HR_2). The relationship with the other variables was not significant.

Table 12: Parameter estimates – dependent variable: HR_2

Parameter	B	Std. Error	t	p-value	95% Confidence Interval	
					Lower Bound	Upper Bound
Intercept	0,044	0,502	0,087	0,931	-0,949	1,037
DC	0,078	0,145	0,537	0,592	-0,208	0,364
DE	-0,143	0,151	-0,949	0,344	-0,441	0,155
Employee turnover rate	0,000	0,005	-0,074	0,941	-0,010	0,009
Size	0,00142	0,000	3,425	0,001	0,001	0,002

Source: own processing.

Among the most important modern HRM practices in Component 2 (HR_2) that companies perceive as critical to the success and competitiveness of enterprises in the emerging Industry 4.0 era is the use of non-monetary forms of reward and linking rewards to enterprise-wide results. Conversely, in the case of the possibility of an individual choice of reward components based on employee preferences and the use of team-based reward, companies do not appreciate their importance and their current level of implementation exceeds the perceived need for such an approach.

Table 13: Modern HRM practices – component 2

HR_2	Importance	Application	Δ I-A
We allow employees to choose the form of remuneration according to their preferences and needs	3,3	3,5	-0,2
Employee selection is made at the level of executive teams	4,4	4,0	0,3
We use other tools than financial incentives in our reward system	4,7	4,5	0,2
We reward employees for behavior that is consistent with our values	4,5	4,1	0,4
Employee reward is linked to the company's performance	4,8	4,6	0,3
We use team-based remuneration	3,4	3,6	-0,2

Source: own processing.

Contrary to expectations, our findings did not show a direct relationship between the level of digitalization and the implementation of modern HRM practices.

Discussion and conclusion

The primary purpose of this study was to examine relationships between both customer-related as well as employee-related innovative technologies and modern HRM practices.

Theoretical implications

The results of the study show that the companies use two approaches in HR practice innovation. One is a focus on predominantly individual tools, mainly aimed at promoting employee performance through feedback, employer branding, and fostering a positive employee experience through autonomy and employee development. The other approach uses predominantly collectively focused tools, oriented toward fostering employee loyalty and engagement through reward and teamwork tools. At the same time, the findings show that

larger enterprises and businesses in the retail and service sectors make greater use of modern HRM practices.

Practical implications

The study shows results addressing the future readiness of companies in the context of Industry 4.0 by comparing the current level of implementation of modern HRM practices with the importance for the future. The findings suggest that there is a discrepancy between current implementation and future need for modern HRM practices in all tested items (HR_1, HR_2). This result points to the scope for improving HRM practice to reflect expected needs and thus make a significant contribution to businesses' ability to respond to the future challenges.

If a company focuses on individual-oriented modern HRM practice (HR_1), current experience shows that it is advisable to ensure that the employee's perception of the meaningfulness of work is supported. This also builds the employee's relationship with the company and consequently the employer's brand. However, for these tools, enterprises currently experience the most significant gap between the level of importance and the level of the current application. The orientation of the company towards a positive employee experience, the promotion of employee autonomy, and their relationship with the enterprise through performance support tools are also among the approaches emphasized by employers.

Of the collectively-oriented modern HRM practice (HR_2), companies identified as crucially important to the use of non-monetary forms of reward and linking rewards to company-wide performance. Such an approach to remuneration fosters employee loyalty to their employer and contributes to building a collaborative culture, which, in line with Krotov (2017), we view as a collaborative process. It is therefore surprising in this context to underestimate the importance of team-based pay, especially if companies prefer a team-based way of working. Equally, the underestimation of the possibility of autonomously deciding on the choice of forms of reward based on one's individual needs appears to be a missed opportunity, especially if the degree of autonomy itself is perceived to be significant.

In the study, we have measured the level of digitalization by digitization index, reflecting the application of employee-related and customer-related innovative technologies. The results show that the overall level of digitalization shows room for improvement. Enterprises declare its higher importance for the success of the business in the future compared to the current status of the application. We refer to Sjödin et al. (2018) and Grant and Newell (2013) that the application of digital technologies will help to support the strategic focus of HRM and businesses need to focus their attention on them shortly.

Consequently, we verified the relationship between the use of modern HRM practices and the level of digitalization. The findings showed that the tested components of modern HRM practices are not related to employee-related or customer-related innovative technologies. The association between modern HRM practices and the digitalization index was not demonstrated, which is contrary to our assumption.

We consider the results of the study to deliver valuable managerial implications. First, results show that managers recognize the path on the way to digital transformation in Industry 4.0 in both employee-related and customer-related innovative technologies. Second, results confirm that modern HRM practices can be implemented regardless of the degree and level of

digitalization of business processes, which is a positive finding, particularly useful in companies that are not leaders in the digitalization of human resource management.

Limitations and future directions

Despite the beneficial findings, the study published in the paper also has several limitations and many more avenues for further research. The limiting factor of this study is the use of a non-standardized questionnaire. It has not been scientifically validated before. Further, the limiting factor of the study is the set of companies that were subject to the research. The selection of companies according to regional presence, size, and business sector does not correspond to the structure of enterprises in the whole territory of Slovakia. Thus, the sample is not fully representative. To a greater extent, enterprises operating in the capital city, whose HR specialists showed greater willingness to cooperate, participated in the research. The research can be extended in the future to examine other tools such as human capital management and its relation to innovations in HR practice.

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PREDICTING BUSINESS ETHICS WITH ORGANIZATIONAL COMMITMENT AND JOB SATISFACTION

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Abstract

Examining the personal characteristics that affect ethical behavior is crucial since corporate citizenship behavior includes business ethics as one of its fundamental components. The main goal of the current study is to examine relations between organizational commitment, work satisfaction, and business ethics, as well as gender differences in these variables. Data were collected using the business ethics scale, organizational commitment scale, and work satisfaction scale from a sample of 243 workers (164 males, 79 women) at Metal Product Ltd. from Zagreb, which produces electrical equipment. As expected, both men and women demonstrated positive associations between organizational commitment and business ethics scales. Moreover, only women demonstrated positive relationships between the business ethics and work satisfaction. Organizational commitment positively correlated with job satisfaction in men but not women. Regression analysis results showed unique predicted relationships between the organizational commitment scale and business ethics in both men and women, as was expected. The relationship between job satisfaction and business ethics varied by gender; job satisfaction strongly predicted business ethics only in women while not in men. 29% of the overall score variation in men's business ethics and 24% in women's business ethics were exclusively explained by organizational commitment and work satisfaction. According to the study's findings, there are some gender differences in the relationships between organizational commitment and work satisfaction as well as in the relationships between business ethics and organizational commitment. Overall, the findings point to the importance of organizational commitment and job satisfaction in the explanation of business ethics.

Keywords: business ethics, organizational commitment, job satisfaction, gender differences

JEL classification: M10, M12

Introduction

Ethics, values, integrity, and responsibility are essential in today's workplace, believing that strong ethical standards are necessary for excellent business. It is widely acknowledged that high ethics can positively impact an organization's economic performance (Shaltegger & Burritt, 2018). Painter-Morland & Bos (2011) emphasize the role of a code of ethics for the stability and reputation of companies, as “establishing and maintaining an ‘ethical culture’ by communicating core corporate values is intended to minimize the risk of reputational damage, associated erosion of confidence and loss of business.” Moriarity (2002) identified key focus points that shape individuals’ actions and their characters: (1) business ethics which puts the

focus on the actions and character of individual people engaged in business, and (2) laws and policies. The role of laws and regulations in shaping human behavior and ethics can have two effects. One is to forbid the action that is considered morally permissible. The other is to allow (when not explicitly forbidden by the law) actions that are considered morally wrong. Lee & Berleur (1994) examined the implementation of the code in relation to person's honesty and have concluded that "codes, like laws, tend to keep the honest persons honest and have little impact on those who chose to ignore their precepts or who have never been exposed to their tenets. Moriarity (2002) discusses the difference between ethics and morality. According to a summary of the relevant literature on ethics, he explains that "ethics is often understood to have two components: morality, which is concerned with how we relate to others, and prudence, which is concerned with how we relate to ourselves. Sometimes morality is understood to be personal, while ethics is understood to be interpersonal or social.

Employee commitment is based on loyalty, identification with the organization, compatibility with its principles, and other factors. One such factor is whether employees feel appropriately compensated for their labor (Blanken & Schrieber, 2005). Satisfaction with the organization should be immediately impacted by compatibility with values or character. The most important finding for modern business and the application of ethics was made by Cameron et al. (2004), who established a statistically significant link between perceived ethics and organizational outcomes. Contrary to popular belief, which holds that applying ethics results in undesirable compromises, these findings demonstrate that ethics positively impacts economic outcomes.

Business ethics are associated with working attitudes and values, employee behavior at work, performance, distinct personality traits, demographic factors, and educational attainment (e.g., Fakunjoju, 2018; Zabel et al., 2016). Companies may have a variety of values that are clearly marketing-related, such as those that govern the calibre of goods and services, the language used in advertisements, the choice of distribution methods, and how clients are handled. Corporate ethical values, however, serve as the foundation for all of these particular values.

Several studies document gender differences in managers' and aspiring corporate leaders' ethical perceptions. This research stream's overall finding is that men are much more likely than women to act unethically, while women are significantly more likely than men to perceive certain dubious behaviors as unethical (see McCabe et al., 2006). However, other studies, indicate that there are no variations in corporate ethics between men and women based on gender (e.g., Roxas, & Stoneback, 2004). Given these inconsistent results, more research is required to determine how other contextual and individual factors, such as socialization, job satisfaction, loyalty to the company, motivation, gender equality, etc., affect business ethics.

Business ethics and organizational commitment

One of the main work-related mindsets that demonstrates how closely an individual identifies and feels a connection to the organization is organizational commitment (Mowday, Steers & Porter, 1979). Numerous studies demonstrate that unique job features, such as job demands, business problems, competencies, range of abilities and skills, and task interdependence, are important determinants of organizational loyalty (Judge & Kammeyer-Mueller, 2012). Communication, management style, and organizational justice are the main organizational determinants of this attitude toward work. On the employee side, personality qualities, particularly conscientiousness, extraversion, and neuroticism, have a significant impact.

According to Shanker and Bin Sayed's (2015) investigation into the connection between emotional intelligence and organizational commitment, affective loyalty to the organization is significantly predicted by emotional intelligence, including its components such as self-awareness, focus on problem-solving, assertiveness, empathy, self-confidence, and managing others. Employee despair and poor management practices may cause firms where employees express their desire to leave. Only the imagined duty to stay in such a circumstance ties the person to the company.

The Eagly & Chaiken (1993) model (E&C model), one of the most popular models of organizational commitment, demonstrates that while the influence of organizational loyalty on behavior is indirect (i.e. mediated), relevant routine behaviors (for example, certain habits) can directly influence certain behaviors—even if the person does not develop an attitude toward that behavior. This implies that organizational commitment to particular activities can be reduced in the presence of strong habits. Generally, habits both directly and indirectly contribute to the explanation of a person's behavior; that is, they are mediated by the attitude toward the conduct and the associated intention.

This model's most significant contribution is the contrast between attitudes toward goals and behaviour. As a result, attitudes toward conduct and intentions mediate the relationship between attitudes toward goals and actual behavior. Both internal organizational elements and personal characteristics are predictors of organizational commitment. According to research, job features, such as job demands, job challenges, necessary competence, range of competencies and skills, and task interdependence, are the most significant determinants (Judge & Kammeyer-Mueller, 2012). When it comes to the company, what matters most is how managers treat their staff, including their communication, empathy, professionalism, ability to work with others, and sense of fairness. Trust, reciprocity, sharing of duties and responsibilities, and task execution are crucial among coworkers. The size of the organization is something that is not to that extent, and centralization is crucial. Conscientiousness, extraversion, and neuroticism have a strong relationship with loyalty, just like job satisfaction does. Despite being conscientious, work ethics, benevolence, and a thorough evaluation of skills and competency are all connected.

There hasn't been enough scientific research on the relationship between organizational commitment and business ethics.

Hunt et al. (1989) findings strongly support the relationship between organizational commitment and business ethics. A recent study (Lee & Vo, 2022) examined how the corporate ethics of audit firms and the code of ethics affect the moral judgment of auditors in Vietnam. The study's findings show that the code of ethics for professional accountants significantly affects the auditors' ethical judgment. The results, however, only weakly support the idea that the corporate ethics of audit firms influence the auditors' ethical judgment.

Lee (2020) investigated leaders and other company members interact to achieve business sustainability performance as well as how both positive and bad employee behaviors might affect these relationships. According to the study's findings, employee actions have a significant impact on a company's sustainability performance. Employee actions can either promote greater corporate citizenship behavior or reduce counterproductive work behavior, depending on contextual or/and relational circumstances.

These results show how important it is to have strong relationships with direct managers as well as ethical workplace condition.

Business ethics and job satisfaction

Job satisfaction refers to an employee's affective attitude about their work, which comprises a range of attitudes regarding various parts of their employment that have an impact on their interaction with the business (Spector, 1997).

Job satisfaction is correlated with positive affectivity toward one's work, whereas negative affectivity toward one's work is associated with lower levels of job satisfaction. Herzberg's two-factor theory of motivation (Herzberg, Mausner, & Snyderman, 1964) distinguishes between hygiene elements and motivators when explaining job satisfaction. Because there is little chance that employees will have an impact on these characteristics, hygienists offer a possible source of unhappiness (e.g. salary, working conditions, job security, administration, technical supervision, and benefits). In contrast, because they are associated with results that the employee can control and self-actualization, motivators can be a source of potential job happiness. These internal, intrinsic elements are associated with job satisfaction and have a favorable impact on employee motivation. Achievement, acclaim, demanding work, commercial success, career advancement, personal development, and well-being are some motivators.

Locke's value theory (Locke, 1976) is another theory that explains job satisfaction. According to this theory, the main elements of job satisfaction are values (also known as "subjective demands of the mind"), value significance (importance of values for an individual), and value perception (evaluation of the current situation and values). According to this view, a person can alter the components of his or her job that he or she finds unsatisfactory.

Situational and dispositional factors might have an impact on job satisfaction (Judge & Klinger, 2007). Situational determinants for job satisfaction include things like the difficulty of the job, the importance of the task, and feedback, whereas affectivity—that is, positive and negative emotions and personality traits—are the most significant dispositional factors. According to research, the top personality traits to predict job satisfaction are neuroticism, conscientiousness, and extraversion (Judge & Kammeyer-Mueller, 2012). Work outcomes and organizational behaviors including turnover, absenteeism, leaving the company, and job performance are all correlated with job satisfaction. Job performance is most strongly correlated with job satisfaction, particularly in more complicated jobs, according to meta-analytic research (e.g., Judge et al., 2001). Among Croatian scientists, one research (Jerneić & Kutleša, 2012) showed that low job satisfaction significantly predicts the intention to leave the organization.

Significant differences in employee outcomes and workplace behavior are influenced by job satisfaction. Less satisfied employees are more inclined to either explore alternative chances and positions or find ways to reduce their involvement at work (Coomber & Barriball, 2007). In the first situation, there is a voluntary exit or turnover; in the second, there is workplace laziness and steadily rising absenteeism, or absence from work. Those who don't show up for work are expressing their displeasure with their jobs, attempting to escape the unpleasant aspects of their jobs, harming the company, and decreasing their productivity and contribution.

One of the first published studies (Vitell & Davis, 1990) examined the relationship between business ethics and job satisfaction in a sample of experts in information system management whose organizational positions ranged from programmer to head of information systems. Several aspects of job satisfaction were examined: income satisfaction, promotions satisfaction, coworker satisfaction, supervisor satisfaction, and work satisfaction. Findings

showed that when top management emphasizes ethical behavior and is positive about the connection between ethics and success, participants were more satisfied with the various aspects of their jobs.

In a recent study, Al-Nashash et al. (2018) investigated how strong work ethics affected job satisfaction among Jordanian bank employees. The study showed a positive relationship between work ethics and job satisfaction. These results show that work ethic is one of the critical characteristics to improving employee job satisfaction and other organisational outcomes. Moreover, raising employee work satisfaction raises organizational commitment, reduces labor turnover, and boosts productivity. Findings SEM analysis (Attar et. al., 2017) show that moral leadership behavior has a beneficial impact on employees' job satisfaction. The findings from this study support the theoretical idea that job satisfaction increases when ethical leadership behavior is perceived to be more effective.

Current study: objectives and hypotheses

This study's main goal was to examine the relationship between organizational commitment, job satisfaction, and business ethics among Metal Product Ltd. personnel as well as the gender differences in these variables.

Based on the findings of the aforementioned studies (Al-Nashash et al., 2018; Attar et al., 2017; Hunt et al., 1989; Lee, 2020; Lee & Vo, 2022; Vitell and Davis, 1990) and in light of the presented theoretical knowledge the following hypotheses were created:

H1: Business ethics will be positively related to organizational commitment.

H2: Business ethics will be positively related to job satisfaction.

H3: Organizational commitment will be positively associated with job satisfaction.

H4: The associations between business ethics and organizational commitment and job satisfaction differed across gender.

Methodology of research

Participants and procedure

The study sample consisted of 243 employees (164 men, 79 women) of Metal Product Ltd. for the production of electrical equipment in Zagreb, Croatia. The Business ethics scale, the Organizational commitment scale, and the Job satisfaction scale were all given to participants in an anonymous manner. As the head of the internal audit at Metal Product Ltd., the first author of this study conducted the research. During working hours, employees were requested to anonymously complete a battery of self-report exercises; they were not paid for taking part. Table 1 presents the participant's demographic profile.

Table 1: Demographic profile of the participants

Demographic factors	Number of employees	Percentage
<i>Gender</i>		
Men	164	67%
Women	79	33%
<i>Years of business experience</i>		
Less than 1 year	52	21%
1 to 5 years	80	33%

Demographic factors	Number of employees	Percentage
5 to 10 years	67	28%
More than 10 years	44	18%

Source: authors.

Measures

Business ethics scale

Business ethics was measured using 11 items specially created for this study. These questions were based on similar self-reported lists of ethical attitudes, like those of Ruch & Newstrom (1975). The questionnaire includes questions about moral conduct. On a scale of 1 (strongly disagree) to 5, participants indicated how much they agreed or disagreed with the statements (strongly agree). The sum of the ratings for the linked items is divided by the total number of items on the scale to determine the final score. This scale's internal psychometric properties were adequate ($\alpha = .83$). Scale of organizational commitment.

Organizational commitment scale

The organizational commitment scale, which was developed for the objectives of this research based on a three-component measurement, was used to measure organizational commitment (Allen & Meyer, 1991). The Organizational Commitment Scale has 15 items with ratings on a 3-point Likert scale, with 1 being disagreed and 3 being agree, and it has strong internal consistency ($\alpha = .94$).

Job satisfaction scale

For the purpose of this study, we developed a scale to measure job satisfaction that takes into account the compensation, nature of the work, coworkers, and relationships with superiors (managers). Similar inventories of one's own creative activities, like the Work Satisfaction Survey, served as the basis for this measure (Spector, 1997). Participants rate their level of satisfaction with specific aspects of their jobs on a 5-point Likert-type scale (from not satisfied to extremely satisfied). The sum of the ratings on related items was used to compute the scale's scores. The Work Satisfaction Scale has shown strong internal reliability coefficients in this study ($\alpha = .72$).

Data analyses

Two different analytical methods were applied in the current study. Firstly, the bivariate associations between business ethics, organizational commitment, and job satisfaction were measured using zero-order correlations (Pearson's r). Also, we performed regression analyses in which the organizational commitment and job satisfaction scale scores were entered as predictors of criteria variables comprising the business ethics scale in order to evaluate for particular connections of scores on each research variable. Given that the study variables differed by gender, hierarchical regression analyses were conducted, with age included as a control variable in each case at Step 1, organizational commitment, and job satisfaction scale scores in Step 2, and age also included as a control variable in each case at Step 2.

In order to test for potential gender differences in the relationships between business ethics, organizational commitment, and job satisfaction, analyses were run with the inclusion of gender x organizational commitment and gender x job satisfaction interaction terms. Although the rise

in R2 at Step 3 was substantial for organizational commitment and job satisfaction, it did not show any gender differences in the association between business ethics and job satisfaction.

Results

Descriptive statistics

Table 2 displays the descriptive information from each questionnaire (means, standard deviations, range, skewness, and kurtosis), gender differences in mean scores, and values for internal consistency. Every scale that was employed showed a sufficient range and internal psychometric properties. All of the used scales' Cronbach's alphas were higher than .70 (business ethics scale: $\alpha = .83$; organizational commitment scale: $\alpha = .94$; job satisfaction scale: $\alpha = .72$), showing sufficient internal consistency. The scales' skewness and kurtosis fell within the normal distribution's suggested range (between -2 and +2). (Gravetter & Wallnau, 2014).

The mean levels of organizational commitment, job satisfaction, and business ethics were compared between men and women using the T-test. The findings of the T-Test revealed gender differences in corporate ethics and organizational commitment, as shown in Table 2. When it came to job satisfaction, women outperformed men but this difference is not statistically significant.

Table 2: Internal consistency values for the total sample (N = 243), as well as descriptive statistics for all scales in both men (n = 164) and women (n = 79)

	Men		Women		<i>t</i>	Range		α	<i>Sk</i>	<i>Ku</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		Min.	Max			
Business ethics scale	24.19	7.89	20.66	5.77	3.42**	11	53	.83	.95	1.67
Organizational commitment scale	19.10	6.68	16.75	3.72	3.17**	15	45	.94	1.92	1.45
Job satisfaction scale	14.65	2.82	15.06	2.37	-1.11	4	20	.72	-.53	.46

Note: Internal reliability coefficients (α). *Sk* = Skewness, *Ku*=Kurtosis. ***p* (two-tailed) < .01.

Source: authors.

Correlation analyses

Simple bivariate (zero-order) correlations between the variables that were measured are shown in Table 3. According to these correlations, men and women both demonstrated positive associations between the organizational commitment scale and the business ethics scale ($r = .55$, $p < .001$; $r = .46$, $p < .001$), supporting our hypotheses (H1).

The business ethics scale exhibited positive associations with the job satisfaction scale only in women ($r = .21$, $p < .05$), but not in males, providing partial support for hypothesis 2.

The organizational commitment scale is, as anticipated, strongly correlated with job satisfaction in men but not in women ($r = .24$, $p < .01$), which partially supports our hypothesis 3.

These correlation analysis results lead us to the conclusion that there are gender differences in the relationships between organizational commitment and job satisfaction as well as the

relationships between business ethics and organizational commitment, which is consistent with our prediction (H4).

Table 3: Bivariate correlations between measured variables in Men (n = 164) and Women (n = 79)

Scale	Men			Women		
	1.	2.	3.	1.	2.	3.
1. Business ethics scale	1	.55***	.12	1	.46***	.21*
2. Organizational commitment scale		1	.24**		1	.17
3. Job satisfaction scale			1			1

Note: Values in the table are zero-order Pearson correlations calculated separately by gender.
* $p < .05$, ** $p < .01$, *** $p < .001$ (two-tailed tests).

Source: authors.

Prediction of business ethics scores from organizational commitment and job satisfaction

The standardized beta coefficients (β) from regression studies are shown in Table 4, and they illustrate the distinctive role that organizational commitment and job satisfaction scale play in the prediction of business ethics. In regard to the study hypotheses, the results of study examining associations between study variables, whether in similar or different directions, are given below. According to the bivariate correlations provided in Table 3, which are consistent with Hypothesis 1, organizational commitment strongly predicted business ethics for both men and women ($\beta = .54$, $p < .001$ in men sample; $\beta = .45$, $p < .01$ in women sample).

The relationship between job satisfaction and business ethics was different depending on gender: only women ($\beta = .29$, $p < .05$) and not men ($\beta = .07$, $p = .39$) demonstrated a significant relationship between job satisfaction and business ethics. This finding partially supported Hypothesis 2. In terms of percentage, organizational commitment and job satisfaction together explained 29% of the overall score variance in men's business ethics and 24% of the total score variance in women's business ethics (see Table 4).

Table 4: Multiple regressions predicting business ethics from organizational commitment and job satisfaction in Men (n = 164) and Women (n = 79)

Predictors	Business ethics					
	Men			Women		
	β	t	p	β	t	p
Organizational commitment	.54***	7.23	.000	.45**	3.25	.002
Job satisfaction	.07	.87	.390	.29*	2.09	.043
R	.55***			.53**		
R^2	.30***			.28**		
Adj. R^2	.29***			.24**		

Note: Standardized regression coefficients (β). R = coefficient of determination. R^2 = squared multiple R. Adj. R^2 = Adjusted R Square.
* $p < .05$, ** $p < .01$, *** $p < .001$.

Source: authors.

Discussion and conclusion

Investigating relations and gender differences in organizational commitment, work happiness, and business ethics among employees of Metal Product Ltd. was the main goal of this study.

Overall, the results supported the assumptions and showed that organizational commitment and job satisfaction were both related to business ethics.

However, these relations are partly gender-based. As anticipated, business ethics is positively correlated with organizational commitment in both men and women on a bivariate level. Also, as expected, we find a link between women's employment satisfaction and business ethics. This association was not statistically significant for men.

Organizational commitment, contrary to what was expected, has a positive relationship with job satisfaction in males but not in women. These findings supported earlier research by demonstrating that relationships between organizational commitment and work satisfaction and between business ethics and job satisfaction partially depend on gender (e.g., McCabe et.al., 2006; Robin & Babin,1997). It is possible that these results are related to the fact that the mean values on the business ethics and organizational commitment scale were significantly higher in men. According to Harðardóttir et.al. (2019), additional studies are required to evaluate these associations with sample employees from different companies. The research should be performed on a bigger sample of women because our sample of women is smaller than the sample of men, which is another important consideration.

Our hypotheses are only partially supported by the results of the multiple regression analyses. As predicted, organizational commitment was found to be unique positive predictor in explaining business ethics in both men and women. This finding is consistent with how organizational commitment is conceptualized as an adaptable aspect of organizational citizenship behavior (Organ, 1988). Altruism, courtesies, diligence, and civic virtue are examples of this kind of organizational behavior (Blakely, Andrews & Moorman, 2005).

Altruism may also be relevant to ethical behavior, in that it includes elements such as being sympathetic, benevolent, kind-hearted, and willing to promote' others' welfare at the expense of one's own. According to Organ(1988), the dimension of altruism is defined as behavior aimed at helping a specific colleague in performing a work task or solving a problem related to work organization.

Also, in line with predictions, job satisfaction was found to be unique positive predictor in explaining business ethics in women but not in men. This finding is in line with the view that factors influencing job satisfaction are situational and dispositional (Judge & Klinger, 2007). The situational factors include, for example, the complexity of the job, the significance of the task, and feedback, while the most important dispositional factors of job satisfaction include affectivity, i.e., positive and negative emotions and personality traits. Research shows that neuroticism, conscientiousness, and extraversion are the best predictors of job satisfaction (Judge & Kammeyer-Mueller, 2012).

In conclusion, the current research's findings add to the body of data showing that organizational citizenship behavior, which includes business ethics, organizational commitment, and job happiness, is a complex construct.

While interpreting the results of this study, some limitations need to be considered. One is that the study sample consisted of employees of a single company rather than employees of different companies or some other sample from the working population. Future studies should be conducted on a larger sample, primarily on a larger sample of women, so that we can better gender differences in the relationships between the study variables. In addition, the reliability

and validity of the used scales, which were modeled for the purposes of this research, should be additionally examined including testing factor structure invariance of the used scales across gender.

The next important limitation relates to our dependence solely on self-report measures, which would have exaggerated observed relationships between business ethics, organizational commitment, and job satisfaction ratings.

Notwithstanding these limitations, the current study revealed unique predictive relations for organizational commitment and job satisfaction with the business ethics and differential associations in men and women, thereby providing new insights into the overlap and distinctiveness among them.

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EARLY PHASE OF EURO INTRODUCTION IN CROATIA

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Abstract

Adopting the euro as the official currency on January 1st, 2023, Croatia has completed the process of monetary integration into European Economic and monetary union. Although euro introduction has been set as one of the final and most important goals of the transition process decades ago, its final realization in practice faced many dilemmas. Furthermore, it contributes to the discussion on the optimal choice of exchange rate regime in terms of a small open economy. Although some economists highly value the potentials of monetary sovereignty, new European union members have a so called “opt-in” clause that obliges them to euro introduction after fulfilling the convergence criteria. Croatian monetary and exchange rate policy during the past few decades of monetary sovereignty were determined, inter alia, with high levels of unofficial euroization. That has also been the limiting factor for its creation. On the other hand, the euro and the policy of European central bank have not been unfamiliar in this country. Convergence criteria have already been in focus of theoretical and practical research but the real readiness for euro adoption and use can be tested only after the process is finished. This paper aims to analyze the early stage of euro adoption, focusing on the most important phases and outputs of the process from the aspects of monetary and exchange rate policy that can be evaluated so far. That is why it covers the first, mostly technical phase, while deeper analyzes should be done later, after a longer period of its use. Thereafter, paper has several goals. First, it provides an overview of the literature on the euro introduction experiences in theoretical aspect, but also on practical examples of selected, comparable countries. Then, the focus is on the experience of the first months of euro use in Croatia, including the specifics on the national and international level. Finally, there are some recommendations for the forthcoming period, which are partly based on the experiences of other countries. Although the analyzes are limited with a short time span of euro use in Croatian practice, it might serve as a good starting point for further discussion and contributes to the existing research.

Keywords: euro, eurozone, Croatia, euro integrations

JEL classification: E52, E58, F33, F36

Introduction

As of January 1st, 2023, when officially introduced the euro and became a member of eurozone, Croatia opened a new chapter in its economic and monetary policy history. Ever since the beginning of 1990s and early stages of transition process that regained national monetary sovereignty, euro introduction was a final and widely discussed goal of the European integration efforts. Still, there are many costs and benefits of this process. On one side there is developing potential of sovereign monetary policy and, consequently, use of national currency. On the other hand, membership in European economic and monetary integrations imply many benefits, including the use of the second most important global currency, the euro. Although new member countries have a so called “opt-in” clause that requires the eurozone membership in

some point after the convergence criteria are complied, some of them have postponed the process, strengthening the use of national policies. Other countries, including Croatia, decided to introduce the euro as soon as the convergence criterions were reached. That resulted in discussions on the “optimal” time for euro adoption and shifting the goals in favor of retaining monetary sovereignty in some cases. Furthermore, influence of severe crisis, namely Great Recession, SARS-CoV-19 crisis and war in Ukraine, combined with strengthening institutions and economic performance in post-transition countries resulted in redefining the goals for some of the countries. That is why they have postponed the final part of the integration, the euro adoption. Inflation pressures from 2021.on have influenced also the members of Exchange Rate Mechanism II (ERM II), so Bulgaria has announced that the euro shall not be introduced in 2024 as planned. In this ERM II member the convergence criterion, primary in terms of inflation, was not satisfied.

In terms of eurozone membership the Croatian case is not without these dilemmas, despite its characteristics from the pre-euro period (such are high level of unofficial euroization, exchange rate anchor, constraints on monetary policy, etc.). One of the reasons for retaining the monetary sovereignty even in cases when it is limited in practice and is more administrative than real, is in exit strategy and the possibility of its widening in future. Monetary union membership implies *one-size-fits-all* approach and monetary policy no longer serves as an automatic stabilizer. The opposite argument is that the euro might serve as a safety net in terms of crisis. There are many theoretical and practical contributions in literature on European economic and monetary integration, related to the both positive and negative aspects. Still, every country-case is unique, with nationally specific characteristics, not limited to economic circumstances. The final phase of the convergence process, followed by the use of common currency is a good test for the real stance of a particular economy. Theory states some important parts of the process, such are necessary changes in legislation, currency exchange, technical preparations, etc., but the strongest fear is connected to inflation pressures, arising from speculations and prices recalculation in new currency. In Croatian case it has been even harder to estimate, because of the negative global inflation trends at the moment of euro adoption.

This paper aims to analyze the early phase of euro adoption in Croatia, considering the theoretical contributions, necessary preparations and experiences both from pre-euro phase and after the euro was introduced. Entering the monetary union and adopting common, supranational currency is a long-term, complex process that requires thorough preparation. This process is well-defined, but the changing environment and national specifics require individual approach for every member country. Although Croatia has been a monetary sovereign country for nearly three decades, high level of euroization was persistent. Global inflation pressures raised insecurities on the future inflation levels and made it difficult to estimate the level of inflation that has been caused by euro adoption. Because of the early stage of euro introduction in Croatia, there is still not much literature related to this process. This paper aims to contribute to its’ description and analyses, considering the fact that we still have modest time series on the subject.

This paper is organized as follows. The introductory part that explains the motivation for this research and the main goals of the paper is followed with a brief literature overview (chapter two). The analyses and discussion are provided in part three. Final part summarizes the paper and gives recommendations for further research.

Literature overview

The topic(s) that include discussion on the choice of national exchange rate regime is covered in literature in many aspects, especially during the second half of the XX century. Specifically, small open economies are under discussions on their real capacities to manage floating exchange rate. This discussion has deepened with strengthening of the European integration, followed by the transition process in former centrally planned economies.

As previously stated, literature related to the topic of European integrations theory and practice is wide and covers both developing stages of the process itself and the nationally specific cases. The latter also includes analyses on new member countries that introduced the euro after 2002., considering their response on internal and external shocks, both in pre- and eurozone membership phases. As previously mentioned, eurozone membership has been the final goals for transition countries from the beginning of the process in early 1990s. But, a combination of factors in its later stages, such are successful structural (macroeconomic and financial) reforms, monetary and exchange rate policy developments, internal and external shocks, etc. for some of them postponed the process. Other countries, Bulgaria for example, did not fulfill the convergence criteria and are still outside the eurozone.

Euro adoption process in Croatia, following the experience of other countries and considering the need for national “eurostrategy”, has been planned in detail. There have been numerous successive documents covering different aspects of the process. Croatian National Bank (CNB), in coordination with national government, developed national plan of euro adoption in 2020. (Vlada Republike Hrvatske & Hrvatska narodna banka, 2020), following the similar document from 2018 (Vlada Republike Hrvatske & Hrvatska narodna banka, 2018). Furthermore, during the pre-euro period, there have been many research and analyses provided on this subject, including periodical publications from national institutions.

Experiences and expectations from euro adoption have also been well described in the literature. Fidrmuc, Klein, Price & Wörgötter (2013) discussed the case of Slovakia during the crisis period of 2009, five years after euro introduction in 2004. Export competitiveness in manufacturing sector during the pre-euro period has been endangered by unprecedented real appreciation. Crisis strategy included a combination of internal devaluation and measures for improving productivity. Similarly, using synthetic control method on the case of Slovakia, Žúdel & Melioris (2016) analyzed the first five years of euro. They concluded that Slovakia would benefit from postponing the euro adoption process for one year, considering the influence of global crisis. Korcsmáros, Machová, Šeben & Fehér (2019) pointed out that the main benefits for Slovakia in terms of euro introduction in period from 2009 till 2011 were stability, ability to solve liquidity problems caused by financial crisis and increase in competitiveness, which is important for attracting foreign direct investments. Walko (2022) discussed the cases of Croatia and Bulgaria and their readiness for the euro adoption. As the most important challenges in these countries the author marks low productivity and high unit labor costs. Also, improvement in business environment is recommended, in connection with digital transformation, innovation capacity and education outcomes. There are also weaknesses in market regulation and the need for maintaining financial stability. Overview of literature contributions covering Croatian and Bulgarian case are summarized in Kordić, Bošnjak & Bilas (2021), covering the pre-ERM II period and discussing the pros and cons of euro adoption for these two countries. Kotarski (2019) focused on political economy aspect of euro introduction in Croatia, describing the process as an opportunity for the country to solve numerous structural problems. Dandashly & Verdun (2018) discussed the process of euro adoption in Hungary, Poland and Czech Republic,

aiming to discuss reasons for their reluctance of euro introduction. Some of their findings include early membership in Exchange Rate Mechanism II that eased the process of euro adoption. Further, they find the pro-european orientation of government a necessary but not sufficient condition and discuss the high importance of political elites' and existence of veto points. The analyses also included the role of central banks in observed countries and the public perception. Finally, the authors made a conclusion on domestic political reasons that influenced the lack of practical realization of the euro adoption process.

A lot of attention is given to the benefits of membership in European integrations. Expectedly, countries aim to improve the quality of life and living standards in many aspects that should arise from it. On the other hand, there is a certain level of Euroscepticism, as the countries try to minimize adverse side effects. Deichmann, Haughton, Li & Wang (2022) examined the perceived quality of life for “old” (or “core”) member countries that entered the EU before the *big bang* expansion in 2004 and new member states (NMS). The research has proven the improvements for the NMS, but there are shocks, such as global recession or SARS-CoV-19 pandemics that put new challenges for the members. Campos, Coricelli & Moretti (2019) contributed to the research on the growth effects of European integration, covering time span from 1973 to 2004. They have concluded that the effects of EU membership on growth are large and positive in all observed countries, except for Greece. Furthermore, per capita incomes without European integrations would be approximately 10% lower during the first ten years. Earlier research provided by Borsi & Metiu (2015) covered data on economic convergence during the 1970-2010 confirmed the separation between the new and old EU members in terms of income. The clustering has been mostly on a geographic basis and since the 1990s there is a difference between South-East and North-West countries. These differences might result in aversion towards the European integrations and/or E(M)U membership, but the level of Euroscepticism has changed over time. Entering the monetary union puts strong limits on some parts of national identity and monetary policy is one of them, while it is doubtful whether this process is followed by the development of the European identity. Negri, Nicoli & Kuhn (2021) researched whether the introduction of the euro might contribute to this process. Using dynamic panel-data model on a sample of 26 European Union countries during 1996 – 2017 time span they confirmed that the euro has fostered European identity. The portion of Europeans that relied on national identity has only decreased by 3%. Research, provided by Oxford Analytica (2022) measured the level of Euroscepticism after the Brexit and concluded that Eurosceptics lost support from 2016 on, with easing their rhetoric. Eurosceptic parties' main agenda is now to change the EU from within, via national governments and the European Parliament. Backé & Beckmann (2022) investigated the way in which the impact of financial literacy and trust in institutions affect attitudes on euro adoption in ten Central, Eastern and Southeastern Europe (CESEE) countries. Their results showed that these attitudes vary widely across and within countries. Generally, those that are financially more literate preferred euro adoption, while the similar results were observed for the level of trust in EU institutions. Apart from the contributions in scientific literature on different aspects of euro adoption, for Croatian case we have some preliminary research (see more in Falagiarda, Gartner, Mužić & Pufnik, 2023). These analyses have been in favor of euro adoption, concluding that the inflation pressures are caused more by international trends, while the costs of euro adoption are one-time and similar to price raises in other examples of euro introduction. Falagiarda & Gartner (2022.) highlighted the need for sustainable economic convergence and structural reforms. The future policy, in authors view, should prioritize institutional and business environment, the public administration and the judicial system, including constant improvements on labor market.

This brief literature overview covered some aspects of euro introduction process that are important for the first, introductory phase. They include experiences from other, similar countries, research on influence of euro introduction on national economy and the attitudes towards eurozone membership.

The process of euro adoption in Croatia: Early phase

This chapter include adjustments in monetary policy, considering also the inflation pressures, changes in monetary sovereignty, monetary statistics and instruments. It is still rather early to discuss the long-term effects of euro adoption on national economy, especially considering the external shocks on global level. Inflation rates are also rising under influence of global trends, but it is undoubtable that inflation pressures are under influence of eurozone membership.

Selected facts on Eurozone membership

The creation of eurozone year-by-year is presented in Table 1. and we might observe that it has been a long gap between the entrance of Lithuania in 2015 and Croatia in 2023.

Table 1: Eurozone members and year of euro adoption

Year	Country
1999	Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain
2001	Greece
2007	Slovenia
2008	Cyprus, Malta
2009	Slovakia
2011	Estonia
2014	Latvia
2015	Lithuania
2023	Croatia

Source: European Central Bank (online), European Union (online).

Since there are still European Union (EU)-members that are outside the eurozone, Table 2. contains some facts on their current status. Apart from Denmark and Bulgaria, these EU members do not participate in ERM II and opted for free floating exchange rate regime. Such policy indicates the intention to be more active in conducting national strategies, avoiding potential limitations of eurozone membership. The latter are especially visible in terms of crisis, while some form of floating regime allows more maneuver space in terms of goals and instruments.

Table 2: Some important facts on non-eurozone member countries integration processes

Country	EU	ERM II	Exchange rate regime	Convergence criteria and euro adoption
Bulgaria	2007 January 1 st	2020 July 10 th	-Currency board arrangement -ERM II	-Convergence criteria not complied, -Euro introduction date postponed
Czech Republic	2004 May 1 st	-	-Free floating	-Convergence criteria not complied
Denmark	1973 January 1 st	1999 January 1 st	-Conventional peg	-“Opt-out” clause for eurozone membership -Not a subject of convergence assessment

Country	EU	ERM II	Exchange rate regime	Convergence criteria and euro adoption
			-ERM II	
Hungary	2004 May 1 st	-	-Floating	-Convergence criteria not complied
Poland	2004 May 1 st	-	-Free floating	-Convergence criteria not complied
Romania	2007 January 1 st	-	-Crawl like arrangement	-Convergence criteria not complied
Sweden	1995 January 1 st	-	-Free floating	-Convergence criteria not complied (ERM II) -Euro adoption rejected in 2003. on referendum

Source: European Central Bank (online), European Union (online), European Commission (2022), International Monetary Fund (2022).

As can be concluded from Table 2., observed countries have not fulfilled convergence criteria (primary in terms of inflation), including also cases of rejection on referendum (Sweden).

Changes in monetary policy caused by euro adoption – discussion

Period before euro introduction contained activities aimed to prepare all sectors for new currency: information campaigns, use of dual prices, fixing the conversion exchange rate, necessary changes in legislation, etc. Also, part of the preparations in terms of official policy monetary policy has already been done while the procedures for other important parts, such as international reserves strategy, are prescribed.

Radical changes after entering the eurozone includes monetary policy strategy, since it is now under conduct of a supranational central bank. National central banks still exist, but as a part of eurozone they primary provide technical and operational support. Decisions are made with the collaboration of member countries' deputies, mostly governors.

Primary goal in terms of price stability remains the same, although defined in a little different manner. European Central Bank (ECB) previously defined its goal as a stable inflation rate below but close to 2%, measured in Harmonized Index of Consumer Prices (European Central Bank (online)), while now the goal is set on inflation rate of 2% over the medium term. Policy of Croatian National Bank (CNB) did not define the price stability in terms of a numerical goal. Furthermore, exchange rate policy is no longer based on intermediate exchange rate anchor, but is under control of ECB.

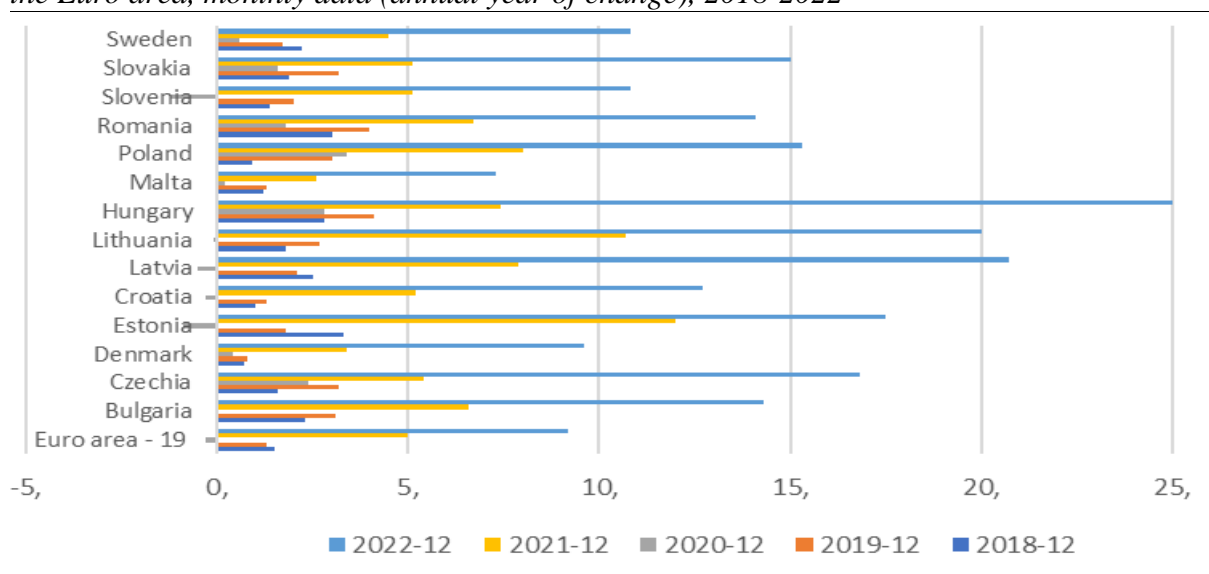
Monetary policy strategy partly consists of set of instruments that are not unknown in Croatia: open market operations, standing facilities and minimum reserve requirements for credit institutions. Fourth instrument, forward guidance is new, but already familiar instrument, based on the practice of unconventional monetary policy. Still, the most important CNB's instrument in pre-euro period, foreign-exchange interventions was abandoned after euro has become national currency. There is also instrument of emergency liquidity assistance, for solvent financial institutions that face liquidity problems (Croatian National Bank (online)).

One of the strongest fears from euro introduction is whether this process would result in inflation. Inflation pressures in comparable cases have usually been caused by rounding the prices, resulting in one of the costs of euro adoption. In the long run, eurozone members should benefit from the use of euro, because of lower transaction costs and currency risk elimination.

In a very short run, immediately after the currency exchange, there is a risk of inflation pressures. In current practice, new members introduced the euro in terms of stable inflation. That is why the Croatian case is rather specific since there are strong inflation pressures on global level at the time of euro adoption.

Graph 1. presents developments of inflation within a 2018-2022 time span for selected countries (non-EMU members and new member countries), since these countries are comparable to Croatia.

Graph 1: Inflation rate in non-EMU members and new member countries - comparison with the Euro area, monthly data (annual year of change), 2018-2022

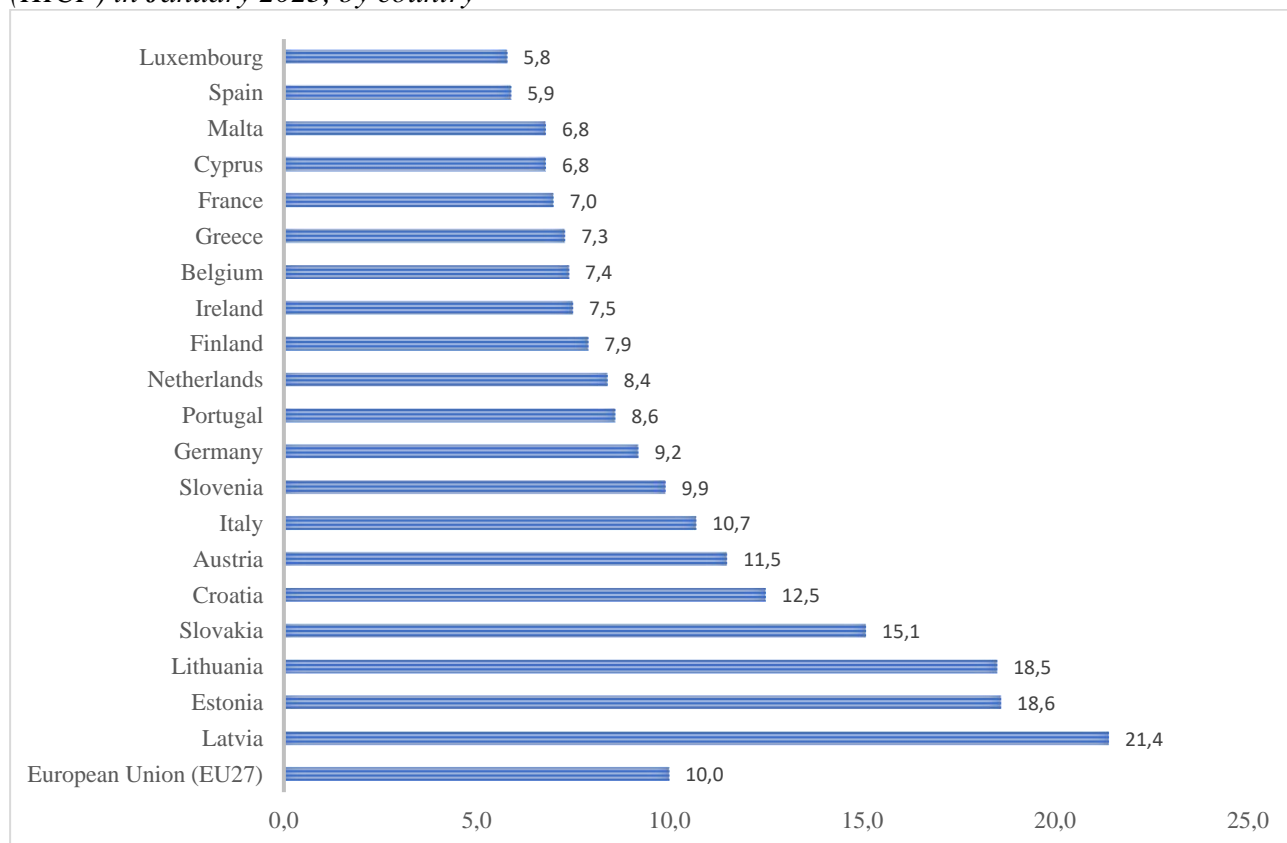


Source: Eurostat (online, 1).

The trend of raising prices rate is visible and, in Croatia, is not caused by euro introduction only. Inflation rate increase has been a result of a few reasons, including energy prices, war in Ukraine, pandemic costs, etc. After a long period of stable and low inflation rate, even with deflationary trends, at the beginning of 2021. rates of inflation strongly increased. This is also an unfavorable schedule for euro introduction, since it is hard to define the portion of total inflation rate that arises from currency replacement. In most cases this rise is caused during the process of price conversion, because of rounding. Although it is not a strong rise, the process is visible on everyday level and, apart from the fears of inflation, also generates negative attitudes on euro adoption. Other countries, that are comparable with Croatia became eurozone members in more favorable conditions, primary in terms of inflation.

Furthermore, on Graph 2. we might observe the inflation rates in eurozone member countries, including the EU-27 rate, in January 2023. We might observe high inflation rates in Baltic countries, while Croatia did not have a sharp rise after euro introduction.

Graph 2: Inflation rates in eurozone member countries, Harmonized index of consumer prices (HICP) in January 2023, by country



Source: Eurostat (online, 2).

On Graph 3. we have a data on short term inflation expectations of both consumers and customers in Croatia. In terms of adopting new currency and with raising inflation rate, expectations are important for stabilization strategies. Thereafter, stabilizing inflation expectations, especially in short term, is among of the crucial prerequisites for reaching stable inflation rates.

Graph 3: Short term inflation expectations of consumers and companies in Croatia



Note: Consumer's expectations cover 12-months ahead, while companies' 3-months ahead.

Source: Ipsos as cited in Croatian National Bank (2023:12).

Based on Graph 3. we can withdraw conclusions on inflation expectations for different sectors. During the period observed, from 2015. till 2019. inflation expectations were stable, even with deflationary fears at the beginning of 2020. Later, direction of trends changed, inflation expectations worsened and were mostly pronounced in 2022. Still, global trends are different in Croatian case than in other cases, considering the instabilities on the international level. The data also describe the influence of shocks (for example, SARS-CoV-19 crisis in the first half in 2020) that later developed in worsening of inflation expectations.

Since 2015 Croatian National Bank used the ECB's framework for monetary aggregates, as a parallel scheme for monetary statistics, while primary using national rules. It was important to determine the level of foreign currency in monetary system, considering the high level of euroization. In the pre-euro period, the total liquidity was covered by the international reserves, that indicated the rigidity of the monetary system and questioned whether that was a managed floating exchange rate, as officially defined. Furthermore, the classification of exchange rate regimes provided by International Monetary Fund defined it (for 2021) as a type of a soft peg, precisely as a "stabilized arrangement", with exchange rate anchor to euro (IMF, 2022:10).

After abandoning the national currency, primary scheme in monetary statistics became those developed by the ECB. It is a three-level scale, from M1 to M3 (European Central Bank (online)), covering different grades of liquidity. It is based on liquidity principle, emphasizing the role of money in terms of asset protection.

International reserves in Croatia traditionally had the highest share denominated in euro, since the European Union has been the most important trading partner, but also because of the dominant use of foreign-exchange interventions for conducting national monetary policy. After euro adoption, part of international reserves has been transferred to the European central bank, while it also creates investment strategy.

So far, after the first days of fulfilling the final stage of integration process and euro adoption in Croatia, the technical aspects have been successfully conducted. Still, the external factors strongly influenced this process, including the measures taken from the government to ease the consequences of crisis.

Conclusion

This paper analyses the first days of euro in Croatia, that has been adopted after a long preparation period. It covers different aspects of the process, including the Croatian specifics.

The goals set on the beginning of transition process in early 1990s in terms of eurozone membership after European Union accession have been fulfilled in the majority of countries. Croatia has joined the eurozone on January 1st 2023., after a rather short time in Exchange Rate Mechanism II (from July 10th, 2020). The most visible part of the process on everyday level has been exchanging Croatian kuna to euro, but there are other important structural aspects.

Accession to the monetary union implies long term preparation, that is in terms of European integrations summarized in convergence criteria. Still, there are always dilemmas on costs and benefits of the process, founded both in theory and in practice. For a rather long time, candidate countries valued benefits more than costs, but after numerous crises (Great Recession, crises

caused by SARS-CoV-19 pandemic and war in Ukraine) that caused inflation pressures worldwide, the attitudes partly changed.

Although they have an “opt-in” clause, some of the countries postponed the eurozone membership and do not put a lot of pressure on convergence criteria fulfilment. Currently, two countries are in ERM II, Denmark and Bulgaria, while the latter removed 2024 as a year of euro introduction.

The literature overview presented in this paper contains both theoretical and practical conclusions on euro adoption, confirming that the most visible fears during the early phase are inflation pressures, mostly arising from the rounding of prices during conversion. Croatian case is somewhat specific since inflation was high at the moment of adoption. That is why the official data confirmed that inflation fears already existed at the time of euro adoption.

The process of common currency adoption includes technical and strategic preparations. Consequently, adjustments were made within the scope of monetary policy instruments and statistics, including also the conducting strategy of international reserves. Although the monetary policy framework is now defined with eurozone membership, in the pre-euro period it has also been limited but with high level of unofficial euroization.

The period of observance is rather short, which is a limiting factor for this study, so the focus is on the technical aspects and necessary adjustments. Longer term shall give more detailed observations on the consequences of euro introduction.

That is why this is a good starting point for further research, including also the experiences of other countries, whether they are eurozone members or are in some other relation with the European institutions.

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CHALLENGING THE CONCEPT OF SUSTAINABLE MEGA SPORT EVENTS – WHAT DOES THE FUTURE HOLD?

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Abstract

Today it is common for sustainability issues to be misinterpreted or even neglected when determining the costs and benefits of a particular event, society, economic activity, or some other phenomenon. Even though global thinking on achieving a sustainable environment has shifted to specific practices rather than simple and not overly efficient declarative statements, there are still a staggering number of unsustainable development practices worldwide. In addition, mega sport events have become a major topic of sustainability reporting due to the inextricable link between tourism and sport. With the development of society and infrastructure, many aspects of organizing mega sport events have come into focus, and more attention has been paid to the issue of covering the cost. On the other hand, nowadays not only sport and tourism are in focus, but also numerous other aspects of organizing such events have to be taken into account - political, cultural, environmental, social, etc. Therefore, it is not surprising that the concept of sustainability has become an important and integral part of event policies and strategies. The research in this paper is based on secondary data, including official statistics, published reports and other scientific research. The main objective of the paper is to analyse how mega sport events deal with the notion of sustainability, taking into account all investments, constructions, disruptions and benefits experienced in the host community. Scientific contribution of the paper is to bridge the gap between the issue of sustainability in tourism and the sustainability of mega sport events. These two phenomena are closely linked and therefore face very similar challenges almost simultaneously when it comes to tracking and assessing the level of sustainability achieved. The research findings suggest that sustainability issues, while emphasised and appropriately addressed, are neither properly nor adequately addressed. The host communities usually do not experience the expected long-term benefits and therefore the willingness to host such events decreases. This means that the idea of organising a mega sport event should be evaluated in all its aspects, bearing in mind that the greatest benefits could be in image creation (if properly managed) and long-term legacy. But will such investments receive the necessary public support in the future? This idea is discussed and reassessed in this paper.

Keywords: mega sport events, sustainability, legacy, social value, community welfare

JEL classification: L83, Q01, Z29, Z32

Introduction

Sport events, regardless of their size and scope, can be seen as a near-perfect link between tourism and sport, bringing economic benefits to destinations and enhancing the importance and role of sport at both individual and national levels. However, in assessing the actual impact of these events on destination level, one must refer first and foremost to the concept of sustainability. At its core, sustainability should be synonymous with the prosperity of the local

community in all spheres of life. Therefore, it is no longer sufficient to discuss only the economic impact of these events or simply to isolate their environmental impact, but the analysis needs to be extended to the prosperity and long-term benefits of the destination (e.g. Hall, 2012; Sotiriadou & Hill, 2015; Kim, Choe, Kim & Kim, 2019; Azzali, 2020; Gulak-Lipka & Jagielski, 2020; Lu, 2021; Duigan, Everett & McCabe, 2022). The main concern, however, is that "for far too many people and places, hosting a mega-event so as to remain competitive in a declining global economy and environment has become the solution rather than a symptom of the problem" (Hall, 2012: 129). For this reason, it is quite clear why the issues of sustainability are not properly addressed, but only assessed on the basis of economic impact and the role of the event in urban development. However, the debate needs to be transferred to the balanced sustainability of events by including the social dimension of impact in the discussion.

Today, all destinations need to meet the sustainability agenda when planning and building the required infrastructure. As a result, both the International Olympic Committee (IOC) and FIFA have issued sustainability strategies that highlight awareness of this issue and recognise the increasing importance of meeting the sustainability postulate (IOC, 2017; FIFA, 2020). There is therefore an urgent need for precise measurements of the sustainability of these events, which should provide the necessary insight into their impact at the local level. The debate is closely related to the issue of measuring tourism sustainability at destination level, which has been the subject of several recent studies (e.g. Gkoumas, 2019; Butler, 2022). Both scholars and practitioners have been discussing the issue of sustainability for almost four decades now, but still there is lack of a clear idea of how to achieve this state at the destination level, let alone how to measure sustainability in a given time period (e.g. Liu, 2003; Mika, 2015; Alfaro Navarro, Andrés Martínez, & Mondéjar Jiménez, 2020; Hsu, Chen, Nyaupane, & Lin, 2020; Sharpley, 2020; Diéguez-Castrillón, Gueimonde-Canto, & Rodríguez-López, 2021; UNWTO, 2021). The issue of the sustainability of mega sport events is similar.

With the outbreak of the COVID -19 pandemic, hopes were raised that tourism development would make a much-needed shift towards sustainable practises, but due to the numerous disruptions in the global tourism market and the slow opening of the tourism system, previous development practises were not improved (Everingham & Chassange, 2020; Higgins-Desbiolles, 2020a; Higgins-Desbiolles, 2020b; Butcher, 2021; Zopiatis, Pericleous, & Theofanous, 2021; Gössling & Schweiggart, 2022). The same applies to the organisation of mega sport events, a topic that is addressed in this paper. It is clear that consumer behaviour has adapted to the new, post-Covid mindset (e.g. Zwanka & Buff, 2021). In addition, a large body of research has addressed the issue of mega sport events during and after the pandemic, emphasising the need to re-evaluate and redefine the conditions under which they take place (Daniels & Tichaawa, 2021; Dergaa et al, 2021; DiFiori et al, 2021; Westmattmann, Grotenhermen, Sprenger, & Schewe, 2021; Breidenbach & Mitze, 2022; Lee Ludvigsen & Hayton, 2022). All these reasons have triggered the need to conduct this research and analyse whether and how sustainable mega events are a future potential, a *conditio sine qua non* or simply a desired state of affairs.

Purpose and methodology

The aim of this study is to critically analyse the idea of sustainable mega sport events, taking into account the core idea of the sustainability concept. Indeed, sustainability can be broadly defined as a method of using a resource in such a way that it is not depleted or permanently

damaged (Merriam-Webster). Although this concept is quite simple, it is far from undemanding when it comes to implementing its principles at the destination level. The UNWTO has highlighted the main objectives of sustainable tourism in general: “1) making the best use of environmental resources, which are a key element of tourism development, maintaining essential ecological processes and contributing to the conservation of natural heritage and biodiversity; 2) respecting the socio-cultural authenticity of host communities, preserving their built and living cultural heritage and traditional values, and contributing to intercultural understanding and tolerance; and 3) ensuring sustainable, long-term economic operations that provide equitably distributed socio-economic benefits to all stakeholders, including stable employment and income opportunities and social services to host communities, and that contribute to poverty reduction” (UNWTO). For a sport to be sustainable, it must “meet the needs of today's sporting communities while contributing to the improvement of future sport opportunities for all and the improvement of the integrity of the natural and social environment on which it depends” (Chernushenko et al, as cited in Swart, Milla, & Mataruna-Dos-Santos, 2021).

In light of these values, it seems reasonable to reconsider the role and impact of mega sport events at the community level. The scale of the impact of these events on livelihoods, local and national economies and the environment is enormous, and the complexity of these events increases with each new alignment hosting. Therefore, the main objective of this article is to analyse *how mega sport events deal with the notion of sustainability*, taking into account all the investments, constructions, disruptions and benefits experienced by the host community.

This research draws on secondary sources as the aim is to provide an overview of the theoretical knowledge on how sustainability has been applied to the issue of mega sport events. The search of the databases included a combination of the following keywords - mega sport events, sustainability, economic impact, environmental impact, social well-being. The analysis included the published papers that showed the greatest similarity to the defined search. The next step involved a more in-depth analysis of the sustainability strategies of mega sport events, with the Olympic Games and the FIFA World Cup being the focus of this phase of the research.

Theoretical background

The impacts of mega sport events are nowadays recognised by numerous researchers. This is primarily explained by their impact at the destination level, but their international importance is also steadily increasing. In addition to their economic impact, they also need to be analysed from technological, environmental, tourism, political, social and other aspects. For example, mega sport events are quite interesting for politicians, as they can spread a general mood of optimism, create shared visions, attract exogenous resources and accelerate urban development (Preuss, 2007: 207). In general, it seems reasonable to expect that a mega sport event will have long-term benefits for the host city, especially by creating a legacy. Hence, regardless of production time and location, “legacies are all the planned and unplanned, positive and negative, tangible and intangible structures that are created for and by a sport event and last longer than the event itself” (Preuss, 2007: 211). Today, however, it is becoming increasingly clear that hosting a mega sport event may not be sustainable, a point that will certainly be of great importance when destinations ask for public support for the organisation. As Gulak-Lipka and Jagielski state, over the past 25 years, mega event organisers have recognised the need for change and have taken steady and progressive steps to integrate sustainability throughout the organisational process (2020: 2859).

It is quite clear that the world has changed significantly in the last 30 years and the issues of safety and security, public health, political stability, social injustice, poverty, climate change and economic stability have come to the fore on a global scale. At the same time, all these factors have a strong influence on the decision to host or even consider hosting a mega sport event. Jago, Dwyer, Lipman, van Lill and Vorster, for example, outline the most important aspects influencing the impact of mega-events on destinations, namely the role of media, technology and security (2010: 228-229). Given the growing awareness of the importance of sustainability in all aspects of today's world, the role of technology and media in this process is crucial.

Further analysis will follow the transition of focus to all three pillars of sustainability and finally emphasise the importance of a holistic approach in assessing the impact of mega sport events at the destination level. As mentioned earlier, sustainability is a concept that needs to be understood as a means to bring the focus and purpose of tourism development back to local communities. Through the prism of such an understanding of sustainability, its manifestation in the field of mega sport events must be visible through economic prosperity, environmental protection and social well-being.

Economic impacts of mega sport events

For a long time, the biggest and most important reason for hosting mega sport events was their economic impact. However, as the projected costs increase significantly over the course of organising the event, more attention is being paid to the ultimate benefits of the event. The discrepancy between predicted and actual costs is shown in Table 1.

Table 1: Mega sport events' cost overruns

Host	Year of games	Initial bid (billions of USD)	Estimated final cost (billions of USD)
Athens	2004	1.6	16
South Africa	2010	0.3	5-6
London	2012	4.0	15-20
Sochi	2014	12.0	51-70
Brazil (stadiums only)	2014	1.1	5

Source: Zimbalist, 2016: 47.

The 2020 Tokyo Games also saw a significant increase in total costs (BBC, 2020), but these figures need to be adjusted to reflect the circumstances at the time, as the Games were postponed for a year due to the outbreak of the COVID-19 pandemic, which increased the final costs. A study conducted by Matheson and Baade (2004: 2) found that “boosters' projections of the economic impact of sport events exaggerate the true economic impact of these competitions, and these events are an even worse investment for developing countries than for industrialized nations”. The rationale for hosting mega sport events should not only be their economic impact, but must go beyond this category.

In general, each host can expect certain economic impacts in the short and long term, as listed in Table 2. Each of these impacts can either pose a serious threat to the local and national economy or bring desired prosperity to the host community. When it comes to long-term impacts, it is generally assumed that mega sport events have a positive impact on tourist arrivals, even if this increase is not always as high as predicted. Fourie and Spronk's (2011)

study emphasises that the number of tourists from participating countries tends to increase the most, while their study finds little evidence of a shift between countries. Again, they stress that these results could be due to the scheduling of off-season events or the fact that the relative size of the events that were the focus of their study was rather small compared to the Olympic Games or the World Cup.

Table 2: Mega sport events’ economic impacts

	Costs	Benefits
Short-term impacts	<ul style="list-style-type: none"> • bidding • opening and closing ceremonies • sport venues and non-sport infrastructure • business disruption • security • cost overruns • other costs 	<ul style="list-style-type: none"> • overcoming political gridlock • higher real estate prices • feel-good effects • construction • tourism
Long-term impacts	<ul style="list-style-type: none"> • white elephants • long-term debt and opportunity costs 	<ul style="list-style-type: none"> • tourism • trade and investment • qualitative and other benefits

Source: Zimbalist, 2016: 44-74.

As Fourie and Santana-Gallego note, the success of hosting mega sport events and their long-term impact depend on several variables, namely the type of mega event, the countries participating, and whether the event takes place during peak season or off-season (2011: 1369). Given the size of the event and the number of participants, which runs into hundreds of thousands, it is quite clear that the economic impact can be interpreted in different ways depending on which premise one wishes to prove. Leagues, team owners and organisers have a strong incentive to state the economic impact with the largest possible numbers to justify high public subsidies (Matheson, 2006: 2). However, the same author gives an example that illustrates the misinterpretation of publicly released data, because while “the 2002 Winter Olympics in Salt Lake City made a profit on paper, the cost figures did not include millions of dollars for additional security measures provided by the US Department of Defence at no cost to the local organising committee” (Matheson, 2006: 3).

It would be wrong to assume that there are no economic benefits felt at the destination level, or that they are not a sufficient reason for hosting such a sport event. On the contrary, the focus today is on discussing the legacy of the events. Preuss argues that there are three legacies of the event that complement the city's long-term development plan:

1. often the host city develops faster than it would have done without the event. On the one hand, accelerated development is a positive legacy. ... On the other hand, accelerated development carries the risk that constraints will be ignored, quality will fall and costs will rise.
2. the consensus of politicians often associated with mega-events helps secure the investment of public funds
3. part of the infrastructures/event structures are financed by autonomous means, for example by sports federations, central government or the private sector (2007: 219).

When properly planned (e.g. Barcelona 1992, London 2012), urban development can be a powerful motivator and an important impetus for community renewal. However, as the data in Table 1 implies, the costs of organising them can significantly exceed the original plans, seriously threatening the issue of sustainability. The real question that arises is: how do we

measure the economic impact and how can we be sure that all costs and benefits have been taken into account? And more importantly, are we sure that all events use the same methodology? There has been an increase in the number of publications and studies on the economic impact of sport events, with the question of the methodological approach and measurement of this impact at the forefront. Saayman and Saayman (2014) have argued that there is still no consensus on which methodology to use when quantifying impact and which expenditures should be included in the measurement process. Madden (2006) has examined the economic and fiscal impacts of mega sport events, in particular the 2000 Sydney Olympics, and concluded that the financial losses from the Games were not too great, including the costs of building the necessary infrastructure.

“While new facilities always include amenities that provide additional revenue streams, and ticket prices usually increase with the opening of a new stadium or arena, new facilities also impose other costs” (Siefried & Zimbalist, 2000: 98). As mentioned earlier, politicians tend to almost over-support mega sport events because of the promise of benefits that might be unrealistic in the period leading up to the event. In addition, macroeconomic conditions could become unfavourable during this period (as was the case with the Rio 2016 Games). Even if certain areas of benefits can be identified, these must be weighed not only against the size of the financial investment in hosting, but also against the opportunity cost of the land used and the human talent employed to plan and deliver the Games (Zimbalist, 2016: 127).

Economic impacts are neither an indisputable nor a fallacious basis for determining the success of a mega sport event. However, they should not be used as the primary criterion for evaluating the sustainability of the event. The economic dimension is only one tip of the sustainability triangle, which is just as important as the environmental and social components.

Acknowledging the importance of mega sport events' environmental impacts

Due to the complexity and size of mega sport events in all their elements (sports and non-sports venues, transportation, media coverage, and other infrastructural needs), their environmental impact is very large. “Since the 1960s the relationship between hosting cities and mega-events has become more complex, and their impact on the built environment more substantial” (Azzali, 2020: 203). Again, this raises the question of legacy - if the event is to be sustainable, its impact at the community level must not compromise the quality of the environment. However, it is not impossible to imagine that hosting an event is seen primarily as a potential influx of investment, with the issue of environmental degradation pushed aside or given much less attention than necessary. “It is quite likely that perceived cost barriers associated with adopting sustainable practices deter the adoption of green design principles” (Sotiriadou & Hill, 2015: 5).

There are two main factors in the design and development of a sustainable event: “first, the reduction of the event's direct environmental impact or footprint (e.g., waste and water treatment, carbon emissions, and energy consumption); second, the potential that events offer to trigger change toward a more sustainable transformation and long-term legacy” (Death, 2011, cited in Azzali, 2020: 206). Interventions in the natural environment need to be duly acknowledged and considered in development strategies, especially when organizers decide to focus on the legacy of events (e.g., Serdar & Al-Ghamdi, 2021).

Pourpakdelfekr & Oboudi outline examples of environmental impacts, namely “negative impacts on natural ecosystems through the introduction of pollution and waste into the most

biologically and culturally rich areas, the use of non-renewable natural resources, the release of greenhouse gas emissions that contribute to climate change, and the high consumption of energy and water during the event” (2022: 1-2). Clearly, environmental protection and minimising the impact of interventions on the environment are receiving a lot of attention nowadays. However, apart from the issue of waste management and the use of environmentally friendly technologies, one of the biggest issues is that of climate change and the impact of these events on the climate (e.g. Fermeiglia, 2017).

A mega sport event requires significant investment to mobilize the economy, reorganize or transform host cities, and promote nationwide development (Serdar, Koc, & Al-Ghamdi, 2021: 6). It is critical that a significant portion of these investments go toward environmentally sustainable solutions. However, one could be misled if conclusions about sustainability are drawn only from this perspective. “The fact that an event has a greater number of positive impacts does not imply that the total balance is positive; only on the basis of comprehensive studies on all environmental impacts can we come to a final verdict on the environmental impact of an event” (Cerezo-Esteve, Inglés, Segui-Urbaneja, & Solanellas, 2022: 11). Once again, the debate is brought back to the original consideration - the sustainability of an event depends on the overall balance of all criteria, not ignoring the welfare of the local community.

Bringing the social welfare into the focus

The concept of sustainability is misinterpreted in most cases, as evaluations focus on the economic impact (primarily the benefits) of an event and the negative impacts are relegated to the background. Although it is undisputed that mega sport events can have numerous positive impacts on destinations, Ritchie, Shipway and Cleeve claim the negative costs or impacts are often not assessed by host destinations, but may linger long after the event has ended (2009: 163). The challenges of using the infrastructure built, maintaining it, social well-being, community development-all of these are in the hands of host communities over the long term. There are numerous examples of white elephants, poorly planned investments, unstable or underdeveloped economies unable to utilise the sports and non-sports venues that have been built, or there simply has not been a clear understanding of exactly how these sites will be used in the long term (e.g., Sarajevo 1984, Athens 2004, Brazil 2014 or Sochi 2014).

If a destination does not have the support of the local community to organise a major sport event, the process itself may be compromised. One such example was examined by Duignan, Everett and McCabe (2022: 12), who found that that resistance in Japan is most likely related to government policies that seek high tourism growth, with the Olympics tied into this critical narrative. Furthermore, they argue that because of the pervasive, nationwide threat of overtourism in Japan, communities across the country are aware of the collective effort required to resist harmful local impacts (2022: 13). Public support is crucial, not only declaratively, but also in the preliminary feasibility studies, as the IOC will not give the green light for further proceedings if local communities do not support the event. In Switzerland and Germany, citizens rejected potential bids in public referendums by 53%; in Sweden, national politics decided not to support a bid; and in Austria, public opposition in a referendum was supported by as much as 72%.... in Krakow, 70% decided against hosting the Games (Zimbalist, 2016: 135). Even though some studies emphasise the positive impact of sport participation on the support of mega sport events (e.g. Kim & Kaplanidou, 2019), it is much more difficult to obtain public support nowadays, as more and more examples of unsustainable events are registered worldwide.

The principles of a sustainable event include: ethical behaviour, accountability, and transparency; community and local stakeholder involvement; positive environmental and social benefits; accessible and inclusive environment; safe atmosphere and facilities for spectators, participants, and staff; excellent customer experience; and a positive legacy (CSA Standards, 2010, as cited in Hall, 2012: 121). Human rights are now central to sustainability strategies, particularly in the context of major sport events. In general, more attention is paid to positive impacts on local communities, volunteers, social well-being, and a positive atmosphere within local society. Jago et al rightly emphasise that the contributions of mega sport event can be optimised if they are part of a long-term development plan, part of a long-term marketing plan, through community engagement, legacies, holistic assessment, corporate engagement and public-private partnerships, and effective media involvement (2010: 231-233).

A study from Cape Town, South Africa, indicated that an enduring sense of well-being, celebratory spirit, and civic pride was used to positively influence some people's daily lives beyond the event (Musikavanhu, Ladkin & Sadd, 2021: 1846). It would be wrong to claim that mega sport events cannot be sustainable, it is enough to analyse the example of the 1992 Barcelona Olympics to convince oneself that it is quite possible to achieve such a state. However, it is also true that nowadays many more factors need to be taken into account in the planning and execution of such events, especially in the area of achieving an overall balance. This is especially challenging when there is political support for increasing economic benefits to justify the event in the first place, while local communities may not see as much benefit due to leakage from the local economy. Smith claims that in critical theory, major sport events are typically seen as representative of a prevailing neoliberal ideology in which cities are forced to compete with each other for investment. From this perspective, major events are seen as phenomena that aim to impress external interests while appeasing residents through entertaining distractions (2009: 111). Local communities and the human rights of all people involved need to be placed at the centre, and this would open a path to a sustainable future for these events.

Sustainability as a blurring concept in organizing mega sport events

In general, sustainability becomes an important element of most global strategies. However, to some extent the term is overused and trivialized. Karadakis, Kaplanidou and Karlis claim that there is a tendency to overemphasise the economic and social benefits and therefore promoters and organisers should be careful when using such economic and social benefits in promotional activities (2010: 181). Nowadays, people are able to obtain various information and it is hardly possible to withhold important knowledge from the interested public. Azzali (2020: 214) has highlighted several key challenges in organizing mega sport events - the low proportion of temporary venues and short-lived components, the exorbitant costs of a mega event, the impossibility of keeping the original budget unchanged, the predominance of public funding, the difficulty of adapting plans to unforeseen circumstances, and the lack of consideration for local needs and specificities. These challenges have strong implications for sustainability in general, not to mention the sustainability of an event with such a large impact at the destination level. This discussion brings us back to the issue of legacy as it determines the potential for overall sustainability. Preuss (2007: 210-211) has highlighted five dimensions of mega sport events' legacy:

1. "The degree of planned/unplanned structure
2. The degree of positive/negative structure
3. The degree of tangible/intangible structure

4. The duration and time of a changed structure
5. The space affected by changed structure.”

Any intervention in the built and natural environment has a strong impact on the legacy. Not all stakeholders are aware of the importance of such interventions and recognise the coherence between them and heritage. Kim, Choe, Kim and Kim (2019) focused their research on the issue of volunteers as co-creators of the event, highlighting the fact that legacy has different meanings from the perspective of the Olympic and volunteers, with personal benefits for the latter group being paramount. All stakeholders are responsible for their own interpretations of legacy, but they must all be consistent with the notion and postulates of sustainability.

“It is not necessarily the more expensive events that bring the greatest benefit: the nature and especially the timing (seasonality) of the mega-event and the countries participating in the event all have an impact on the 'success' of these events as measured by tourist arrivals” (Fourie & Santana-Gallego, 2011: 1369). Clearly, the location of the host also has an important impact on the event itself due to the time difference and scheduling of sport events. Given all these factors, it would be all too understandable to claim that mega sport events are a simple equation of three criteria added together. Although this is to some extent the case, there are many factors that should be taken into account in this equation, i.e. in the evaluation of sustainability.

“While it is important from an ethical perspective to understand the impact of sport and tourism on the external environment so that this impact can be managed more effectively, it is also important to understand the impact of changes in the external environment on the sustainability of sport and tourism to ensure the long-term viability of the sector” (Fyall & Jago, 2009: 81). Sustainability cannot be imposed on communities from the outside, it has to be embedded in people's everyday lives and become a way of life. Therefore, it seems inappropriate to justify the organisation of mega sport events from only one perspective, as it only offers a partial insight into the situation. According to Hall, “the use of gross value added as a contribution to GDP, as measured by those seeking to justify events, also serves to obscure the overall impact of events” (Hall, 2012: 129). Indeed, this is a rather simplistic approach to determining the impact of an event on the wider economy, not to say on sustainability in general. Moreover, this approach represents a partially dangerous perspective and could jeopardise prosperity in the long run.

In terms of sustainability, it is important to consider other investment and development opportunities. According to Preuss, there are five aspects that should be considered when arguing with the opportunity costs of investing in mega sport events:

1. the indirect and intangible impacts effects of mega event
2. the output for an alternative investment can only be based on the resources invested by a system
3. in cases where the mega event is politically wanted to achieve a certain goal, the alternative investment must be more efficient to achieve the same output
4. externalities often occur in the same spatial area but for other stakeholders not directly involved in the mega-event
5. synergies influence inputs when a second event follows the first (2009: 139).

The opportunities for investment and development in today's world are numerous, and as more and more stakeholders have a say in the final decision, it seems prudent to take time to consider optimal solutions that will have the least impact and the greatest benefit to the built and natural environment.

Along with the advancement of knowledge about sustainability in general and sustainable tourism development in particular, mega sport events have come into focus in this sense. Over the last 30 years, the main investments in Olympic host cities, besides the construction or renovation of sport facilities, have focused on projects in the following areas: transport, roads, neighbourhoods, parks, port facilities and airports (Gulak-Lipka & Jagielski, 2020: 2860). The intrusion of an event into the host's living environment is excessive. To emphasise the motivation for sustainability, the IOC and FIFA have initiated sustainability strategies and sustainability goals to strengthen their efforts towards a sustainable environment. IOC claims that sustainability is now firmly established as one of the priorities of IOC leadership. This ethos informs the way they work, their focus on ensuring sustainable Olympic Games and their collaboration with the wider Olympic Movement (IOC, 2021: 3). Their sustainability objectives for 2021-2024 are grouped into following categories (IOC, 2021: 26-30):

- the IOC as an organisation
- the IOC as owner of the Olympic Games
- the IOC as leader of the Olympic movement.

For all these goals, there are clearly defined measures to ensure their implementation. The IOC's five priority areas for sustainability are “1) infrastructure and natural sites; 2) sourcing and resource management; 3) mobility; 4) workforce; and 5) climate” (IOC, 2017: 31). However, the future of the Olympics may be in question as the economic impact is no longer as beneficial for governments and communities, leading to a recent decline in interest in bidding to host the Games. A study by Müller et al (2021) shows that while many host cities (e.g. Vancouver or London) declare to be an example of sustainable hosts, the results are quite different. Indeed, they have developed a model to measure the sustainability of Olympic Games and concluded, based on the research results, that “sustainability rhetoric does not match actual sustainability outcomes” (Müller et al, 2021: 344).

On the other hand, FIFA’s sustainability objectives for Qatar 2022 are determined within the following categories (FIFA, 2020: 22-23):

- human: developing human capital and safeguarding workers’ rights
- social: providing an inclusive tournament experience
- economic: catalysing economic development
- environmental: delivering world-class environmental solutions
- governance: setting an example of good governance and ethical business practice.

In the run-up to the 2022 FIFA World Cup Qatar, there has been much discussion about the sustainability of this event. At the same time as sustainable practises were being promoted, there was a fierce debate in academia and the media about the violation of human rights in the construction of the venues, particularly in relation to migrant workers (e.g. Dorsey, 2013; Ganji, 2016; Human Rights Watch, 2022). The question is whether this event can be considered sustainable, given that it represents such an enormous barbell touching on the issue of human rights and social justice? The answer must be based on an accurate measurement of the globally accepted model of sustainable development.

Kucukvar et al (2021) looked at circular design and its contribution to the social sustainability and legacy of the Qatar 2022 FIFA World Cup. Their study has shown that circular design is able to save up to 60% of human health impacts and significantly reduce the material footprint and dependence on imported building materials. Much current research has focused on this event. O'Rourke and Theodoraki, for example, focused their research on the sustainability strategy and concluded that “the tripartite policy network of actors represents a participant-

based governance approach with coherent policy formulation, different resources at their disposal, inconsistencies in accountability measures, and with the leading role of the network depending on specific initiatives and commitments of actors” (2022: 2). Talavera, Al-Ghamdi and Koç (2019) focused their research on the fact that Qatar 2022 was promoted as the first carbon-neutral World Cup and concluded that additional efforts are needed in reducing environmental impacts and especially on the issue of human rights violations.

It seems that mega sport events may find the sustainable way in small, non-mega events. The latter are more likely to be able to implement a sustainable concept, as their scale is smaller in every respect. “Sustainable events are more likely to be found in the smaller localized community-based events that run over the longer-term or at least help maximize the use of existing infrastructure” (Hall, 2012: 129). This approach has been explored from a variety of perspectives (Taks, 2013; Taks, Chalip & Green, 2015; Lu, 2021). Nevertheless, the two are not comparable in all dimensions and the solution cannot be to abandon the concept of mega sport events. However, some practises could be addressed and adapted to achieve much needed sustainability at the international level. It appears that the sustainability of these events is now being recognised and acknowledged and that the right tools need to be found to introduce sustainable practises. However, this alone is a higher level than the approach of assessing impact solely through the prism of economic benefit. Furthermore, there is still an imbalance between the conclusions of organising committees, indicators developed by international organisations and models developed by academics (such as in the research by Müller et al, 2021 or Talavera, Al-Ghamdi & Koç, 2019).

To answer the research question - how mega sport events take into account the notion of sustainability - it can be concluded that nowadays the organising committees of mega sport events take the issue of sustainability more seriously and publish strategies that focus on this issue. However, it remains to be seen whether the implementation and final results of these strategies will lead to the desired outcomes. It is difficult to move away from the conventional wisdom that economic benefits can compensate for all other impacts, especially negative environmental and social ones. As already pointed out in the introduction, the adaptation process for the issue examined in this study is similar to the one related to the concept of sustainable tourism development, but with a delayed timetable. Thus, the solution to the problem could be to adapt and adopt best practises and continue the process so that all stakeholders involved in the process can achieve optimal gains and create a prosperous environment.

In line with this idea, Jago et al propose a possible solution to the problem of ensuring the sustainability of mega sport events. They see this in the development of a knowledge portal for mega-sport events that would help “build knowledge in an accessible form and reduce the likelihood of destinations having to reinvent the wheel” (2010: 234). Knowledge should be shared and developed, as this is the only way society can grow and improve. Zimbalist proposes several different solutions to the problem, although his approach comes exclusively from the perspective of reducing the economic burden on host cities (2016: 137-144) - reform from above (including simplifying the bidding process, including more modest stadiums, sharing more revenue with host cities - a solution FIFA and the IOC may not readily adopt) and reform from below (making the urban development plan work for the Olympics, not the other way around - a model developed and implemented in Barcelona in 1992). So the solutions are there, the only question is when the sustainability issue will reach its critical stage and put pressure on organising committees to adopt sustainable practises regardless of possible profit losses, as long as the overall balance sheet can ensure the much needed sustainable environment.

Conclusion

The world must become a more sustainable and responsible place, with human rights and social well-being at the heart of development strategies. Indeed, we are witnessing a highly unbalanced society, an unequal distribution of wealth and a destruction of the natural environment. These conditions have led to the need to rethink the meaning of sustainability and to seek solutions to the question of how to translate sustainable practises into development strategies. The same is true for tourism development in general and mega sport events in particular. Although sport events are primarily designed to achieve the best sport results, their success in terms of economic benefits is strongly linked to tourism and is therefore analysed from a tourism development perspective.

The research conducted in this paper emphasised the progress made in analysing the sustainability of mega sport events, from different perspectives, i.e. the pillars of sustainability. Based on this analysis, it was found that economic impact was for a long time the only variable used to discuss not only the success but also the sustainability of an event. However, this approach is now questioned as it became clear that these effects often do not include all costs and, more importantly, are favoured by policy makers as they are in most cases a reason for strong government support. These conclusions enabled the transition to a balanced approach to the sustainability of these events.

However, the scope, size and disruption of mega sport events are sometimes unpredictable and host cities (or countries) face unplanned expenditure, which in turn challenges the balance of the sustainability pillars. Although both the IOC and FIFA have highlighted the importance of this concept and stated that they are committed to it, adapting these strategies to the specificities of each host is a daunting task. Therefore, some solutions need to be proposed globally. One of these solutions, as proposed in this paper, can be seen in the creation of a base of prior knowledge about the process of organising and hosting a mega sport event. Certain practises can certainly be adapted to other hosts. However, all these solutions should take into account the legacy of an event and think of local communities and their long-term well-being. Community satisfaction should never be undermined, as the event depends on their support and this would be proof that the event not only serves its own purpose, but that its purpose is in line with the main ideas of sustainability - long-term prosperity and duration of an event. In this way, the future of these events could be quite bright.

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STUDENTS' INTENTIONS IN SUCCESSION OF FAMILY BUSINESSES IN CROATIA

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Abstract

Succession is one of the most important research topics in family business. The theoretical part of this paper is about identifying the most important factors that influence a potential successor's decision to join a family business. The factors are considered from four different perspectives: Trends in society, external factors at institutional/cultural level, factors at family level and factors at individual level. In the empirical section, the results of a survey of students with family business background in Croatia are presented, which provides information on the extent to which students with family business background in Croatia are interested in succeeding their family business. The data was collected as part of primary research on the career plans and intentions of students with a focus on family business succession through an online survey. The survey was conducted in February and March 2023, and the respondents were the students from different faculties in Croatia. The number of students whose responses were included in the analysis is 52, spread across all years of the study. The students who participated in the survey had one or both parents owning a family business. The results show that students ranked high income and achieving their dream as the most important career goals, while they also considered a high position and being able to be their own boss important. Continuing the family tradition was rated with a neutral average score. Most students see themselves as employees in a public/private company after graduation, while about one third of them plan to start their own business either alone or with business partner(s), while about one fifth of them plan to be employed in the family business. The percentage of those who plan to succeed the family business was almost the same for both business and non-business students (21%). The most frequently cited reason for not intending to take over the family business was a lack of interest in the business activity and the industry in which the family business operates.

Keywords: family business, succession, potential successor, succession intention

JEL classification: J24, L26

Introduction

Succession is one of the most significant research areas in family businesses. Only a small fraction of family businesses make it to the second generation, and many intergenerational

transfers end in failure shortly after the second generation assumes control (De Massis, Chua & Chrisman, 2008).

The issue of business transfer is particularly important “for the Croatian economy, where over 5,300 businesses with about 57,000 employees represent a risk group whose owners underestimate the complexity and longevity of the business transfer process” (Alpeza, Singer & Mezuli Juric, 2016, p. 28).

The process of transferring a business is most often associated with the retirement of the owner of the business. However, the owners of the business may also leave the business earlier due to changes in their professional interests, a good opportunity to sell the business arises, he or she wants to start a new business, or because he or she exits due to emergencies like illness or death (Van Teeffelen, 2012). The main models of business transfer include family succession, sale of the business or liquidation.

One of the most important prerequisites for an intra-family succession is a successor who is willing to take over the business. Global University Entrepreneurial Spirit Students' Survey (GUESSS) is a global research project on student entrepreneurship in which students are asked about their career plans, including succession in a family business. The results of the GUESSS survey by Zellweger, Sieger & Englisch (2012) show that next-generation family members overall do not show a strong intention to take over the business. Only 22.7% of all students with a family background in a global sample of students whose parents own a business have thought of taking over their parents' business. Buljan, Vidić, Šimek, Krce Miočić & Klarin (2022) conducted the GUESSS survey in Croatia on students, who had at least one self-employed parent or at least one parent who was the majority owner of the company, about their succession intentions with the average score below neutral rating on Likert scale.

Following the identified low interest of potential successors in succeeding the family business is low, a comprehensive review and analysis of the literature on family businesses revealed that many studies focus on the owner, while little attention has been given to the motivation of successors and to systematising the factors that influence successors' intention to take over the family business. Understanding what prevents succession in family businesses, i.e. what influences the next generation's commitment to their family business, is important due to the role of family businesses in the global economy and the difficulties associated with intra-family succession.

To fill this gap, the paper aims in the theoretical part to identify the main factors that influence a potential successor's decision to enter a family business, while the empirical part aims to measure students' interest in family business succession. The main research question to be answered in the study is the extent to which students with a family business background in Croatia are interested in succession in their family business. The population of the research was students from various faculties in Croatia, which we focused on because we consider students as the group that is most intensively considering their career options and might have already been involved in a family business to some extent.

Participants were asked to complete a questionnaire to determine their career motivation, entrepreneurial experience, career plans after graduation and in five years after graduation, level of interest in family business succession and reasons for disinterest in family business succession. The questionnaire was completed by 52 students in February and March 2023.

This paper is expected to contribute to the existing literature on the same or similar topic. It is expected that the research findings will contribute to a better understanding of students' career motivations and consequently their interest in family business succession. The rest of the paper is structured as follows. After the introduction, a literature review is presented, followed by the results of the survey. The conclusion of the study is given at the end, where the limitations of the research and suggestions for future research are given.

Literature review

Based on the literature review in the field of family business succession, we have classified the factors influencing successors' motivations and intentions into four different groups: societal trends, external factors at the institutional/cultural level, factors at the family level and factors at the individual level. The authors do not claim that the list of factors in this paper is exhaustive. However, we have identified the factors to include in the framework based on their general applicability to a wide range of potential successors.

Trends in the society

According to Zellweger (2017), the relatively weak intention of potential successors can be explained by several underlying trends in developed economies that make the intra-family succession path progressively unattractive for potential family successors including:

Demographic trends. The average fertility rate in Organisation for Economic Co-operation and Development (OECD) countries was 1.59 births per woman in 2020, down from 2.84 in 1970. According to Zellweger (2017), the decline in intra-family succession may be related to underlying demographic trends towards lower fertility rates in developed and most Western economies, resulting in a shrinking pool of direct family successors. Demographic trends also manifest themselves in the lengthening of working lives. Workers now remain in the workforce longer, and parents may not be ready to step back from their leadership roles at the time their children graduate and take their first jobs (Zellweger, 2017).

Changing family structures. As Zellweger (2017) notes, as a result of the rise in divorce rates, non-traditional family structures are increasing, which in the context of business succession means that non-traditional families may have fewer clear 'heirs' for succession.

Individualism in society. As economic development progresses, societies tend to become more individualistic. In individualistic societies, ties between people are looser and independence is highly valued. In contrast, collectivist societies are dominated by strong, cohesive groups such as extended families, where unconditional loyalty and acceptance of strict power structures are valued. Entering the family business means accepting, at least to some extent, the structures and norms created by the family, a context that runs counter to the ideal of independent life valued in an individualistic society (Zellweger, 2017).

Multioptional society. Traditional careers were characterised by hierarchical, highly structured and rigid structures. Earlier career models were characterised by a clear, one-dimensional or linear path of prescribed "advancement": this implied promotion (Rosenbaum, 1979; Wilensky, 1964, as cited in Baruch, 2004). By the end of the twentieth century, however, the nature and concept of careers had fundamentally changed. Boundaryless careers (DeFillippi & Arthur,

1994, as cited in Baruch, 2004) emerged with the boundaryless organisation (Ashkenas, Ulrich, Jick & Kerr, 1995, as cited in Baruch, 2004). The new career models encompass a wide range of possibilities and potential career paths. People can (or must) choose between different options and there is no single path to success, hence the term "multidirectional" career paths (Baruch, 2004).

As contemporary sociology points out, individualistic societies are accompanied by an increase in options or choices. This multioptionality manifests itself prominently in career patterns that are less linear and predictable. Driven by a strong desire for flexibility and self-fulfilment in their life course, younger professionals with many options are less likely to seek a job for life. This sociological trend runs counter to the career of a successor in the family business, a role in which the successor is often expected to persist until retirement (Zellweger, 2017).

Institutional and cultural factors influencing successors' intentions

The wealth of a nation. According to Zellweger et al. (2012), succession intentions are high in impoverished nations due to necessity and a lack of attractive career alternatives. As wealth increases, succession intentions wane as more appealing alternatives emerge. In very prosperous countries, where financial elements are less important, family business successors are motivated by status, prestige and self-fulfilment that can be achieved through succession in a family business.

Taxes on succession. A high tax burden, especially inheritance or gift taxes, can reduce the attractiveness of taking over the family business (Zellweger et al., 2012).

Cultural drivers. Succession intentions are greater in societies where pride, loyalty and cohesion are lived out in businesses or families, because family business succession allows successors to show loyalty and pride. "The more a community accepts and endorses authority, power differentials and status privileges, the stronger succession intentions are among potential successors" (Zellweger et al., 2012, p. 14).

Factors at the family and the family firm level influencing successors' intentions

Birth order. Zellweger et al. (2012) find that the strength of succession intentions is lowest with three siblings and increases as the number of siblings increases. An only child seems to be the natural successor in the parental business. However, as the number of siblings increases, "survey participants find themselves in the "family niche" where accessible positions in the business are already filled or will be occupied by siblings born before them" (Zellweger et al. 2012, p. 15).

The gender gap. According to research by Zellweger et al. (2012), using data from the GUESSS, women are less likely than men to be considered as designated successors. Regardless of the fields studied at university - from business and law to physics, medicine and social sciences - this gender gap remained. Traditional gender roles, a preference for male firstborns and expectations of one's profession are some of the explanations for the observed gender inequalities.

Firm size and firm performance. According to Zellweger et al. (2012), the next generation aspires to take over larger, wealthier companies. The GUESSS project's findings show that the share of intended successors increases when family businesses employ more full-time equivalents (FTEs).

Family context. Garcia, Sharma, De Massis, Wright & Scholes (2018, p. 238) state that “next-generation members appraise how they are treated by their parents and this in turn shapes their beliefs about their competence and their attitudes towards the family firm”. Kandade, Samara, Parada & Dawson (2021) show that early involvement of potential successors in family business can increase their socialisation with family and non-family stakeholders. Porfírio, Felício & Carrilho (2020) found in their study that the interplay between organisational characteristics of the family business (size, maturity of the business and presence of a succession plan), personal characteristics of the successor (age, gender and education level) and the regional context produces different patterns that lead to different succession outcomes.

Factors at the individual level influencing succession intentions

Successors' intention to join the family firms differ at the individual's level. Sharma & Irving (2005) identified four motivational bases for joining a family firm: affective, normative, calculative, and imperative commitment.

The basis of affective commitment is a strong belief in and acceptance of the organisation's goals, and a desire and confidence in one's own ability to contribute to those goals. The follower essentially "wants" to pursue such a career. If the career goals and identity of the next generation family member are compatible with the prospects and identity of the organisation, affective commitment should be more evident.

The sense of duty to work in the family business underpins normative commitment. The successor strives to foster and maintain positive relationships with the older generation by pursuing a career in the family business. In other words, successors who demonstrate a strong sense of normative commitment believe they "should" choose this path. Strong family norms regarding the maintenance of the family legacy, birth order (firstborn) or gender (male successor) should foster a sense of obligation in the offspring concerned.

Calculative commitment is based on the fact that successors assess the high opportunity costs and the risk of a loss of investment or value if they do not continue to work for the family business. Successors “with high calculated commitment believe that they "must" pursue such a career” (Sharma & Irving, 2005, p. 3). Higher opportunity costs, such as a lower salary outside the family business, should encourage calculative commitment.

A sense of self-doubt about one's ability to pursue a lucrative occupation outside the family business underlies imperative commitment. Individuals with high vital commitment believe that a job in the family business is their only option. The "need" to pursue such a career underlies this situation.

It is assumed that next-generation family members with strong affective commitment are expected to exhibit the strongest discretionary behaviour because their personal interest are aligned with those of the firm. A slightly lower level of commitment should be expected for normative and calculative commitment. With these two types of commitment, the potential

successor feels that there are good reasons to join the company, but these reasons are mainly provided by external sources (e.g. social and economic pressures). Finally, successors with imperative commitment and thus a lack of alternatives should have the lowest - or even negative – commitment to the effectiveness of the company.

Results of the survey

This paper uses data collected through an online survey as part of a study on the career plans and intentions of students focusing on succession in family businesses. The items of the questionnaire related to succession intentions were taken from Torres, Augusto & Quaresma (2023), which is an adapted version of the questionnaire of Linan & Cheng (2009), while the items related to career motives were taken from GUESSS.

Since this paper investigates succession intentions, it is a reasonable choice to conduct the survey on students, as they are a population group that in the vast majority has not yet translated their intentions into behaviour, i.e. in this context, into taking over a family business from their relatives. Students are a population that has plans for future employment, but only a few students have translated these intentions into behaviour during their studies. The career choice for the mentioned population group starts with the completion of the chosen studies at the higher education institution. Therefore, it is legitimate to examine the intentions on the student population.

This survey was conducted in February and March 2023, and the respondents were the students of various faculties in Croatia. At the beginning of the questionnaire, only students with family business background were invited to complete the survey. The number of students whose responses were included in our analysis of the results is 52. The students who participated in this survey were in all years of study, from the first to the fifth year.

Furthermore, Table 1 shows the descriptive statistics of the respondents' characteristics. The demographic characteristics of the average respondent at the group level are as follows: the respondent is female, born in 2000, a second year business student, one parent is an entrepreneur.

Table 1: Descriptive statistics of the characteristics of the respondents

Feature	Description	Number	Percentage
Gender	Male	15	28.85%
	Female	37	71.15%
	Total	52	100.00%
Year of birth	1995/1996	3	5.77%
	1997/1998	3	5.77%
	1999/2000	13	25.00%
	2001/2002	26	50.00%
	2003/2004	7	13.46%
	Total	52	100.00%
Field of study	Economics / business	33	63.46%
	Other	19	36.54%

Feature	Description	Number	Percentage
	Total	52	100.00%
Year of study	First year	6	11.54%
	Second year	25	48.08%
	Third year	2	3.85%
	Fourth year	3	5.77%
	Fifth year	16	30.77%
	Total	52	100.00%

Source: authors' calculations.

In the questionnaire, we first wanted to find out how potential successors assess the importance of statements about career motivations. The questionnaire used a Likert scale with scores from 1 (not important) to 7 (very important). The students rated the statement about earning a high income with the highest average score of 6.2, while continuing the family tradition was rated with a neutral average score of 4.1. The other statements were given an average score between 5.2 and 6.

Table 2: Descriptive statistics – Career motivations

Item	N	Minimum	Maximum	Mean	Std. Deviation
Realizing one's dream	52	1	7	5.981	1.394
Being one's own boss	52	2	7	5.212	1.523
Earn high income	52	4	7	6.154	1.063
Being in a high position	52	1	7	5.365	1.532
Continue family tradition	52	1	7	4.135	2.019

Source: authors' calculations.

In the following question, we were interested in students' employment plans after graduation. About 46.2% of the students see themselves as employees in a public/private company, about 30.8% plan to start their own business, either alone or with one or more business partners, while about 21% plan to be employed in the family business. The percentage of students planning to work in the family business is approximately the same (21.15% vs. 20.62%) as in the survey conducted by Turčić (2022).

Table 3: Frequencies of answers on employment plans

Answer	Number of responses (N)	Share
Founding my own company	12	23.08%
Founding company with business partner	4	7.69%
Employee in private/public company	24	46.15%
Employee in family business	11	21.15%
Not sure	1	1.92%
Total	52	100.00%

Source: authors' calculations.

The next question asked students to rate their succession intentions to follow on a Likert scale

with scores ranging from 1 (I do not agree) to 7 (I completely agree). The average rating for all particles listed is 3.26, which is lower than the neutral rating (4.00). Of the individual items listed, respondents gave the highest average rating to the statement "I was thinking very seriously about taking over my parent's company" (3.78), while the other items were rated similarly, with average ratings ranging from 2.87 to 3.39. These results were similar to those of Buljan et al. (2022).

Table 4: Descriptive statistics – Succession intentions

Item	N	Minimum	Maximum	Mean	Std. Deviation
I am ready to do anything to take over my parent's company	52	1	7	3.250	1.979
I was thinking very seriously about taking over my parent's company	52	1	7	3.788	2.169
I am determined to become the successor of my parents' company in the future	52	1	7	3.385	2.114
I will make every effort to become the successor of my parents' company	52	1	7	3.231	2.163
My professional goal is to become a successor of my parents' company	52	1	7	2.865	1.942
I have a strong intention to one day become a successor of my parents' company	52	1	7	3.019	2.108

Source: authors' calculations.

In the next question, we were interested in the students' previous work experience in the family business and/or their plans to do so in the future. About 38.5% of the students are already working in the family business and another 25% of the students are planning to work either after graduation or within 5 years of graduation. About 21% of the students are not interested in working in the family business, both in the business and non-business fields of studies.

Table 5: Frequencies of answers on the question regarding the work experience in the family business

Answer	Field of study in business (N)	Share	Other fields of study (N)	Share	Total (N)	Share
Yes, I am already working in my parents' company	13	39.39%	7	36.84%	20	38.46%
No, I am not working but I plan after I finish my studies	9	27.27%	2	10.53%	11	21.15%
No, I am not working but I plan in 5 years after I finish my studies	1	3.03%	1	5.26%	2	3.85%
No, I am not working and I am not intending to work	7	21.21%	4	21.05%	11	21.15%
I still have not decided	3	9.09%	5	26.32%	8	15.38%
Total	33	100.00%	19	100.00%	52	100.00%

Source: authors' calculations.

The following question asked students about their plans to take over the family business. The results were analysed from the point of view of the field of study, business studies vs. non-

business studies. Both business and non-business students such as medical, law, civil engineering and others responded positively with the same percentage of 21% when asked if they intend to take over the family business, with most students planning to take over the family business within 5 years of completing their studies rather than immediately after graduation. The percentage of students who do not intend to take over the family business was higher among students in the field of study unrelated to business, 58% compared to 33%. The remaining percentage referred to students who could not decide on the possible takeover of their family business. The percentage of students who were still undecided was higher among students of economics (45%) than among students of the other fields of study (21%).

Table 6: Frequencies of answers on the question regarding the intention of succeeding family business

Answer	Field of study in business (N)	Share	Other fields of study (N)	Share	Total (N)	Share
I have already taken over family business	0	0.00%	0	0.00%	0	0.00%
Yes, I plan after I graduate my studies	1	3.03%	0	0.00%	1	1.92%
Yes, I plan in 5 years after I graduate my studies	6	18.18%	4	21.05%	10	19.23%
No, I do not plan to take over family business	11	33.33%	11	57.89%	22	42.31%
I still have not decided	15	45.45%	4	21.05%	19	36.54%
Total	33	100.00%	19	100.00%	52	100.00%

Source: authors' calculations.

Of the 41 students who responded negatively or were undecided when asked about their intention to take over the family business, 24 responses were given about the reasons for choosing these answers. Out of these 24 responses, 16 responses related to the students' lack of interest in the business activity and the industry in which their family business is operating. Other responses were rather dispersed and included students' lack of interest in owning a company, doubts on the abilities of managing a company or desire to start up their own company.

Conclusion

One of the most important prerequisites for an intra-family succession is a successor who is willing to take over the business. Due to a number of underlying trends in society, external factors at the institutional/cultural level, factors at the family level and at the individual level, family members of the next generation do not show a strong intention to take over the business.

This paper presents the results of an empirical survey on students' intention to take over the family business, conducted among 52 students from various faculties who filled in the questionnaire in February/March 2023 in Croatia. The students who participated in the survey had one or both parents owning a family business.

The results show that students ranked high income (6.2) and realising their own dream (6.0) as the most important career goals, while they also considered it important to achieve a high

position (5.4) and be their own boss (5.2). Continuing the family tradition was rated with a neutral average score (4.1). The intensity of succession intentions was rated with an average score below neutral. When asked about their employment plans after graduation, most students, about 46.2%, see themselves as employees in a public/private company, about 30.8% plan to start their own business either alone or with business partner(s), while about 21% plan to be employed in the family business. Although most of the students surveyed already work or plan to work in their family business (63.5%), only 21.2% of them plan to take over the family business. The percentage of those who intend to succeed the family business was the same for both business students (21.2%) and those from other fields (21.1%). The most frequently cited reason for not intending to take over the family business was a lack of interest in the business activity and the industry in which their family business operates.

The limitations of this paper arise from the relatively small sample size of students surveyed (results should be interpreted with caution) and the fact that there is a possibility that some respondents did not give honest answers. This research was a cross-sectional study. However, it would be helpful to conduct a longitudinal study to find out to what extent the students' intentions and plans regarding employment in and/or taking over the family business were actually realised. Future research should also be conducted with a larger sample to determine whether there are differences in intentions to take over family businesses in Croatia in terms of factors at the family business level (business size and business performance) and family level (birth order and gender) that influence successors' intentions.

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RESEARCH ON THE USE OF SOCIAL NETWORKS IN BUILDING RELATIONSHIP MARKETING IN SPORTS

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Abstract

This paper investigates the use of social networks in building relationship marketing in sports. For the purpose of the research, a survey questionnaire was used as an instrument on a non-probability convenience sample of 200 respondents. The conducted research showed that Facebook, Instagram and YouTube are the most used social networks for following professional sports, and that the respondents' relationship with professional sports organizations became better after the respondents followed a professional sports organization on social networks. The main advantages for building long-term relationships gained by respondents are greater awareness, improved experience, passion and commitment. Furthermore, it turned out that most of the respondents are passive observers, and that professional sports organizations need to make more efforts to start a dialogue with the respondents. In addition to dialogue, it turned out that there are many opportunities for professional sports organizations that could encourage the development of quality relationships with followers on social networks. For example, promoting content during matches in real time to encourage interaction with respondents, sending more frequent notifications related to the publication of new content, giving additional benefits in the form of gifts and discounts during special occasions and after starting a relationship with followers. In conclusion, the results show that to succeed in building a long-term relationship with the target audience, it is not enough to just be present on social networks. In addition to presence, it is necessary to invest effort, time, human capital and financial resources in the management of social networks in order to develop a long-term relationship with the target audience.

Keywords: social networks, relationship marketing, sport

JEL classification: D12, M31, M37, O35

Introduction

The commercialization of sport, the increase in expertise and professionalism of sports organizations have brought with them many advantages, but sports have also faced numerous challenges. In order to remain competitive, sports clubs and organizations had to explore new market opportunities, take advantage of new media, technological advances and find new ways

to create added value (Bühler & Nufer, 2010). One of the solutions is the application of relationship marketing, which is based on building a cooperative relationship that is realized through communication and interaction between organizations and their stakeholders, and the very purpose of which is to retain customers through long-term mutual satisfaction (Grönroos, 2004). Social networks, as a relationship marketing tool, provide the possibility of a two-way dialogue and enable organizations to understand the customer's needs, resulting in the possibility of delivering jointly created products and assured long-term profit (Grönroos, 2004; Chinn & Williams, 2010). The daily growth of the popularity of social networks presents sports organizations with the challenge of applying this tool within the framework of relationship marketing to achieve set goals and maintain the business of the organization itself.

Conceptual definition of relationship marketing

One of the key consequences of globalization is increased competitiveness. The quality of products and services has become the standard in the market and is no longer a source of competitive advantage, therefore companies have had to direct their efforts towards relationships with customers and the community of interest (Bühler & Nufer, 2010).

Relationship marketing originated from a number of different academic disciplines such as economics, psychology and sociology, so its complexity can be easily detected precisely because of the knowledge that it was created as a combination of multidisciplinary academic directions. Thanks to various researchers and experts, who have extensively covered the topic of relationship marketing in their research, it is difficult to determine a universally accepted definition of it today. Different schools of learning about the concept of relationship marketing are responsible for this fact, and equally, these differences can be attributed to the different range and nature of relationships in the industrial, service and consumer markets, and to the different relationships between their subjects operating in the said markets (Abeza, 2016).

Besides different socio-political heritage and different academic background, the relatively short life span of relationship marketing is also attributed to the lack of a fully formed paradigm. In order to fully cover the theoretical basis of relationship marketing, several important theoreticians of this field and their theoretical assumptions will be mentioned.

Gronroos (1994) suggests that the emergence of relationship marketing represents a paradigm shift in marketing, from a limiting focus on managing the marketing mix to one that emphasizes the development and management of relationships with more or less known or at least somehow identified customers. For Ballantyne, Christopher, and Payne (1991), relationship marketing integrates the ideas of customer service, quality management, and marketing. Hunt and Morgan (1994) discuss how relationship marketing encompasses ideas such as relational contracting (i.e. where some obligations of two parties may not be detailed in a contractual agreement), relationship marketing, working partnerships, symbiotic marketing, strategic alliances, co-marketing alliances and internal marketing, and suggest that relationship marketing should refer to: "all marketing activities aimed at establishing, developing and maintaining a successful relationship exchange". Christy, Oliver and Penn (2010) defined relationship marketing as a context within which formal transactions between a customer and a supplier (in the form of a manufacturer, retailer or service provider) are complemented by voluntary and reciprocal actions of both parties to that customer, with the effect of increasing the likelihood of future transactions between the two parties, and it is assumed that customers (and suppliers)

voluntarily enter and stay in this type of relationship because they feel that they will somehow be better off because of it.

Parvatiyar and Sheth (2001) described relationship marketing as continuous cooperative activities between trader and customer, while in practice, relationship marketing is characterized as customer attraction, development and retention. The above statements are associated with a long-term view of the relationship between the trader and the customer, and the current approaches to market relations are different and can take a very narrow perspective that focuses on the short-term components of the behavior between the trader and the customer, and can also take the already mentioned broader perspective that fulfills the long-term goals in the relationship between the customer and the trader. The narrow perspective of relationship marketing is based on repeat purchase marketing databases, and focuses on units sold to the customer and units consumed by the customer. It is this perspective that is considered reactive and transactional and cannot be considered one that fulfills long-term goals. In contrast, there are approaches that look at a broader perspective, and try to understand customers better, deeper and more qualitatively, going beyond current transactions and superficial repeat purchase techniques in order to develop more meaningful and useful relationships that are proactive, permanent and interactive. This perspective views customers as lifelong, and focuses the effort thoroughly on customer wants, needs and values (Bee & Kahle, 2006).

It is evident from the above table that there are differences between relationship marketing and transactional marketing, and although at first relationship marketing sounds better and creates a longer-term relationship between the customer and the company, it does not mean that it will be suitable for every stage of development in this relationship. In order to better understand when to focus on which concept, it is necessary to determine in more detail in which phase our customer is, and the loyalty scale will help us with this.

The ultimate goal of relationship marketing is to convert new customers into advocates, who will later play an important role for the organization as a referral source. The company will achieve this by providing personalized service and service quality that exceeds customer expectations (Broderick, Garry, & Harwood, 2008).

Chiu, Hsieh, Li, and Lee (2005) believe that the key to relationships is the connection between subjects. This very process of connection can be defined as a component of the business relationship that results in the unique action of the two parties towards the desired goal. In the context of relationship marketing, three types of ties are visible, namely financial, social and structural (Chiu, Hsieh, Li & Lee, 2005).

According to Hansen and Hennig-Thurau (2000), and Ballantyne, Christopher, and Payne (2002), the key question from a practical point of view is about the determinants of customer retention and loyalty.

Role of social networks as a marketing tool in relationship marketing

Sports marketing experts operate in an environment where consumers of all demographics are increasingly social media literate, because of greater availability of social media to the general population. This situation presents many opportunities and at the same time challenges for marketing experts, who must adopt new strategies and take advantage of social networks in order to be successful.

Social networks actually have multiple roles. Škare (2015) emphasizes that "Social networks in modern definitions are platforms that serve to interact with users and exchange communication content. Users are both receivers and providers of messages and content, but they do not individually control the overall content, that is, they do not have control over the medium". Data from DATAREPORTAL (2022) shows how important and popular social networks are among today's population, where in January 2022, 58.4% of the total world population (4.62 billion people) worldwide used some form of social networks.

According to Bradley (2010): "Social networks can be defined as tools, platforms, and applications that allow consumers to connect, communicate, and collaborate with others", adding that they differ from other forms of communication because they support user participation in mass i.e. collective level, and contributions to this tool are distributed among users for review, sharing and improvement. As such, social networks have the potential to significantly influence the relationship between companies and consumers, and can provide new directions and advantages in relationship marketing carried out by an organization (Griffiths & Liyange, 2008).

To be able to create a successful strategy, it is necessary to know who our target audience is, and social networks are what make this job easier because consumers are becoming more and more expressive, share their experiences and opinions, and increasingly influence the choices and preferences of other consumers. Therefore, social networks represent an environment where consumers create strong relationships in which parties influence each other's attitudes, knowledge, information gathering, purchase behavior and post-purchase evaluations (Constantinides & Fountain, 2008).

As a result, the new environment created on social networks significantly affected the power structure in the market, leading to a significant migration of market power from companies to customers, and created a completely different environment for traders (Bowen, Kotler & Makens, 2010). Despite all the benefits that social media has brought to consumers/users, it has also presented many attractive opportunities for businesses, where it has created an opportunity for marketing experts to communicate directly with consumers. This approach and opportunity completely contradicts the traditional one where organizations had difficulties with identifying its customers, and could not achieve direct communication with them (Abeza & O'Reilly, 2013).

Social networks can also be used to attract and retain users and build relationships. Foux (2006) indicates that people view information provided by other consumers as more honest, therefore social networks are considered a reliable source when seeking information about products and services. This statement indicates that social networks should be seen as a modern form of "word of mouth communication" within the conventional marketing mix. Haenlein and Kaplan (2010) suggest that when using social networks, marketing experts should be active, interesting, unpretentious, less "professional", and honest in their communication with customers. Social network sites that express authenticity and enable user engagement are more effective in attracting and maintaining a user base (Abeza, O'Reilly, & Seguin, 2017).

According to Kozinets (2010), online communities with their social power can increase consumption, which can potentially result in increased loyalty and increased use of the brand, while it is important to emphasize that online communities are not geographically limited, and

are characterized by being organized and connected around a common appreciation, i.e., interest for a certain brand/topic.

For marketing experts, communication in these communities will be particularly challenging, as most interactions will take place in real-time, allowing for revisiting and retrospective analysis of the interaction. However, it is crucial to note that social networks are not communities themselves, but a platform through which communities can be formed based on this shared brand appreciation. Furthermore, individuals who participate in these communities can be very different in face-to-face situations. Therefore, it cannot always be assumed that what attracts people in the "real" world will necessarily work in the virtual world as well (Abeza, O'Reilly, & Seguin, 2017).

Like other marketing strategies, communicating with consumers through social networks has its advantages and disadvantages. Although it is a very effective way of creating relationships with customers, it is important to be aware of the advantages, but also the challenges that a company can face when using this marketing tool.

Dumitrescu, Fuciu and Gorski (2018) list seven advantages of social networks on the Internet, namely speed, image, cost, content personalization, worldwide availability, CRM, and interaction and trust.

In order to effectively implement a plan for management of social networks as a company's marketing tool, the company should be ready to invest more time and human resources to manage communication and treatment of consumers on social networks. Regardless of the need for additional resources, the advantages of this way of advertising and communicating with customers make it extremely attractive and positive, both for companies that have been on the market longer, and for those that are just on the rise (Butorac, 2019).

Research methodology

Primary data for the purpose of this research was collected through a highly structured survey questionnaire that was created based on previous research in the field of sports, social networks and relationship marketing, which were mainly conducted through focus groups and interviews, and a non-probability convenience sample. For this research, people who follow at least one professional sports organization through at least one profile on social networks were chosen as a sample. Although 225 respondents joined the survey, 200 of them answered yes to the first elimination question and entered the sample. The elimination question was: "Do you follow at least one professional sports organization on one of your social network profiles?".

The questionnaire was constructed based on the following works: Gibson (2018), Begorgis and Buss (2015), Watkins (2013), Clark and Melancon (2013), Lim, Waldburger, and Witkemper (2012), Kim and Ko (2012), Solomon and Tuten (2012), and Broughton (2012).

Most of the respondents were male. Out of 200 respondents, 166 were male, which is 83%, and 34 of them were female, which is 17%.

Most respondents were in the age group from 18 to 25 and they make up 57.5% of respondents, followed by respondents aged 26 to 35 who make up 39%, and respondents from 36 to 45 with

2.5%. The smallest share of respondents was under the age of 18 and over the age of 55, each accounting for 0.5%.

In the conducted research, the emphasis was on 5 social networks: Facebook, YouTube, Instagram, TikTok and Twitter, but on certain questions the respondents were given space to list "other" social networks that they use to follow professional sports organizations. Most respondents follow at least one professional sports organization on Instagram, 80% of them, followed by Facebook with 69% of respondents and YouTube with 52% of respondents. A smaller number of followers follow at least one professional sports organization on Twitter, 24% of respondents, and 9.5% on TikTok. Respondents also indicated that they follow at least one professional sports organization via: LinkedIn (1.5%), Reddit (1.5%), Discord (1%), Twitch (0.5%), Flashscore (0.5%) and SofaScore (0.5%).

Table 1: Please mark all social networks through which you follow at least one professional sports organization

Social network	Followed by respondents
Instagram	80%
Facebook	69%
YouTube	52%
Twitter	24%
TikTok	9.5%
LinkedIn	1.5%
Reddit	1.5%
Discord	1%
Twitch	0.5%
Flashscore	0.5%
SofaScore	0.5%

Source: authors' research.

The frequency of using the mentioned social networks for the purpose of following professional sports shows that Instagram, Facebook and YouTube are the platforms most often used by respondents. According to the conducted primary research, 44% of respondents use Instagram daily, 25% Facebook and 23% YouTube. Instagram and YouTube share the same percentage of respondents (20%) who use these social networks three to four times a week, while Facebook is used with the same frequency by 18% of respondents. The rest of the respondents use these three social networks once a week, less often, or they do not have a profile on this social network, i.e., they never use it. Most respondents do not use Twitter and TikTok or do not have an open profile on these social networks; 69% of respondents do not use or do not have an open profile on Twitter, and 84% of respondents on TikTok. This opens many opportunities for business entities on social networks and represents a great potential for them.

Research results

Since the paper is focused on the role of social networks as relationship marketing in professional sports, it was important to understand to what degree respondents consider themselves to be sports fans. When asked how they would rate themselves as a sports fan on a scale of one to five, 52.5% of respondents answered five, that is, as the biggest fans, 44% of them answered with three or four, while only 1% rated themselves with one.

Table 2: On a scale of 1-5, with 1 being the lowest and 5 being the highest rating, how would you rate yourself as a professional sports fan?

Sports fans	Share of respondents
Highest rating (5)	53%
4	28%
3	16%
2	2%
1	1%
Total	100%

Source: authors' research.

When asked what sources respondents use to follow professional sports, 92% of respondents answered that they use social networks, indicating the great importance of this marketing tool in professional sports. Social networks are followed by internet portals (81%), television (64%), and print media (24.5%), radio (10%) and other sources (2%).

Table 3: Below are several types of media. Please indicate which of the following do you personally use to follow professional sports?

Media	Followed by respondents
Social networks (Facebook, YouTube, Instagram, TikTok, itd.)	92%
Internet portals (sports organizations official pages, etc.)	81%
Television (news, sports shows, etc.)	64%
Print media (newspapers, magazines, etc.)	25%
Radio (shows, interviews, etc.)	10%
Other (Podcasts, fantasy apps, forums, streams, etc.)	2%

Source: authors' research.

What is the relationship of respondents with a sports organization today when they follow it on social networks compared to previous times when they did not follow the same organization on social networks? 44% of respondents answered, "a better relationship than before", 29% of them stated "a much better relationship than before" and 19% of them considered that their relationship with professional sports organizations was the same as before. Only 6% of respondents believe that the relationship is worse than before, or significantly worse than before. Based on the answers given, it can be concluded that social networks have influenced the improvement of respondents' relations with professional organizations.

Table 4: How would you rate your relationship with professional sports organizations today when you follow them on social media, compared to previous times when you did not follow the same organizations on social media?

Relationship with professional sports organization when following on social networks	Percentage of respondents agreeing
Much better relationship than before (5)	29%
Better relationship than before (4)	44%
Same relationship as before (3)	19%
Worse relationship than before (2)	5%
Much worse relationship than before (1)	1%
I can't answer	2%
Total	100%

Source: authors' research.

Respondents consider more information (95%), improved experience (75%), passion (53%) and commitment (46%) as the main benefits that social networks bring to them, and at the same time to their favorite professional organizations, and help build long-term relationships. Additionally, 19% of respondents consider mutual trust and 3% other advantages (greater availability, timeliness, insight into the club and exchange of ideas) as advantages provided by social networks.

13% of respondents declared that using social media of their favorite professional sports organizations did not gain any advantage for building long-term relationships, and cited the excessive amount of information showered on followers on a daily basis as the main reason.

Table 5: Please identify three benefits that you, as a fan, have gained from using your favorite professional sports organization's social media to build a long-term relationship?

Social media benefits	Percentage of respondents agreeing
More information	95%
Improved experience	75%
Passion	53%
Commitment	46%
Mutual trust	19%
No benefits	13%
Other	3%

Source: authors' research.

Additionally, the respondents were asked to what extent they believe that certain variables on social networks represent a long-term investment of a professional sports organization in the relationship with the target audience on a scale of one to five, where a rating of one means "completely disagree" and five "completely agree".

The results from Table 6 indicate that social networks and the presence on them are one of the key tools in the development of the relationship between a professional sports organization and its followers.

The highly rated statements among the respondents indicate that professional sports organizations, in addition to having a presence on social networks, must constantly invest in the further development of social networks to create a long-term relationship with the target audience.

Table 1: I believe this statement represents a long-term investment in relations with the target audience for a professional organization.

Statement	Average level of agreement	Standard deviation	Variance
Social networks presence.	4.67	0.56	0.31
By investing appropriate effort in managing social networks.	4.65	0.65	0.43
By investing adequate time in managing social networks.	4.62	0.65	0.43
By investing appropriate human capital in managing social networks.	4.57	0.70	0.49
By investing appropriate financial resources in social networks.	4.50	0.69	0.47

Source: authors' research.

Professional sports organizations are not the only sports entities on social networks. The following question lists nine key entities that make up the sports ecosystem on social networks that together form a sports community that is complemented with content and distributed to its followers.

According to the frequency of monitoring, respondents mostly follow athletes, media, sports clubs and humorous profiles on social networks every day (Table 7).

Table 2: How often do you read or follow the posts and activities of the following participants in a professional sports environment via social networks?

Subject	Mean
Athletes (current and former)	3.64
Media (TV, print media, radio, internet)	3.61
Sports club, association or team	3.59
Humorous profiles on social networks (Out of context football, Trollfootball, NBA Hoopster...)	3.52
Sports league	3.35
Stars/others (celebrities outside of sports that follow sports)	2.79
Super-fans (big sports fans and critics with prominent followings who regularly post sports-related content)	2.57
Coaches	2.32
Bloggers	1.86

Source: authors' research.

Social networks enable two-way communication and encourage commenting and interactivity on the profiles themselves, but on the social network profiles of professional sports organizations this is not the practice. 77% of respondents do not engage in dialogue about professional sports according to the conducted research. However, 12% of them join the dialogue to connect with friends who follow the same sport, and 11% of them to celebrate the victory of their favorite team.

Table 8 shows that 27% of respondents estimate that professional sports organizations with an open profile on Facebook engage in dialogue every day or 3 to 4 times a week. Respondents consider YouTube as a platform less responsive than Facebook. Respondents estimate that professional sports organizations most often enter dialogue via Instagram. Respondents most often do not have an open profile or do not follow any professional sports organization via TikTok and Twitter.

Table 8: In your opinion, how often does the professional sports organization you follow engage in dialogue (e.g., talking with fans) on the organization's official social media profile?

Frequency of engagement in dialogue	Facebook	YouTube	Instagram	TokTok	Twitter
Don't have a profile / Don't follow	17%	16%	15%	67%	58%
Never	12%	21%	11%	8%	8%
Once a month	26%	26%	20%	9%	10%
Once a week	18%	16%	18%	5%	6%
3-4 times a week	16%	15%	23%	6%	11%
Every day	11%	6%	13%	5%	7%

Source: authors' research.

If they are implemented in a high-quality manner and strategically placed, social networks can complete the experience of users or spectators during a match. Based on the conducted research

(Table 9), respondents do not have the habit of watching or listening to matches or similar events and simultaneously following the game on social networks. Audience preferences are expected to change in the future.

Table 9: While watching or listening to a match/event live, how often do you simultaneously follow the game on the following social networks?

Frequency of engagement in dialogue	Facebook	YouTube	Instagram	TokTok	Twitter
Don't have a profile / Don't follow	17%	16%	15%	67%	58%
Never during a match (1)	46%	63%	38%	26%	23%
(2)	9%	5%	9%	2%	3%
(3)	19%	8%	23%	3%	5%
(4)	3%	3%	6%	1%	4%
Every time during a match (5)	6%	5%	9%	1%	7%

Source: authors' research.

The results from Table 10 indicate that information is an important resource, and social networks are the main source of information. An important finding of the research is that fans of sports organizations are one of the most emotionally intense subjects, as they show a high level of agreement with the statement "I care about the long-term success of the professional sports organizations I follow." This is one of the key reasons why sports organizations need to build long-term success together with their fans.

The respondents' perception of the profiles of professional sports organizations shows that a significant number of respondents express a high degree of agreement with the statement that the profiles of sports organizations are focused on building relationships with followers.

Word-of-mouth marketing distributed electronically is extremely important, as it can easily make content go viral, and the results show that there is significant room for improvement in content sharing.

It is interesting that the respondents state that their relationship with the professional organization is not consistently high. One of the possible reasons for the above may be because the sports season does not last throughout the entire calendar year. Respondents are sometimes unable to maintain an active relationship with the organization. The goal that a professional sports organization must strive for is high and constant quality, but this does not necessarily depend on the intensity of the relationship.

Table 10: Agreement with statements

Statement	Mean
The content displayed on the profile of the professional sports organization I follow contains the latest information.	4.53
I care about the long-term success of the professional sports organizations I follow.	3.93
The social media profiles of the professional sports organizations I follow are focused on building relationships with followers.	3.63
I feel motivated to continue my relationship with the professional organizations I follow.	3.45
I feel a sense of belonging to the community of the professional sports organization I follow.	3.36
I would share content published by my favorite professional sports organization with my family and friends.	3.24
The quality of my relationship with the professional organizations I follow is consistently high.	2.83

Source: authors' research.

The results from Table 11 show that the respondents believe it is easy to express their opinions on the social networks of the professional sports organizations they follow. Also, conversation and exchange of opinions via social networks, i.e., multidirectional communication, is facilitated.

Table 11. Level of agreement with statements

Statement	Mean	Standard deviation	Variance
It's easy to voice my opinion on the social networks of a professional sports organization I follow.	4.2	0.92	0.84
Conversation and exchange of opinions with others is possible through the social networks of the professional sports organizations I follow.	4.1	0.92	0.84
Social communities of professional sports organizations enable multidirectional communication on social networks.	3.9	0.95	0.90

Source: authors' research.

The room for progress in the communication of the sports organization with the followers is visible in Table 12. In particular, the relevance of the content published to the followers and the monitoring of the followers' comments can be further worked upon.

Table 12: Level of agreement with statements

Statement	Mean	Standard deviation	Variance
Professional sports organization is in regular contact with me (e.g., I get notifications about new content on the organization's profile).	3.07	1.29	1.67
Professional sports organization knows me (e.g., posts content relevant to fan interests).	3.04	1.25	1.57
Professional sports organization collects my opinion about it (e.g., follow my comments on its profile).	2.63	1.25	1.56

Source: authors' research.

Discounts and gifts distributed by a professional sports organization on social networks would encourage followers to follow them more often.

Table 13: Level of agreement with statements

Statement	Mean	Standard deviation	Variance
Discounts and giveaways distributed by a professional sports organization on social media would encourage me to follow it more often.	3.11	1.37	1.88
Professional sports organization sends me special occasion discounts.	2.23	1.38	1.90
I received special benefits after becoming a social media follower of my professional sports organization.	2.15	1.35	1.81
A professional sports organization sends me gifts on special occasions.	1.81	1.25	1.57

Source: authors' research.

Research limitations

There are two key limitations of the conducted research. The first limitation is the lack of representativeness of the sample of respondents. In addition, the respondents are not evenly distributed within the age groups. Namely, 57.5% of respondents belong to the age group of 18 to 25 years, and 39% of them belong to the age group of 26 to 35 years. To improve the representativeness of the sample, it is necessary to collect a numerically even number of responses from all age categories. The other limitation is the number of social networks that were covered in detail within the questions and statements throughout the conducted research. The research focused on five social networks that were chosen because they are among the most current social networks at the time of writing this paper, namely: Facebook, YouTube, Instagram, TikTok and Twitter. The topicality and trend of using social networks change quickly, so it is necessary to make a more extensive analysis and cover additional social networks that were not included in this work, such as Snapchat, Reddit, LinkedIn and others that will be popular among the population at the time of conducting the next research. It is recommended to conduct this research on the example of a selected sports organization and to focus on social networks that are relevant to that particular organization. With such research, one would get an insight into how well social networks are used in achieving long-term relationships with that specific organization and how to improve them. Additionally, in further research, a different methodology can be used, for example content analysis, which was used by Zhou and Wang (2015) when they measured how sports organizations use social networks to build relationships.

Management recommendations

This research mostly serves as a general overview of the importance of social networks as a relationship marketing tool in professional sports. The results of the research showed that following professional sports organizations had a positive effect on improving the relationship between respondents and professional sports organizations, and that additional resources and efforts should be invested in order to realize the full potential of social networks and attract the rest of social network users who currently do not follow these organizations. In addition, social networks are the main source for following professional sports according to the conducted research, therefore management should be additionally educated about the latest trends and functions within social networks to maintain the attention of followers in the most unique ways and keep them following the organization and thus nurture the relationship with organization.

Conclusion

Social networks have changed the way different industries do business, and in accordance with these changes, organizations have had to revise their business strategies and adapt to consumer preferences and new market conditions. Sports organizations must equally follow the preferences of their target audience and market trends, and in order to achieve a long-term relationship with them, they must have a well-developed marketing strategy. This paper answered the question of the role of social networks as a relationship marketing tool in the field of professional sports and how much they contribute to creating a long-term relationship between professional sports organizations and their target audience.

Social networks are the most used media for following sports. This knowledge should be used in the distribution of resources for marketing activities, and the thesis that the relationship of the respondents with professional sports organizations became better after the respondents followed a professional sports organization's social media was confirmed. Likewise, respondents confirmed that the main advantages of following professional sports organizations via social networks are greater information, improved experience, passion and psychological attachment. Those advantages should be emphasized more by sports organizations to develop strong long-term relationships with their target audience.

An important finding of this research is that it is not enough that sports organizations are present on social networks, but that they should invest in that presence. More precisely, professional sports organizations need to invest additional human capital, time, effort and financial resources to further strengthen relationships with the target audience through social networks. In addition, followers of professional sports organizations care about that organization, so professional sports organizations should be aware of this advantage and additionally work on developing a quality relationship. This relationship can be further improved through more frequent sending of notifications related to the publication of new content and recognition of their followers through additional benefits, gifts and discounts, during special occasions and after starting a relationship with followers.

Social networks are a dynamic and powerful tool of relationship marketing that the holders of marketing strategies within professional sports organizations should analyze, develop and use to further improve the long-term relationship with their followers and realize all the advantages that this tool brings.

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EFFECTS OF THE FINAL DEMAND ON THE ECONOMIC ACTIVITY IN CROATIA: INPUT-OUTPUT APPROACH

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Abstract

The purpose of the study is to estimate the multiplicative effects of different categories of final demand on gross value-added generation in Croatia. The role of effective demand in stimulation of economic growth is especially important in the recession periods when shortage in the effective demand decrease real output under its potential output. Multiplicative effects of individual categories of final demand depend not only on the given structure of goods and services but also on origin of demanded products. The method applied in this study is the input-output model. Standard set of formulas is used to calculate total economic effects in terms of gross domestic product, gross value added, employment and government revenues induced by individual components of final demand. Both types of multipliers, derived from open and closed input-output model, are calculated. Multiplier of type I includes gross value added and employment effects directly generated by unit delivering product to final user and indirect effects which capture economic activity of other domestic producers which deliver intermediary inputs required by direct producers. Besides direct and indirect effects closed input-output model, where personal consumption is treated as endogenous variable, also include the economic effects of increased personal consumption financed by labour income received along value-added chain of direct producer. Results for Croatian economy indicates that increase in exogenous final demand in the closed input-output model on average induce 17% higher increase in GDP compared to initial change in final demand. The highest effects per unit change are estimated for government consumption. Results could be used as analytical background for policy purposes. In recession period, more expansive fiscal policy could be effective in supporting economic activity. However, the intensity of fiscal stimulus is limited by efforts to keep public finance deficit and dept sustainable. Process of intensive international integration, as witnessed in period 2010-2018, result in less intensive multiplicative effects. Expenditures on imported products induce lower relative economic effects in domestic economy than domestic production, while high direct and indirect import dependence limit the aggregate multipliers for Croatian exports.

Keywords: input-output model, macro multipliers, final demand, fiscal multiplier, induced effects

JEL classification: C67, E01, E20

Introduction

The system of national accounts, integrated with an input-output table, shows the circular flow of the transactions in an economy. According to the basic identity of national accounts, each expenditure of an individual economic unit or sector simultaneously represents the revenues or income of another economic unit (Eurostat, 2010). Input-output tables show in detail the flows of revenues and expenditures among various industries and institutional sectors. It provides an

insight into the structure of deliveries of goods and services among economic sectors and presents the cost structure of the production of each economic sector (Eurostat, 2008).

In addition to the availability of production inputs and the adoption of technological processes, the total production in the national economy is determined by the level of final demand – sum of the expenditures for final consumption of households and government, investments and exports of goods and services. The production and delivery of goods and services generates revenues for domestic producers. Producers use revenues to purchase intermediate inputs, while the surplus of revenues over intermediate consumption is defined as the gross added value (GVA) of the industries. GVA is income distributed to the owners of the factors of production which generate the disposable income of institutional sectors. Disposable income in turn determines the level of expenditure for final consumption, which closes the circular flow cycle (Miyazawa, 1970). At the level of the total economy, not only total value of macroeconomic variables, but also their structure plays a significant role in the spread of multiplicative effects. The analysis of multiplicative effects is therefore based on the given structure of exogenous variables of final demand, which, by applying standard formulas from input-output analysis, is used to calculate the total level of production, GVA and employment generated by production activities conducted to deliver required goods and services demanded by final consumers (Leontief, 1986).

Both, input-output methodology and theoretical foundations of demand driven growth should be considered as old concepts developed before more than 100 years ago and most of the relevant literature explaining those concepts has been written in the last century. Although theoretical contribution to those concepts is limited, the number of empirical studies focused on the role of the sudden disruptions in the demand on the economic activity usually rise in periods of economic crisis such as recorded in 2008 or recently in 2020 when drop in demand and economic activity has been induced by Covid-19 pandemic.

The goal of the paper is to quantify the multiplier effects of final demand for the Croatian economy by applying the input-output model. Because on the reliance on the secondary data sources, primarily input-output table for Croatian economy, analyse is limited to the years for which official IO tables are published. In Eurostat transmission programme, IO tables, as one of the most comprehensive and costly statistical survey, are not expected to be published on annual but multiannual basis. Data for two different periods (2010 and 2018) are analysed to determine how the change in the structure of final demand, as well as changes in technological coefficients, influenced the intensity of the spread of multiplier effects. The analysis of the spread of effects is based on the decomposition of effects into individual components of final demand, which enables the identification and quantitative determination of multipliers at the macroeconomic level (MM).

Literature review

In the standard macroeconomic literature, two different models explaining factors behind the speed of economic growth can be found. Demand-side economics is in literature usually called as Keynesian theory after the originator John Maynard Keynes. According to this theory the main factor which explain the growth rate of national economies is demand for products and services. In the situation, when demand is decreasing, capacity of an economy to produce and supply goods and services is not sufficient to ensure economic growth (Blinder, 1988). Contrary, classical supply-side economics is focused on the role of technological progress

which along with investments in equipment and human capital can ensure sustainable economic growth.

Classical theory focused on the supply of goods and services is primarily concerned with the ways in which business owners choose optimal technological processes (Mankiw, 1990). The maximization of production with given limitations in the short term is based on the choice of an appropriate combination of production factors, while in the long term the growth of the production possibilities of an economy is determined by the successful adoption of improved technological procedures.

Unlike the theory of supply-driven growth, the demand theory emphasizes the importance of sufficient purchasing power of final consumers, because without demand, producers will not be able to sell their products. In this mechanism demand drives production, producers hire more employees, which then again increases purchasing power (Babić, 2006). Thus, growth of demand finally results in the economic growth. In his theory, Keynes emphasizes that in situation when demand is insufficient, producers will have no one to sell goods and services to, and the economy will not be able to realize economic growth. One of the major contributions of Keynesian theory is development of the effective demand concept. According to the classical theory it is implied that equilibrium can be reached in all circumstances at the level of full employment under the condition that marginal productivity of labour is equal to the wage. Thus, an increase in output has positive impact on wages and supply creates its own demand. Keynes rearranged the order in the process claiming that an increase in employment creates labour income which is distributed to final expenditures and savings. He used the term marginal propensity to consumption which is defined as change in consumption induced by a change in income (Babić, 2006). Since marginal propensity to consumption is assumed to be less than 1, consumption will increase at a lesser rate than income. Thus, increasing savings could negatively affect demand and consequently limit the production as producers will not be able to sell surplus of goods and services produced.

Demand theory advocates government interventionism in the sense of conducting appropriate monetary and fiscal policy depending on the phase of economic cycle. In periods of recession or slow economic growth, the demand theory advocates conducting of expansive monetary and fiscal policy (Gordon, 1990). The increase in government spending leads to effective increase in demand for certain types of goods and services. Expansive fiscal policy, in addition to increased direct expenditures, can also be the result of tax cuts. The decrease in personal income tax affects the level of the household's net disposable income, and thus result in the growth in their purchasing power. The reduction of profit tax, on the other hand, leaves a larger amount of business surplus to the producers themselves and thus affects their tendency to invest.

The mechanism of monetary policy action is less direct than fiscal policy but can be even more effective in ensuring adequate level of demand. Central banks can, by means of appropriate monetary policy measures, influence the increase in money in circulation, and thus the lowering of interest rates, and thus the availability of funds that households can use for personal consumption or companies for investments (Blinder, 1988).

The new classical approach refined by inclusion of rational expectations premises dominated over Keynesian approach among economic profession in 1970s. The introduction of uncertainty and expectations in macroeconomic theory derived a guideline on economic policy effectiveness related to anticipation of measures by firms and public. One of the most substantial differences in theoretical background in classical and Keynesian economics is

assumption on the labour market. While classical macroeconomics assume the existence of market mechanism which can assure full employment without capacity surplus, Keynesian macroeconomics describes the situation where unemployment exists along with excess capacity and potential output is higher than actual output which is limited by lack of demand (Mankiew, 2020). Some authors point out that policy prescriptions based on Keynesian approach could be effective even in the circumstances when the role of rational expectations is significant (Mankiew, 1990).

On the level of total economy, effects of autonomous change in final demand, such as government expenditures, have multiplicative effects on economic activity. Babić (2005) defines multiplier (m) as:

$$m = \frac{1}{1 - b(1 - t) + m} \quad (1)$$

where b is marginal propensity to consume, t is marginal tax rate and m is marginal propensity to import. As can be seen, higher marginal propensity to import, higher taxation and lower propensity to consume decrease the multiplier. Total economic activity can be derived as a ratio of autonomous final demand and multiplier:

$$mY = \frac{a + I + G + X}{1 - b(1 - t) + m} \quad (2)$$

where a is autonomous personal consumption, I is investment, G government consumption and X is import. Empirical works estimate macroeconomic multipliers of in range from 0.8 Barro (1981) to 1.2 Ramey (2011) depending on the period and geographical area included in the analysis.

Estimate of aggregate multipliers measure the impact of total change in exogenous demand on total economic activity. However, due to differences in technological processes, import dependence and taxation of individual items of final demand could result in variability of multipliers for components of final demand and economic sectors. When applying the input-output model for calculating the multiplier at the national level, it is a common assumption that differences in the structure of final demand can result in different effects on total production and GVA (Ciaschini, 1989). Even with the existence of a given total size of an individual component of final demand, the different structure of that component can result in significant variations in the overall effects.

In an empirical analysis for the Marche region (Ciaschini, and Socci, 2007), the macro-analysis of the multiplier is based on a tabular representation of the growth in output of a particular industry in response to a unit increase in demand for the goods produced by that industry. In addition to the scientific community, the calculation of multipliers can also be useful for economic policy holders, as they provide an analytical basis for the valorisation of certain sectoral measures of economic policy and demand management policy.

In recession periods, such as in period of the most recent financial crisis of 2008, governments usually support demand as suggested by Keynesian economics. Example of tax cuts and increased government expenditures in USA, Germany, China, and other countries in 2008/2009 recession imply that fiscal measures proposed by Keynesian economics could provide better policy answer than monetary measures (Otaki, 2015). Empirical studies on the macroeconomic multipliers in the more recent period are available for limited set of the economies. Ramey and Zubairy (2018) used quarterly US data for long period covering several recessions and found

multipliers below unity. Inclusion of the effects of input-output sectoral interdependence reveal amplified financial distortion during the 2008–09 financial crisis (Bigio and La‘O, 2020). Some studies indicate that a more intensive integration of economic sectors, as captured by higher input-output coefficients, results in wider economic effects of external shocks (Flynn, Patterson, and Sturm (2022). Dell'Erba, Koloskova and Poplawski-Ribeiro (2018) found the lag in the response in the case of medium-term fiscal consolidation and suggested that plans for reduction of public debt should be proceeded gradually. Restrepo (2020) found significant variations in fiscal multipliers in the countries of Latin America but generally estimated the larger multiplicative effects than previous literature. Cumulative multiplier for government spending is estimated to be the lowest in Dominican Republic (0.47) and the highest in Columbia (1.89). According to the results of the study conducted for USA economy by Bouakez, Rachedi & Santoro (2023), the aggregate value-added multiplier is larger if input-output interactions and sectoral differences in the price rigidity are included instead of focusing on the one-sector model. While value added multiplier in the one sector model is estimated at 0.42, the same multiplier in multi-sector model is 75 percent higher (0.74). The size of government investment fiscal multipliers in select European countries has been estimated by Deleidi, Iafrate, and Levrero (2023). Fiscal multipliers of the discretionary measures of the fiscal policy are found to be close to 1.

Methodology

Methodology of input-output analysis based on the intersectoral flows of goods and services has been broadly explained in relevant literature (Leontief, 1986; Miller and Blair, 2009; ten Raa, 2005). Columns of IO table describe cost structure of output of each economic sector to production costs and GVA. Production costs include expenditures on intermediary inputs bought by other economic sectors or imported. GVA is income generated by a production process which is distributed to the owners of the production factors. Employees receive wages and salaries; government receive taxes on production, while profit can be distributed to the owners or accumulated on the accounts of producers. Rows of IO table present the value of deliveries of goods and services to other economic sectors or final users. Each entry in IO table depicts the central assumption in the circular flow - expenditure of one unit is at the same time a revenue for the other unit.

Table 1: Simplified presentation of input output table

		Producers			Final uses	Total production
		1jn	Y	x
Producers	1	x_{11}	... x_{1j} ...	x_{1n}	Y_1^D	x_1

	i	x_{i1}	... x_{ij} ...	x_{in}	Y_i^D	x_i

	n	x_{n1}	... x_{nj} ...	x_{nn}	Y_n^D	x_n
Import	1	m_{11}	... m_{1j} ...	m_{1n}	Y_1^M	M_1

	i	m_{i1}	... m_{ij}	m_{in}	Y_i^M	M_i

	n	m_{n1}	... m_{nj} ...	m_{nn}	Y_n^M	M_n
Net taxes on products		$tind x_j$	$tind x_j$	$tind x_n$	Y_{tind}	
Gross value added	v	v_1 ...	v_j	... v_n		v
Production/final uses	X	x_1 ...	x_j	... x_n	Y	

Source: systemization of the author based on Eurostat (2008).

An output of each sector in IO table (presented by rows in Table 1) is distributed to other producers (sum of x_{ij} - inputs used by other producers) or delivered to other institutional sectors. Final uses could be further separated (not presented by Table 1) into personal consumption (C), government consumption (G), investment (I) and exports (E). Total final demand for domestic products is thus: $Y_i^D = C_i^D + G_i^D + I_i^D + E_i^D, i = 1, \dots, n$, where superscript D stands for domestic origin and $i = 1$ to n denotes n economic sectors. Use of imported goods and services are expenditures of domestic units which do not stimulate domestic production and therefore are separated in IO table.

In the standard set of national accounts, final consumption expenditures (Y) are usually valued at purchaser prices which includes basic prices (amount received by a producer), net taxes on products (VAT and similar taxes) and trade and transport margins. On the other hand, IO tables usually present all transactions in basic prices. Therefore, expenditures expressed in retail purchaser prices should be transformed in basic prices prior using IO model. For example, personal consumption recorded in retail prices should be transformed by application of the formula:

$$Y^D = T^{DC} Y^{DK} \quad (3)$$

where Y^{DK} is column-vector with n rows which presents the structure of final expenditures on domestic products valued at purchaser prices. Transformation matrix T^{DC} is square $n \times n$ matrix which have the ratios of basic to purchaser prices for output of each sector at diagonal. Distributional sectors (trade and transport) have entries on relevant positions which present the share margins in purchaser prices for each product. Zero entries are present on other positions of transformation matrix (non-diagonal elements except trade and transport). Transformation matrix for imported products T^{UC} includes non-zero entries only for trade and transport where the share of margins of domestic distributors can be found. Thus, in the case of imported products only part of retail price related to domestic trade and transport results in economic effects because funds with potential for multiplicative effects have been transferred abroad:

$$Y^U = T^{UC} Y^{UK} \quad (4)$$

Matrix A is a technical coefficient matrix where $a_{ij} = \frac{x_{ij}}{x_j}, i, j = 1, \dots, n$ present the share of the intermediate inputs delivered by sector i required to produce unit value of output in sector j . Matrix $L = (I - A)^{-1}$ is called the Leontief inverse matrix (Miller and Blair, 2009). Total output induced by final expenditures is calculated as:

$$x = (I - A^D)^{-1} T^{DC} Y^{DK} \quad (5)$$

Type I output multiplier as presented above includes direct and indirect effects. Type II multipliers additionally includes effects induced by increase in personal consumption financed by wages and salaries earned along value-added chain. In closed IO model, personal consumption is treated as endogenous variable and an extended matrix A' is used instead of matrix A. It contains an additional row and column describing coefficients of wages and salaries (in final row) and structure of personal consumption in final column (Miller and Blair, 2009; ten Raa, T., 2005).

Total effects of final demand on GVA and employment can be calculated by the following formulas:

$$VA = V(I - A^D)^{-1} T^{DC} Y^{DK} \quad (6)$$

$$EM = E(I - A^D)^{-1} T^{DC} Y^{DK} \quad (7)$$

where elements of diagonal matrices V and E denote the GVA and employment coefficients for each economic sector. Total GDP induced by final expenditures is the sum of GVA and net taxes on products.

The main data source used in this study is symmetric IO table for Croatian economy, with separated flows of domestic and imported products, for 2010 and 2018, which are available from: https://ec.europa.eu/eurostat/databrowser/view/naio_10_cp1700/default/table?lang=en. Transactions are distributed by 64 economic sectors according to CPA rev. 1 classification of products.

Results

By applying the equations presented in previous chapter, total GVA, employment and tax revenues can be decomposed to the contribution of the individual component of final demand. Final demand for domestic products directly affects economic activity in Croatia, while expenditures for imported products stimulate transport and trade only. Trends in the change of the contribution of individual components of final demand were evaluated based on the comparison of the results for 2010 and 2018.

Imported products meet a quarter (24.8%) of the final demand for goods and services according to the concept of market purchase prices as presented by Table 2.

Table 2: Total demand in Croatia expressed in purchaser prices, in 2018, million EUR

	Domestic products	Imported products	Total use	Import share, in %
Personal consumption	28,974	7,971	36,945	21.6
Government consumption	9,879	727	10,606	6.9
Investments	8,283	3,710	11,993	30.9
Exports	10,204	6,516	16,720	39.0
Total demand	57,340	18,924	76,263	24.8
Index 2018/2010				
Personal consumption	115.8	144.1	120.9	119.2
Government consumption	107.7	*	115.6	*
Investments	122.3	146.9	129.0	113.9
Exports	115.9	302.5	152.6	198.2
Total demand	115.2	185.2	127.1	145.6

**index 2018/2010 above 1000*

Source: Eurostat database,

https://ec.europa.eu/eurostat/databrowser/view/naio_10_cp1700/default/table?lang=en .

Out of all components of final use, the largest share of imported products was recorded in the exports and investments. The high import dependence of exports is the result of the geographical factor and availability of transport infrastructure. A certain proportion of the goods for which destination is territory of other EU members, are imported in Croatia for the purpose of re-export to other more distant EU areas. In addition, significant proportion of export of services include expenditures of foreign tourists who, based on their consumer habits, often demand the same brand as they buy in their domicile countries. Investments include imported usually technically complex equipment which is not produced domestically. Although the share of imported components in government consumption is relatively low, compared to 2010, it recorded a significant increase and form 6.9% of total government consumption.

Final demand for imported goods and services grew faster than the demand for domestic products in analyzed period and all components of final demand recorded a significant increase in value of imports. Thus, demand for domestic products used for the personal consumption grew cumulatively by only 15.8% in the observed period, the growth rate of imported products was three times higher (cumulative growth of 44.1%). The demand for imported products in the category of investments was three times higher, while the share of imports in exports doubled (index 198.2).

By applying the IO model as described in previous chapter, the total contribution of individual components of final demand in 2010 and 2018 was calculated. The contribution is expressed in terms of gross added value, employment, and government revenues. Table 3 show the effects on economic activity related to the final demand for domestic and imported products in Croatia 2018. GVA effects induced by demand for imported products capture economic activity of domestic traders and transporters (including effects in their value-added chains) related to the distribution of imported products. The category of personal consumption is the largest component of final demand, and its contribution to domestic production activities is also the largest. In total 48.4 percent of GVA is induced by personal consumption, where 46.1 % is related to effects of demand for domestic products and only 2.3% for personal consumption of imported products. Exports and government are approximately equally important categories of final demand, and both generate almost 19% of Croatian gross value added, while the contribution of investments is estimated at 14% of GVA. The share of economic activity generated by imported products (5.4 percent) is significantly lower than share of total expenditures on imported products (24.8 percent as presented by Table 2).

Table 3: GVA induced by final demand for domestic and imported products in Croatia 2018

	GVA, mil. EUR		Total GVA induced by final demand, mil. EUR
	Domestic products	Distribution of imported products	
Personal consumption	19,392	959	20,351
Government consumption	7,845	83	7,928
Investments	5,403	462	5,866
Exports	7,137	752	7,889
Total	39,778	2,256	42,034
Relative importance of components, in % of total contribution			
Personal consumption	46.1	2.3	48.4
Government consumption	18.7	0.2	18.9
Investments	12.9	1.1	14.0
Exports	17.0	1.8	18.8
Total	94.6	5.4	100.0

Source: author's calculations.

The structure of employment generated by individual components of final demand do not deviate significantly from the share of GVA (Table 4). It is interesting to note that the share of exports in terms of employment is even higher (19.5 %) in comparison to GVA, which indicates relatively low productivity in the Croatian export sector. This is a consequence of the low share of technologically complex products and the prevalence of traditional less productive export sectors, such as the food industry, agricultural and wood products. In addition, the export of tourist services is also oriented to activities with below-average productivity.

Table 4: Contribution of individual components of final demand in total employment, in 2018

	Employment, in thousands FTE jobs		Total employment induced by final demand, thousands FTE jobs
	Domestic products	Distribution of imported products	
Personal consumption	662.5	39.9	702.4
Government consumption	362.4	3.5	365.9
Investments	236.9	19.2	256.2
Exports	289.2	31.2	320.5
Total	1,551.1	93.9	1,645.0
Relative importance of components, in % of total contribution			
Personal consumption	40.3	2.4	42.7
Government consumption	22.0	0.2	22.2
Investments	14.4	1.2	15.6
Exports	17.6	1.9	19.5
Total	94.3	5.7	100.0

Source: author's calculations.

Table 5 presents the relative importance of individual components of final demand in terms of generated public revenues. As Croatian tax system is strongly oriented to indirect taxation with high share of VAT and excises finally paid by household sector, the contribution of personal consumption is generation of taxes is higher than its importance in terms of employment and GVA. It is interesting to note that the importance of distribution of imported products in generation of public revenues is significantly higher than its importance in inducing domestic economic activity. It is also consequences of dominant share of indirect taxes where domestic and imported goods are equally taxed.

Table 5: Contribution of individual components of final demand total net taxes and social contributions generated in Croatia, in 2018

	Net taxes and contributions, in mil. EUR		Total taxes induced by final demand, mil. EUR
	Domestic products	Distribution of imported products	
Personal consumption	8,297	1,906	10,204
Government consumption	2,372	48	2,420
Investments	2,094	353	2,447
Exports	2,113	318	2,430
Total	14,877	2,625	17,502
Relative importance of components, in % of total contribution			
Personal consumption	47.4	10.9	58.3
Government consumption	13.6	0.3	13.8
Investments	12.0	2.0	14.0
Exports	12.1	1.8	13.9
Total	85.0	15.0	100.0

Source: author's calculations.

Compared to 2010, the total gross added value of the Croatian economy increased cumulative by 12.9% (Table 6). Above average growth in contribution were estimated for GVA generated by exports of goods and services (17.9%) and GVA realized by distribution of imported products (26.1%). The trends indicate the increasing importance of imports on public finances, as taxes directly or indirectly generated by imports increased by 54.8% compared to 2010. The lowest growth in contributions was achieved by government expenditures due to the continued efforts of the government to consolidate public finances. Investments recorded the largest increase in contributions both in terms of employment and taxes. The total number of employees, in accordance with demographic trends, recorded a decrease in the examined

period, which is primarily a consequence of the increase in productivity in the production of goods and services intended for personal consumption.

Table 6: Cumulative growth in GVA, employment and net taxes and contributions effects period 2010-2018, in %

	GVA	Employment	Taxes and contributions
Personal consumption	14.2	-11.6	9.1
Government consumption	3.2	3.7	15.3
Investments	12.3	15.2	46.7
Exports	17.9	3.0	15.8
Distribution of imported goods	26.1	11.0	54.8
Total	12.9	-1.5	19.8

Source: author's calculations.

Table 7 presents type I multipliers for GDP, GVA, employment and public revenues. Multipliers should be interpreted as relative effects of economic variables generated per unit value of final expenditure in purchaser prices.

Table 7: Type I multipliers GDP, GVA, employment and public revenues in 2018

	GDP			GVA		
	Domestic	Imports	Total	Domestic	Import	Total
Personal consumption	0.84	0.33	0.73	0.67	0.12	0.55
Government consumption	0.85	0.16	0.80	0.79	0.11	0.75
Investments	0.76	0.19	0.58	0.65	0.12	0.49
Exports	0.75	0.14	0.51	0.70	0.12	0.47
Total	0.82	0.23	0.67	0.69	0.12	0.55
	Employment, FTE jobs per 1 million EUR expenditures			Net taxes and contributions		
	Domestic	Imports	Total	Domestic	Imports	Total
Personal consumption	22.6	5.3	18.8	0.29	0.24	0.28
Government consumption	36.9	4.5	34.7	0.24	0.07	0.23
Investments	28.6	5.3	21.1	0.25	0.10	0.20
Exports	28.6	4.5	18.8	0.21	0.05	0.15
Total	27.1	5.3	21.8	0.26	0.14	0.23

Source: author's calculations.

When domestic households buy domestic products worth 1 EUR it results in GDP increase of 0.84 EUR which includes 0.67 EUR of GVA, and the 0.17 EUR is increase in VAT and other indirect taxes (not presented individually in Table 7 but is part of total net taxes and contributions). In comparison, purchase of an imported product of the same value increases the Croatian GVA by only 0.12 EUR mainly in distributive sectors such as trade and transport. The difference in the product origin creates 5.58 ($0.67/0.12=5.58$) times more gross value added if Croatian household buy domestic instead of an imported product. Total expenditures on personal consumption, generate 0.67 units of GDP per unit value of expenditures.

Gross added value per unit of final demand is the highest for the category of government expenditures (0.75 EUR GVA generated by 1 EUR of total expenditures) because the largest part of government expenditures is the gross wages of employees in the public sector. According to national account convention wages and salaries in public sector are directly included in the gross added value. The relative employment effects are also the highest for government expenditures where 1 million EUR expenditures generates approximately 35 jobs according to the full time equivalent. The relative employment effects are the smallest for

personal consumption. It is a result of high share of imputed owner-occupied dwelling services in personal consumption which do not require any employment.

In difference to open IO model, where each component of final demand is treated as exogenous, in closed IO model personal consumption is treated as endogenous variable. The level of personal consumption is determined by wage income received by production unit which produce and deliver goods and services to other components of final demand: government consumption, investments, and exports. The application of closed IO model results in type II multipliers which include direct effects (related to the unit which deliver final good), indirect effects (related to activities of units which produce inputs which are required by direct producer) and induced effects which include economic activity induced by personal consumption financed by increase in wages and salaries of employees engaged in value added chain. According to the assumptions applied, closed IO model is more in line with the assumptions used in standard macroeconomic models where personal consumption is assumed to depend on the level of national income. Application of IO model, instead of simple aggregate multiplier, provides more reliable information on the economic effects of the change in exogenous demand because it incorporates more detailed information on the structure and origin of products used by different categories of final demand. Type II multipliers for Croatian economy are presented by Table 8.

Table 8: Type II multipliers for GDP, GVA, employment and public revenues in 2018

	Domestic	Imports	Total	Domestic	Import	Total
	GDP			GVA		
Government consumption	1.76	0.26	1.66	1.51	0.20	1.42
Investments	1.37	0.31	1.04	1.14	0.22	0.85
Exports	1.39	0.25	0.94	1.20	0.20	0.81
Total	1.51	0.27	1.17	1.29	0.21	0.99
	Employment, FTE jobs per 1 million EUR expenditures			Net taxes and contributions		
	Domestic	Imports	Total	Domestic	Imports	Total
Government consumption	65.5	8.3	61.8	0.58	0.11	0.55
Investments	48.2	9.0	36.2	0.48	0.14	0.38
Exports	48.2	8.3	32.4	0.44	0.09	0.30
Total	54.2	8.3	41.4	0.50	0.11	0.39

Source: author's calculations.

On average, the increase in exogenous demand of 1 EUR results in the increase in GDP of 1.17 EUR in the Croatian economy. The highest GDP multiplier is estimated for government consumption, where 1 EUR of expenditures induce 1.66 EUR GDP. It is evident that origin of product is crucial in the spreading of initial effects. If compared to type I multipliers (Table 7), type II multipliers are significantly higher. Estimated effects of the change in the exogenous final demand are more intensive because induced effects related to personal consumption, in the closed IO model are distributed to the other components of final demand.

When domestic product is used, increase in GDP is 51% higher than initial change in final demand, while in the case of expenditures on imported products, GDP increase is estimated to only 27% of initial increase. However, economic policy of stimulation of economic growth by the expansion of public expenditures is limited by the concerns over sustainability of public finances. Although each EUR of public expenditures induce 0.55 EUR in government revenues from net taxes and contributions, increase in government expenditures result in deterioration of stability of public finance. Future economic growth would be primarily based on exports where,

because of the significant import dependence and lower taxation, GDP effects are slightly below the initial change in value of delivered goods and services.

Conclusions

In the last century, periods of dominance of classical and Keynesian economics alternated in standard macroeconomic textbooks and articles. Besides the affiliation of the school of economic thought, policy proposals of macroeconomists usually depended on the state of the economic cycle. Thus, in periods of serious economic crisis, economists often resort to postulates of Keynesian economics and propose active role of government policy makers in stimulation of effective demand while in more stable macroeconomic environment classical macroeconomics prevail. The purpose of this study was not to test hypothesis on superiority of one of the approaches, but to provide empirical assessment on the role of individual components of final demand on economic activity in Croatia based on input-output approach.

Closed IO model for Croatian economy indicates that increase in exogenous final demand on average induce 17% higher increase in GDP which is closer to upper boundary of estimates for other economies (Ramey, 2011). The highest effects per unit change in exogenous demand are estimated for government consumption which point to the conclusion on the effectiveness of fiscal policy in stimulation of economic activity in the recession periods. Croatia as a small open economy, is expected to further improve international integration through increased trade openness in the future period. Higher openness in future long-run period will probably result in decreasing multiplicative effects. Expenditures on imported products induce 5 times lower relative economic effects in comparison to expenditures on domestic products. High direct and indirect import dependence limit the intensity of aggregate multipliers for Croatian exports.

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COMPARISON OF SOME BUSINESS PROCESS MATURITY MODELS

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Abstract

The competition of today and tomorrow is centred around processes. Organizations have come to the conclusion that processes must be able to offer efficiency in addition to quality and service. Business Process Orientation (BPO) emerged as an appealing management solution for a range of organizational issues as a result of this tendency. With the increasing application of process orientation in today's business conditions, there is a stronger connection between business processes and their characteristics with the state and performance of the organization. In this context, the importance of the concept of process maturity can be observed. A series of stages (levels) that define an expected, logical or desired progression from an initial level to maturity are generally included in models of maturity. The level of maturity at which an organization currently operates reflects its aptitudes in relation to a specific object class and domain of application. Models of maturity are employed to assess existing conditions, direct improvement efforts, and monitor development. The goal of every organization is to mature to the greatest extent possible so that its processes continuously improve. The literature abounds with models of process maturity. In fact, there are numerous models of maturity associated to the business process management sector that practitioners and academics may become confused. Despite the fact that academics are slowly starting to recognize the appropriate research needs and business process management specialists want consolidation of "the motley assortment of maturity models," potential adopters from industry still face significant uncertainty. So, the question arises as to which model is most suitable for implementation in practice. In order to answer that question, a comparative analysis of several models of maturity was made in this paper.

Keywords: business process orientation, process maturity models, maturity phases, comparison

JEL classification: M15, M20

Introduction

Organizations around the world are under tremendous pressure from competition, a rapidly changing business environment and increasingly demanding customers, so many of them are seeking to cut operational expenses and improve efficiency. As a sequence of events, the focus of business shifts to business procedures, and process management becomes the basis of modern management (Mendling, Pentland & Recker, 2020). The end aim of a business process is to satisfy customer needs for products or services of appropriate quality and pricing, within a reasonable amount of time. Business processes are a collection of logically connected actions that utilise the company's resources, while at the same time realizing some value (Fischer et al, 2020). Process management carries out by examining every business activity right up to the organization's foundation. Today, organizations integrate their business processes through

functional units and thus adopt a process-oriented approach (Tarhan, Turetken & Reijers, 2021). The degree to which an organization pays attention to its primary business processes is known as process orientation (McCormack and Johnson, 2020). One of the numerous methods used to support business process management and process orientation are maturity models which are gaining importance due to growing academic interest and their increasing application in industry (Scott, 2017). Process maturity refers to the idea that each business process has its own life cycle and as such provides a useful theoretical framework for guiding process improvement activities (Becker and Khan, 2015).

The Association of Business Process Management Professionals (ABPMP) claims that today there are over 150 process maturity models (Röglinger, Pöppelbuß & Becker, 2012). Despite the fact that the literature abounds with works on process maturity models, their usefulness for practice, as well as their theoretical support and credibility, remains questionable, since not all of them are empirically proven (Tarhan, Turetken & Reijers, 2021). Certain authors think it is precisely the poor definition of many models is the reason for their poor implementation by the business community (de Bruin & Rosemann, 20019). In addition, there is a lack of practical advice about implementation of all phases of process management and its construction in the company (Röglinger, Pöppelbuß & Becker, 2012). Accordingly, this paper tries to address the mentioned deficits in the area of the process maturity model by defining the research question/problem: Which model of process maturity is most suitable for implementation in the organization? So, this paper's objective is to present the three most known process maturity models according to practice and academy and to compare them in order to conclude which one is the most appropriate for today's businesses.

The paper is organized as follows. After the introduction, the usefulness and problems of using the process maturity model are defined and described. The third chapter presents and analyzes some of the more significant models of process maturity. In the fourth chapter, the presented models are compared according to several criteria and the results of the comparison are interpreted. The last chapter provides a conclusion that summarizes the final considerations, significance and limits of the work and offers recommendations for further study.

Theoretical background

Maturity models are a strategy for enhancing organizational performance and enhancing the ability to manage business processes (Röglinger, Pöppelbuß & Becker, 2012). They are used to assess the current state and to guide improvement initiatives and control progress (Wendler, 2021). Maturity models are mostly based on a phased approach. This approach assumes that a set of related abilities are achieved together and that one set is achieved before the other. They typically have a progression of phases that represent an anticipated, intended, or logical progression from the earliest stage to complete maturity (Cronemyr, Danielsson, 2019). In the context of process maturity, the stages of process maturity of organizations that are in one of the defined stages or are in the process of transition from one stage to another are defined (Harmon, 2019).

Business process management is a complicated practice, according to an analysis of the business processes literature that poses a problem for many organizations (Mendling, Pentland & Recker, 2020). Therefore, process orientation maturity models are developed with the purpose of: (1) enabling organizations to assess their current position in business process management; (2) enable organizations to assess their desired stage of maturity using key

factors; (3) help organizations move from their current to their desired position. In addition to these benefits related to the application of models in practice, the development and application of such models also enables a significant contribution to the knowledge base on the administration of organizational business processes. The establishment of generally accepted maturity models help in understanding important business elements of process management, which leads to a clear differentiation of this approach from other management approaches.

The literature recognizes a number of business process maturity models (BPMM), some of which are mutually exclusive similar (Van Looy, 2014), and according to Tarhan, Turetken and Reijers (202) there is evidence that the above does not indicate the validation and improvement of existing models, rather the lack of in-depth familiarization with model species. It is possible to state that there are many models of process maturity, but not as many models for achieving process maturity (Ivančić, 2018). McCormack and Johnson (2020) state that companies with strong process maturity measures performed better overall business results. The process orientation maturity models have been applied with various research objectives in several studies (Milanović Glavan, 2020; Hernaus, Bosilj Vukšić & Indihar Štemberger., 2016; Škrinjar, Hernaus, & Indihar Štemberger, 2007). The dimensions in process maturity models can be seen as independent variables, and their fundamental premise is that the improvement in maturity in these dimensions has a favourable effect on the organization's process performance as a dependent variable. Instead of focusing on evaluating the effectiveness of particular procedures, the goal is to measure these separate aspects for two reasons. The first is that such a method provides insight into how to improve process performance, which is better than just reporting results. The second is that there are already a large number of models and solutions for measuring business performance. The measurement of the dependent variable, i.e. actual process performance, includes measuring the impact of business process management on operational results (time, costs, quality), customer satisfaction, valuation and financial results. Tang, Pee and Iijima (2019) compared low and high maturity in organizations to make the idea of process maturity easier to understand (Table 1).

Table 1: Table 1. Low level vs. high level of maturity in organizations

Low level of maturity	High level of maturity
Isolated projects	Coordinated business process management activities
Weak process management skills	High expertise in business process management
Reactivity	Proactivity
Manuality	Automation
Self-focused	Expanded organization
Static	Innovativeness

Source: adjusted according Tang, Pee and Iijima, 2019.

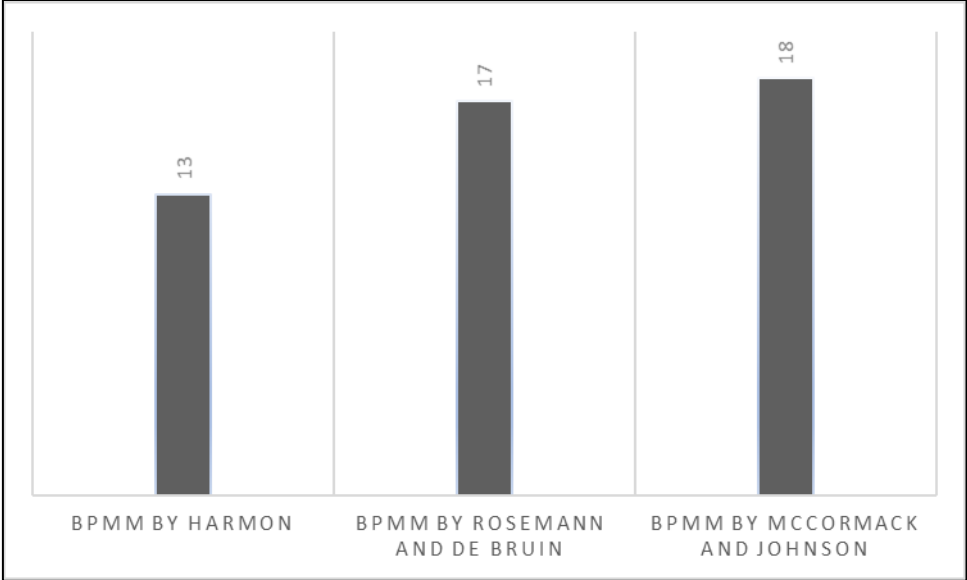
As already mentioned, a number of process maturity models have been developed. The CMM model (Capability Maturity Model), created in 1977 at Carnegie Mellon University's Software Engineering Institute (SEI), served as the foundation for the creation of such maturity models. This model, which is based on the idea of immature and mature software organizations, was initially created to assess the software development process. The foundation for using such model was verified by Tang, Pee and Iijima (2019) arguing that an increase in maturity leads to an improvement in an organization's process capabilities. And Harmon (2019) developed his CMM maturity model of business process management with five stages. Similarly, Fisher (2019) combined five levels of change with five stages of maturity. However, according to Smith and Fingar (2020), maturity models built on the CMM model must include well-structured, repeatable processes in order to adequately represent the requirement for process innovation. These models' shortcomings include their oversimplification and single-

dimensional concentration on gauging the maturity of business process management, as well as their lack of actual application (Rosemann and de Bruin, 2019). Therefore, for example, ten success factors were devised by Rummler and Brache as part of a research to gauge how well-managed an organization's major processes are (2020). When Maull et al. (2018) attempted to describe the maturity of business process management programs, they ran into the issue of a lack of objective measures. They attempted to define the management of business processes using two dimensions: weighing the measure of preparedness for changes and utilizing objective measures (time, number of teams, etc.). However, this method proved to be overly complex. As a result, they adopted a strategy in which they evaluate the organizational perception of maturity using quantitative data. DeToro and McCabe (2016) provided another illustration of how to define process maturity, using two dimensions to evaluate the condition of the process.

Maturity models of process orientation

Tarhan, Turetken and Reijers (2021) have done a systematic literature review on business process maturity models using SLR methodology in different articles published in academic journals and conference proceedings through digital libraries. They have shown (Figure 1) that the most studied models and the most referred in academic literature and practice are: the maturity model of the organization and its processes (by Harmon) with 13 studies, the maturity model of business process management (by Rosemann and De Bruin) with 17 studies and the maturity model of the organization's process orientation (by McCormack and Johnson) with 18 studies. That is why, in the continuation of the paper, these three models will be presented in details.

Figure 1: The most studied models in the academic literature



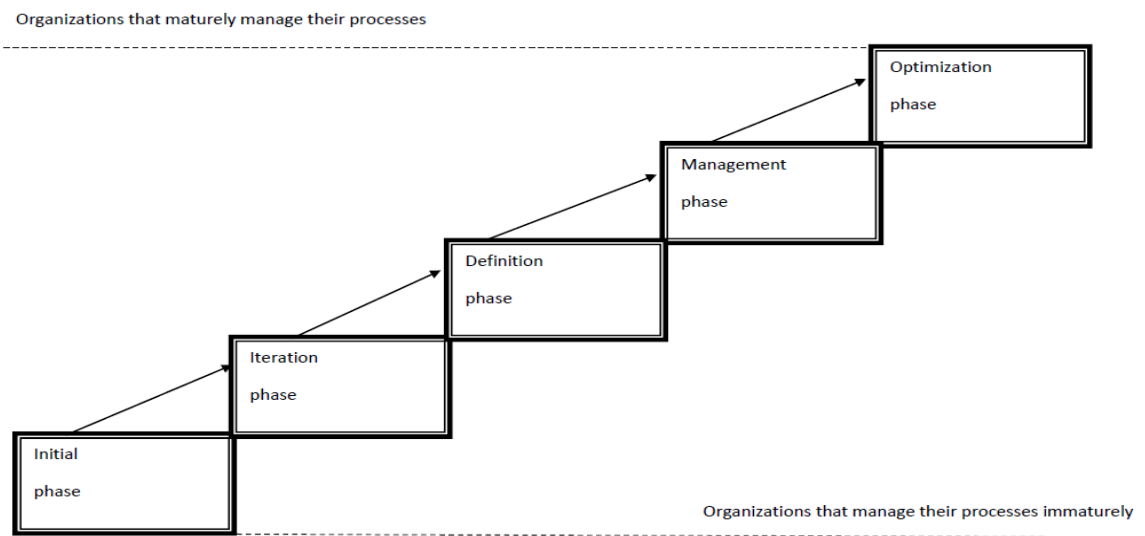
Source: adjusted according to Tarhan, Turetken and Reijers, 2021.

Maturity model of the organization and its processes

Based on the already mentioned CMM model of the SEI Institute, Harmon develops his own model that measures the maturity of the organization and its processes (2019). This model

consists of 5 phases: the initial phase and the phases of repetition, definition, management and optimization (Figure 2).

Figure 2: Maturity model of the organization and its processes



Source: adjusted according to Harmon. 2004.

Initial stage: In this stage, organizations are immature. Processes are not defined, and projects are unpredictable. Only a few activities are explicitly defined, and success depends on the efforts of individuals. In the initial phase, there are organizations and organizational units that start doing business. The best advice for organizations at this stage is to define their processes.

Iteration phase: Organizations in this phase are focused on processes and define certain key processes. Some processes can be repeated and produce predictable results, but some processes are still not controlled. To keep tabs on expenses, the fulfilment of the projected timetable, and functioning, the fundamental project management procedures are laid down. As organizations mature, they begin to conceptualize their business processes, organize them, iterate and measure results.

Definition phase: Organizations in this phase define all their key processes and have some degree of control over them. Emphasis is placed on collecting data and using measures to help managers manage their processes. However, the manager's goals are not related to the process goals.

The difference between the second and third phases, that is, between the repeating and defining phases, is easy to see. Harmon (2019) claims that most organizations are between the second and third stages. This means that they have defined only some processes, while others have not. In essence, organizations between the second and third stages have well-defined processes, but do not understand how the defined processes connect to each other.

Management Phase: Organizations place emphasis on process management. They have good process measures and collect data consistently. Managers rely on measures and data when setting goals in projects. Project managers are aligned in achieving the organization's goals. Detailed measures of process performance and quantitative information on product quality are collected. In this phase, the organization's strategies and goals are aligned with specific process activities.

It is not easy to determine the difference between the third and fourth stages, that is, between the stages of definition and management. In order to achieve the third stage, organizations must have well-defined processes. During the definition of its processes, the organization typically establishes measures and orients management around its processes. The essence lies in the difference between organizations with informal, incomplete management and measurement systems, and organizations that have hierarchically aligned measurement systems and process management systems. In the third phase, organizations try to monitor and measure specific processes. In the fourth phase, monitoring and control are part of hierarchically coordinated systems that ensure that processes achieve strategic goals.

Optimization phase: Employees in the organization know everything about the processes and strive to improve them. Continuous process improvement is enabled by quantitative measures of process success. Managers and employees are required to work together to improve processes. At this stage, organizations understand the processes so well that they can conduct systematic experiments to determine whether certain changes will be beneficial or not.

Which stage the organization is in is determined using a checklist containing key points. Using this list, organizations can observe the process and add it to a certain stage, and make notes about the characteristics that the process has or does not have. The essence of this approach is that it not only assesses the maturity stage of the process orientation of the entire organization, but also assesses the individual processes or set of processes of the organization.

Maturity model of business process management

In Australia, at the Queensland University of Technology, a research team created the business process management maturity model (Rosemann and de Bruin, 2019). The major objective of the maturity model is to evaluate the present and desired levels of business process management maturity. This model is used as a diagnostic tool to determine the process organizations' current maturity. The model and the results obtained from its use can be used to define the desired state of maturity. The model should enable organizations to focus on areas of lower maturity and develop improvement plans to progress to the desired level of maturity. The model makes it easier to prioritize areas for business process management growth. It may also be used over time to track the success of process efforts, acting as a continuous monitoring tool as organizations transition from their current state of maturity to their intended state. Business process management maturity is characterized by Rosemann and de Bruin (2019) as a combination of coverage and proficiency. While expertise refers to the caliber and efficacy of business process management inside the organization, coverage refers to the ability within the organization and the level of implementation of BPM. Alternatively, coverage answers the question of how far process management activities extend through the organization, and skills how well process management activities are implemented in the organization. Achieving a higher level of maturity requires improvements in both coverage and skills. This model uses phases, factors, organizational capabilities, and time to evaluate the maturity of business process management. A factor is a quantifiable, unrelated aspect that has an impact on the fundamental and unique features of process management. Rosemann and de Bruin (2019) identified five characteristics of the management of business processes based on the literature:

1. Information systems and technology: How business process management is implemented with the aid of information systems and technology.
2. Culture: workplace adoption, use, and promotion of process management.
3. Responsibility: Tasks and responsibility of employees in the practice of implementing

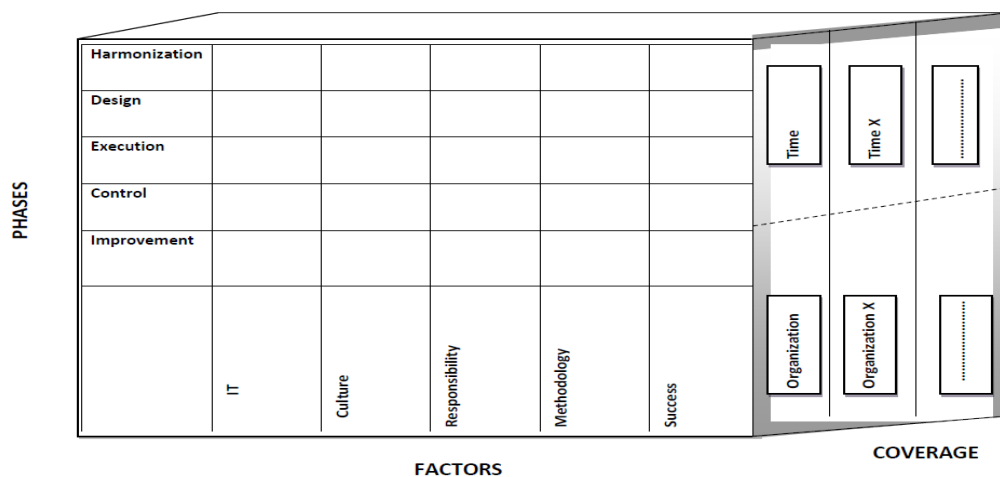
management.

4. Methodology: adoption of formal, well-defined procedures for managing.

5. Performance: review and measurement of management performance, including employee-related organizational and individual procedures.

The phases refer to business processes management in general, but also to individual processes. The five phases are: alignment, design, execution, control and improvement. The organizational goal represents one model dimension and represents the entity in which the model is applied. An entity can be either an entire organization or a part of an organization in a specific geographic location, a business department, a branch or even a project or process itself. Time is the precise moment in time when the model was used. The combination of factors, stages, organizational competencies and time leads to a multidimensional maturity model for process management. Factors and phases form a 5 vs. 5 grid that produces 25 squares (cubes). The smallest measurable item in the model is called a field, which is made up of factors and phases. Based on a quantitative questionnaire on a scale from 1 to 5, the self-evaluation is conducted. The organization can identify and comprehend its current position, or the maturity stage of business process management, through the examination of 25 fields (Figure 3).

Figure 3: Maturity model of business process management by Rosemann and de Bruin



Source: Roseman and de Bruin, 2005.

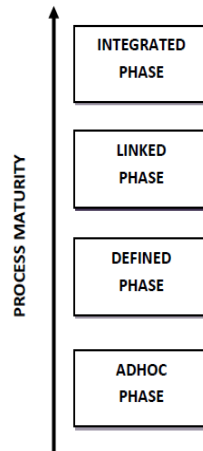
The business process management maturity model is applicable not only at the organizational level, but also at the level of organizational units, projects or individual business processes. Applying this model to several organizations could therefore enable valuation studies across organizations, industries and countries. According to its authors, measuring and comparing the maturity of business process management of different units provides essential information about internal practice and enables comparison between these units at different time intervals, which represents the first step when it comes to internal business process management standards in the organization.

Maturity model of process orientation of the organization

The process orientation maturity model of the organization was developed by McCormack and Johnson (2020). The model proposes four stages of maturity through which the organization goes until the realization of complete process integration: adhoc, defined, connected and

integrated stage (Figure 4). Each phase or stage contains certain characteristics.

Figure 4: McCormack and Johnson's process orientation maturity model



Source: created by the author.

AdHoc phase: The definition and structure of processes are lacking. Jobs and organizational structure are based on conventional functions rather than horizontal processes, and process metrics are not used. Functional cooperation and customer satisfaction are both low.

Defined phase: Basic procedures are spelled out and recorded. Changes to these processes must follow established protocols. Although processes are a part of some jobs and organizational structures, they are basically conventional. Functional representatives only meet in their capacity as representatives of established functions, and they consult on procedural matters on a regular basis. Although it has increased, customer satisfaction is still poor.

Linked phase: Phase of breakthrough. Process management is put into practice by managers with a strategic goal. Process work and process organization go beyond the bounds of conventional functions. Collaboration between departments, vendors, and clients produces process teams with similar process metrics and objectives. The process becomes more efficient, and the intended outcomes appear more frequently. Initiatives for process improvement involve customers, and customer satisfaction is rising.

Integrated phase: At the process level, the organization works together with its clients and suppliers. Traditional functions are starting to disappear, and organizational structure and occupations are focused on processes. The process management system and process measures have a long history inside the company. Process teams establish and frequently accomplish process goals. Success turns into an organization's competitive edge.

Lockamy and McCormack (2021) build on this model with another, fifth, expanded stage. **Extended phase:** competition is based on the networks of several organizations, i.e. it includes processes within the value chain between several organizations. Trust between process teams, interdependence and performance are the aspects that hold this extended value chain together. There is a horizontal, collaborative culture that is customer-oriented. The success of the process is measured and joint investments, as well as the return on investment in such a system, are shared.

By analyzing the individual dimensions of process orientation, its state is established, that is,

the process orientation's average value is calculated, according to which the stage of process maturity in which the observed company is located is determined. The boundaries of maturity stages are not unique and depend on the research sample (McCormack and Johnson, 2020).

Analysis of the comparison of different process orientation maturity models and discussion of the results

Table 2 compares the maturity models that were chosen and presented in the paper, from which their similarities and differences are visible.

Table 2: Comparison of maturity models

	Maturity model of the organization and its processes (by Harmon)	Maturity model of business process management (by Rosemann and de Bruin)	Maturity model of process orientation of the organization (by McCormack and Johnson)
Goal	Measure the level of process maturity of the organization and its individual processes.	Measure the level of business process management.	Measure the level of process maturity of the organization.
Number of stages	Five.	Five.	Four.
The lowest level of maturity	Processes are not defined.	Attempts to manage business processes do not exist or are completely uncoordinated and unstructured.	Processes are unstructured and poorly defined. There are no procedural measures. The organizational structure is based on functions.
The highest level of maturity	Processes are managed and their success is measured. There are teams in the organization that deal with process improvement.	Business process management is a key part of both strategic and operational management within the organization	The organizational structure is based on processes. Process measures are deeply rooted in the organization.

Source: created by the author.

It can be seen from the table that although maturity models have different names and different number of stages, they do not differ significantly. They consist mainly of four to six stages and emphasize very close aspects. Process maturity models are similar in many respects and all have the same purpose, which is to determine the maturity level, harmonize and improve processes, find solutions to problems, and rationally use all available resources to mature corporate processes to their fullest potential. That is, all maturity models seek to reduce complexity from a traditional way to a process way of doing business (Bosilj Vukšić et al., 2008).

Given the large number of existing models, the decision to select the appropriate model for assessing the stage of process maturity in the company must be founded on numerous criteria. Among the most important criteria is that the selected model understands and determines the relationship between process orientation level and process capabilities with organizational performance (Fischer et al., 2020). Also, it should be designed to capture current organizational performance in order to enable comparison of company performance with already established industry standards for most key business processes (Wendler, 2021).

Conclusion

Given that there are a handful of process maturity models today, the research question that arose is which model is most suitable for implementation in organizations. Practitioners may be well-advised to take into account additional academic works on maturity models when selecting a maturity model for their organization's evaluation and improvement in order to determine selection criteria and educate themselves on the potential advantages and disadvantages of applying the maturity model in practice. In order to answer that question, a comparative analysis was made of three process maturity models that are the most cited in the literature, but which are also represented in practice in addition to the literature. The comparison made showed that all maturity models, regardless of the name and number of stages, have the same task, which is to evaluate the degree of maturity of processes within the organization and find a way to increase the maturity of the process.

It is precisely in this conclusion that the main contributions for research and practice are evident. Regarding academic work it can be stated that only a few papers contain references to the relatively large number of models that have been proposed and spread throughout the field. It can be claimed that the study in this area is still in its early stages because the perspectives on the purpose of use and the assessments are unclear. It is challenging for practitioners to develop a business case for potential applications due to the scarcity of works on model application and validation, which has a detrimental effect on the broad adoption of models in practice. Existing BPMs should be improved in order to make them more useful. Regarding practice it can be stated that regardless of the model choice, it is clear that the path to the highest level of process maturity is long and thorny. When thinking about increasing process maturity, managers must be aware of the fact that it is not possible to skip sequential levels, because each level represents the basis for the development of the next, higher level, therefore organizations must be patient when institutionalizing the process approach. The transition to a new process philosophy for organizations represents a long-term and complete change in the business paradigm, which requires not only significant resources and numerous changes, but also maximum commitment and involvement of all employees.

The limitation of the work is the fact that only a theoretical comparison of maturity models was made. In future research, an assessment of the maturity of the process orientation of one or more Croatian companies should be carried out in order to show how maturity models work in practice.

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OUTSOURCING IN THE CROATIAN SERVICE SECTOR

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Abstract

From the beginning of its application until today, the use of outsourcing is constantly growing. The fact is that outsourcing has become indispensable in the modern business. Aware of numerous benefits such as the opportunity for specialization, cost reduction, risk prediction and elimination, increased performance within the company, outsourcing has been recognized as an ideal strategic approach for companies that strive to internationalize their business. Although it has many advantages, outsourcing is not a unique solution that will optimize the operations of every company. It should be approached seriously and professionally. A detailed analysis of the business is a key step before activity allocation. Inadequate preparation can lead to counter-effects and have a negative impact on the overall business. The most common subjects of outsourcing are services which occur globally in the private and public sectors. Croatian companies are little behind world trends, but they recognize the advantages of outsourcing and implement it more often in their operations. The basis of the work is research on the implementation of outsourcing in Croatian service companies. The goal was to understand the reasons, satisfaction, and negative aspects of outsourcing. The research results indicate an increased presence of outsourcing. Small domestically owned companies dominate. They are oriented towards more outsourcing partners, of which they prefer those who are also local with many years of experience. The cost component is of a crucial significance, but importance is also attached to quality, reputation, and reliability. There is a whole spectrum of different services that have been outsourced. Customer support, accounting, marketing, transportation, and cleaning are just some of them. But the most unpopular are the key stages of business such as procurement and sales. Outsourcing contributes to performance, but the exceptional quality of improvement is still not unquestionably noticeable. The negatives are reflected in the time and cost dimensions where efficiency is lacking. However, companies do not feel the need to return activities to their own jurisdiction, on the contrary, they plan to turn even more to outsourcing.

Keywords: outsourcing, Croatia, Croatian companies, service sector

JEL classification: L25, L84, N74

Introduction

The separation of a certain activity was used much earlier in history but outsourcing as a term itself appeared at the end of the eighties of the last century (De Vita & Wang, 2006). In the past, it was primarily used if a company did not have its own resources to perform a part of the business. Outsourcing was applied due to the financial pressure or a lack of knowledge, capacity, and technology. Meanwhile, this has changed drastically in modern society (Grossman & Helpman, 2005). Although lack of knowledge can still be a reason for outsourcing, nowadays the main goal is to reduce operating costs and focus on the core activity because of a constant struggle for profit (Troacă & Bodislav, 2012). The dynamic and uncertain business environment has forced today's companies to make major changes in their operations

and timely assimilate to market circumstances (Pavić, 2016). Only flexible companies that react quickly and efficiently to changes can survive. Continuous business improvement and the introduction of innovations lead to an increase in a competitive advantage (Stanko & Calantone, 2011). With the development of society and advancement of technology, new forms of business appear. In other words, along with the constant improvement of the quality of products and services, a need to engage external collaborators who could perform the necessary activities for the company at lower costs has arisen. One of the strategic options that companies can apply is outsourcing. This is exactly how any lack of their own knowledge and skills can be replaced and success and quality maintained. The result is maximum specialization in each segment. It can contribute to the improvement and expansion of business, increasing value, eliminating multifarious environmental risks, preserving knowledge, and creating advantages over competing companies (Letica, 2016). Outsourcing can bring many benefits to companies, but the application is not a universal solution. Outsourcing can cause compromised security of confidential information, unforeseen costs, excessive dependence on the outsourcing company or wastage of control (which is especially risky if the outsourcer is unreliable) and the loss of knowledge and skills (Somjai, 2017). Therefore, good preparation in the form of a fundamental business analysis is more than necessary.

The popularity of outsourcing is undoubtedly growing, especially in the service segment. In today's market, services have a high value and are an irreplaceable competitive advantage for companies. The reason lies in the introduction of modern technological solutions in business processes. Nevertheless, outsourcing is subject to global trends and its implementation changes according to fluctuations. For example, a financial crisis, turbulence in international relations and any other unfavourable or uncertain economic or social situation in the short-term causes stagnation or decline in internal operations and mutual cooperation (Tomašević, 2018). Considering the actuality of the topic and contemporary turbulences, the paper emphasizes outsourcing through a theoretical and research prism. The main goal of the paper is to observe trends and investigate the application of outsourcing in Croatian service companies. The interest is focused on gaining knowledge about the intensity of outsourcing in practice, its basic characteristics in the form of business experience, decisive factors in the selection, future plans and perspectives when it comes to the separation of business activities.

The structure of the paper is as follows, after the introduction part, an overview of outsourcing in the service sector was made through the analysis of global trends and interesting facts on the Croatian market. Then, the research part of the work is in the repertoire, in which the methodology is described, the results of the research are presented, and a discussion of the results is made by combining new knowledge with that one that has been acquired before. The paper is finalized with concluding considerations.

Outsourcing in the service sector

Trends in the application of outsourcing in the service sector

In the nineties of the last century, there was a sudden increase in the use of outsourcing, mostly in the USA and developed European countries (Nguyen & Lee, 2008). Many Western companies have outsourced services to developing countries. Interest in them exists for two reasons; first, many companies have specialized in outsourcing offering educated people, and second, these locations have low labour costs due to poorer living conditions and an unfavourable economic structure. As a result, entire regions are dedicated only and exclusively

to the outsourcing of services. Examples of such business oases are specialized outsourcing regions in India (Delhi, Bombay, Bangalore, Chennai, Hyderabad, Pune...), Philippines (Manila, Cebu...), Island (Dublin), Poland (Krakow) etc. (Manning, Larsen & Bharati, 2015).

In the last decade, outsourcing has mostly been used for web design, (digital) marketing and advertising, market research and customer support, human resource management, public relations, mobile applications, finance, and accounting (Pang, Zhang & Jiang, 2021). The rough structure indicates that accounting services and IT services are the dominant outsourcing categories. Accounting is an activity that is prescribed by the law and the IT sector is implemented in almost all parts of business and thus is inevitable. Therefore, it is not surprising that the aforementioned services are outsourced most often. By all means, these are services that are not primary for companies but are necessary for business. In general, enterprises outsource about a quarter or a third of their business (Panko, 2019).

Today, outsourcing is not only used by companies that do not have the necessary knowledge or skills to perform a certain activity, but also by successful companies in order to respond to changes in the market as quickly and efficiently as possible. Along with the private sector, this form of business practice is increasingly appearing in public administration as well (Poutvaara, 2020). The value of separate activities is also growing, reaching a value of 92.5 billion dollars in 2019. The largest share was achieved by North and South America, followed by Europe, the Middle East and Africa (Kalinina & Kushnarenko, 2022). Online shopping services have grown in particular during the COVID-19 pandemic. Accordingly, the needs of companies to establish quality delivery and return logistics grew (Naseeb & Metwally, 2022; Tsai, Ho, Lin, Tu & Chang, 2021).

When it comes to outsourcing activities from companies, according to data from 2021, the USA has the highest percentage of outsourcing in the economy in the world (as much as 68%), followed by the United Kingdom, whose companies are outsourcing 48% of activities. A significant number of companies from the mentioned countries outsource their activities to some of the following countries – India, Philippines, Mexico, Argentina, Ukraine, Poland. These are countries that were the leaders in the performance of separate activities by virtue of their professional population and low prices for their services. The most frequently performed services in the mentioned countries are IT services, customer support, technical support, and software development (Outsource Accelerator, 2022).

The growth of outsourcing potential in Croatia

Throughout history, Croatian companies have mostly performed a large number of activities within their own business. With the development of the market, the comprehensive way of working in its own arrangement was not sustainable and slowed down growth and increased business costs. Inadequate business results turned Croatian companies towards the application of outsourcing in order to be more competitive on the market and to provide users with better services (Pavlov, 2003). It can be said that in the modern business environment, outsourcing is implemented in the practice of Croatian companies. The dominance of outsourcing is visible in transport and distribution, information technology, cleaning, and maintenance services (Pavić, 2009).

In addition to the private sector, outsourcing is increasingly used in the Croatian public sector too. In 2014, the Government of the Republic of Croatia published a document entitled "Models

of effective management of independent activities in public administration – opportunities for the public sector and the economy" in which core and non-core activities in the public sector were classified. The document presents a model of external contracting for the aforementioned independent activities, cleaning, maintenance, washing and ironing, food and beverage preparation, transportation, and security, which guarantees savings to the state. This decision of the government was not received well by the citizens, mostly due to the fear of losing jobs. The government did not take the necessary steps to fully implement the presented reform of the public system. Only two measures were adopted – a ban on employment in the state administration and public services and entrusting the performance of work to external service providers in the event that the performance of the work cannot be ensured with the existing staff (Šarić, 2016).

However, in comparison with world economies, a large number of Croatian companies still do not perform their main activities at the best level. Technological backwardness is only one of the reasons why this is so. Namely, high business and service prices make companies in Croatia uncompetitive. Still, the use of outsourcing undoubtedly has a positive effect on increasing the export competitiveness of large Croatian companies (Pavić, 2009). There are prospects for the intensification of outsourcing in Croatia, especially in the IT services sector since Croatia is also a developing country (Hong & Pavlou, 2017). In addition, European countries, including Croatia, are increasingly attractive to developed countries due to: (i) the stable and predictable regulations, especially in the member states of the European Union, (ii) excellent education in the fields of science, technology, engineering, and mathematics, (iii) good knowledge of the English and (iv) lower prices for experts (Hira, 2019; Piotrowicz & Kedziora, 2018; Tahvanainen, 2010; Bardhan & Kroll, 2003).

The use of outsourcing in the service context in Croatian companies

Research methodology and sample characteristics

Research on the application of outsourcing in Croatian service companies, which also represented the target population, was conducted through a structured questionnaire during August and September 2022. A total of 150 companies were selected for the sample. The companies were chosen arbitrarily, regardless of the size of the company, based on the list of registered service companies on the Croatian Companies Business Search Engine. At the time of conducting the research, there were 894 companies on the list. Companies were selected in a random systematic pattern using the method of step [$k = N$ (population)/ n (sample)], with a randomly selected beginning determined by a number between 1 and k that is determined by random number table. As a result, companies were ranked according to the alphabet in order to avoid periodic repetitions in the sample related to the activity, region or some other characteristic that could affect the sample representativeness. The questionnaire was designed in two parts and consisted of a total of sixteen questions. In the first part, there were general questions about the determinants of companies and the main question – do they use outsourcing. Companies that practice outsourcing continued to the second part of the survey where their experiences were examined. The identity of the respondent was protected. The goal was to find out about the reasons for using outsourcing and to examine the company's satisfaction with separating activities from business. Also, possible negative effects of outsourcing implementation were investigated as well as future plans.

A total of 46 companies participated in the research (response rate 30,7%), of which the

dominant category is small companies (74%). The remaining 26% is distributed between medium (17%) and large companies (9%). Domestic companies participated in the survey mostly (89%), while 11% of companies are foreign owned. These are companies that are mainly oriented exclusively to the domestic market, as many as 63% of them. However, 37% of companies turned their business towards the international market, that is, they internationalized their business. It can be said that the majority of surveyed companies have many years of experience in business. Namely, 67% of companies have been operating for more than 10 years, 15% of companies have been present on the market between 5 and 10 years, and 17% of respondents have a maximum of five years of business experience. Regardless of permanence, international operations, ownership structure and company size, almost $\frac{3}{4}$ of companies (74%) apply outsourcing in their operations. Below are the results for respondents who practice outsourcing (34 companies).

Research results

Out of the total number of respondents, the largest number (47%) entrusts the performance of secondary activities to three or more associates. Furthermore, 29% of companies have two outsourcing partners, and 24% of participants use the help of one partner in performing a separate activity. In addition, most respondents (94%) choose cooperation with domestic companies primarily. Nevertheless, the long-term experience of the outsourcing partner is crucial for 59% of the participants. However, foreign companies were not neglected either. Namely, 44% of companies cooperate with foreign partners, and 41% of respondents leave part of their business to new outsourcers on the market. Cleaning and maintenance are the most common services that the surveyed Croatian companies outsource, 38% of them. External partners perform transport services for 29% of participants, and 26% of outsourcing companies are in charge of information technology. Additionally, accounting and security services are also outsourced to specialized employees (24%), and a slightly smaller number of participants decide to outsource marketing services (18%). Performing administrative tasks is singled out by 15% of respondents, while the smallest percentage of participants outsource procurement (6%), sales (6%) and legislative tasks (3%).

When asked about the reasons for using outsourcing, the majority of respondents use outsourcing to reduce business costs. The distribution of other results is as follows: 26% of the companies want to increase the quality of the service through outsourcing, 29% try to perform the activity faster through outsourcing, 18% aim for smaller investments, and 12% of the participants see outsourcing as an initial step for the internationalization of their business. The least important reason for companies is the accelerated development of new services within the parent company's core business – only 3% cite innovation in services as a reason. For respondents, price is the most important factor when choosing an outsourcing partner. The quality and reputation of a potential business associate stand out as significant features too. Of those offered, the least important category when choosing an outsourcing partner is the location, that is, spatial distance.

Respondents were asked to compare the performance of the outsourcer with the previous performance of the company's internal units. Only 3% of the respondents believe that the outsourcer performed the isolated activity worse than their own involvement in the matter of the same work while 35% of participants believe that there is no progress in performance. In other words, it considers the activity performed equally well by the outsourcer and by its own employees. Still, the majority of companies (62%) have noticed an increase in quality since the

outsourcing partner took over part of the business. On the other hand, in considering the negative aspects of outsourcing, the application of outsourcing did not bring anything bad to the majority of respondents (71%). Of the companies that noticed negativity, most were those that solved problems slower (24%). Negative financial consequences were reflected in 18% of respondents in the form of unforeseen and increased costs. Considering the inconveniences, the background of the negative outsourcing outcomes was examined through the research. Namely, 18% of the participants were dissatisfied with the quality of the activities performed after the separation. The ability of the outsourcer to perform the separated activity optimally was wrongly estimated by 12% of the respondents. For 9% of the participants, the reasons for the negative results were the lost control and the inadequate preparation of the company for the separation process. The return of separate activities under the auspices of the parent company was also examined. After introducing outsourcing into the company's way of doing business, 12% of respondents gave up outsourcing and returned one or more activities to the company. However, the majority of participants did not and do not consider returning activities to internal company units. The last question was: "Given past experience, will you apply outsourcing in the future and in what form?". Eighteen surveyed companies answered affirmatively. Activities that are planned to be separated in the future are administrative work, damage assessment, marketing, accounting, storage, customer support and information technology.

Discussion

Based on the results of the research, it can be concluded that outsourcing is not foreign to Croatian companies. The popularity of outsourcing intensified somewhat later in Croatia than it was the case in the world and Europe. Namely, the nineties of the last century were marked by the Croatian struggle for independence, a rather disorderly system, a number of newly founded companies that did not consider outsourcing as a primary strategic direction. Nevertheless, currently Croatian companies are successfully keeping pace with trends on the global and regional market. In other words, the use of outsourcing as a business model is intensifying in Croatia as well as in developed world and European countries. The fact that $\frac{3}{4}$ of the surveyed companies apply outsourcing in their operations, indicates the monitoring of global business trends and the maturity and openness of domestic business entities. Croatian companies are aware of competition, especially since Croatia joined the EU. Accordingly, they try to focus on what they excel at, that is, the segment of business based on which they can achieve a competitive advantage. Simply, they do not have the privilege (as well as no one) to waste time and miss opportunities. If they are branched out on several sides, this is a likely scenario.

Most of respondents were small companies which is not surprising. The structure of companies in Croatia is mostly made up of small companies (98%). Since small business entities dominate the Croatian market, it is expected that they will more often opt for partnerships (such as outsourcing) because they cannot always solve the problems with their own capacities due to the small number of employees and inadequate skills of individuals who have to delegate a number of different responsibilities. Also, the largest number of respondents are domestically owned companies with a five-year and even more than ten-year business tradition but oriented towards domestic subcontractors which is not the case in developed Western companies that are increasingly showing interest in outsourcing in developing countries. Although Croatian companies apply outsourcing and use three or more partners, the above points to the problem of internationalization of business despite many years of experience. Moreover, in theory, by joining the European Union, Croatia's access to the foreign market has been facilitated, but the

real data is different. Apart from tourism, which is Croatia's strongest asset, the rest of the economy is not competitive in developed foreign markets. There is a lack of adequate technology and skills that would enable Croatian companies to keep pace with those of the world. Croatia does not have the possibility of economically justified production of a large number of goods and services, and deadlines are very often a problem due to the technological lag. Furthermore, the business environment stands out as one of the main causes of the low capacity of the Croatian economy, which is significantly contributed by high business costs, strict regulations on the market of goods and services, and a large administrative and tax burden. Nevertheless, the fact that 37% of respondents are oriented towards international markets indicates that there is an initiative for more and more companies to export. The EU can certainly visibly help in achieving these goals. Also, through membership, the economic power and influence of Croatia grows. In this regard, Croatian companies could increasingly follow the trends of Western companies and turn to the outsourcing of services in other developing countries, especially for the reason that spatial distance is not a problem for them.

The main reason for using outsourcing in Croatian service companies is to reduce costs, followed by faster performance of activities and an increase in service quality. However, domestic service enterprises are mainly oriented towards the cost component and profit which can be concluded from the results of the survey in which the participants cited the price of the service as the most important factor when choosing an outsourcing partner. Meanwhile, the price is also globally, regardless of the success of the company, very often an extremely important factor. Maybe not decisive, but certainly one of the main factors. Even successful companies are looking at outsourcing locations with low service prices, still giving great importance to the expertise of the population. Excellence is a characteristic that Croatian companies have begun to attach great importance to. Still, reliability and reputation are also set aside, so it is not surprising that the set activities are mostly entrusted to companies with many years of experience. Although location is of crucial importance in many business segments, when it comes to outsourcing it is classified as a less important factor. Trust and complete handover of a part of the business is reflected as a logical explanation for this result. Namely, the location of the activity provider is an advantage for the outsourcer, but not for the parent company, which, by ignoring this component, shows understanding for the business partner, especially if companies have a similar cultural background. On the other hand, location is extremely important for companies that want to control the execution of activities. Distrust and uncertainty are eliminated if the outsourcer is nearby.

The preference for outsourcing is also reflected in the wide range of activities that are singled out both in Croatia and in Europe and the world. Each of the offered activities are given to outsourcing. However, the most common are cleaning and maintenance, transportation, information technology, security services and accounting. It can be concluded that all of these are secondary activities for most companies. Apart from these secondary activities, in Croatia, unlike the rest of the world, the outsourcing of research activities and customer support, as well as the business segment related to human resources, is not so popular. Nevertheless, the interest of Croatian companies follows world trends in the context of more intensive plans for the outsourcing of marketing, logistic, storage, IT and accounting services. Namely, all global companies fear a complete loss of control if outsourcing is applied in segments such as procurement and sales, that is, in some of the key stages of business. This fear is much more present in Croatia as a relatively inexperienced and economically less developed country. But also, legal business is the least separated activity in Croatian companies, and it is not mentioned in foreign companies either, which can be connected to citizens' distrust in institutions and the problem with a high rate of corruption. According to Transparency International's 2021 data,

Croatia ranks 63 out of a total of 180 countries in the corruption perception index.

Most of the surveyed companies answered that the performance of the outsourcer is better than the performance of the company's internal units in performing the isolated activity. However, a significant number of respondents do not notice a change in the quality of activities performed by the outsourcer. This is certainly a startling fact that points to inadequate and immature operations of Croatian companies, insufficient responsibility, and doubts about the efficiency of business partners, as well as lack of integrity in the business context. The absence of the psychological component of simultaneous and synergistic action through joint business successes is certainly a domain that needs to be investigated more thoroughly in the future and on which more significant emphasis needs to be placed.

The perspective of outsourcing implementation in the future is also reflected in the result that most companies did not notice negative effects. Of course, there were some (slower problem solving and increased costs), but when compared to the positive consequences they are negligible. However, we should not ignore the fact that the time to solve the problem can be crucial for the positive operation of the company. The modern market is changing and progressing rapidly so companies must react quickly and efficiently to the problems that arise. In this regard, this problem of insufficient activity and promptness of the outsourcer must be resolved definitely. Nevertheless, it is necessary to refer to the negative aspects of outsourcing, which also existed. The respondents singled out dissatisfaction with the quality of the activity performed by the outsourcer and a wrong assessment of the outsourcer's capabilities. The responsibility for negative experiences can be attributed, in addition to the above, to the lack of self-awareness of business entities, insufficient communication and clearly set expectations, an imprecisely defined financial plan, and extraordinary circumstances on the domestic and foreign markets (especially in the last few years). Poor preparation for the outsourcing implementation was also one of the reasons for the unsuccessful allocation of activities. All these negative aspects that have been recorded in Croatian companies could be addressed to one of the fundamental, although not the main, reasons for using outsourcing at the global level, which is the lack of the necessary knowledge.

Finally, the largest number of surveyed companies are satisfied with their operations after the outsourcing application and do not plan to return any separated activities to the company. This is not even expected because companies will be forced to externalize their operations even more. This proves the success and efficiency of business operations of companies in Croatia as well as those to whom they give their trust. Due to the advantages that the separation of activities brings, Croatian service companies plan to continue using outsourcing in the future and even increase the number of separate activities, which is in favour of global trends.

Conclusion

The accelerated growth and development of the international market has changed the way of doing business on a global and national level. The use of outsourcing is intensifying with the aim of reducing business costs and creating a sustainable competitive advantage. By separating individual secondary business segments, the company can specialize and focus on the main comparative activity and thereby improve its quality. In addition to cost reduction, the advantages that outsourcing offer are higher quality performance, risk reduction, employee development and education, and access to new markets. Although there are many positive aspects, a detailed analysis of the company's operations is required before applying outsourcing

in order to determine whether such a change is necessary. If the company does not prepare for the outsourcing adequately, there may be counter-effects. The negative consequences are the compromised security of confidential data, unforeseen costs and the loss of knowledge, skills, and control over the entire process. However, in addition to private companies, the positive effects of outsourcing are also recognized in the public sector, both in the world and in Croatia. IT services, customer support, finance and marketing are some of the services that are most often outsourced in recent years.

After conducting research on the application of outsourcing in Croatian service companies, it can be concluded that Croatian companies recognize the advantages of outsourcing activities and that they are turning to this way of doing business increasingly. They are open to cooperation with several outsourcing partners, while the decisive factors for selection are price, quality, and reliability. Despite the increasing degree of international activity, they still prefer working with domestic partners. Croatian companies are mainly focused on profit, so they try to reduce business costs by outsourcing. The research provides an insight into the current trends in the application of service outsourcing in Croatia, but it contains some limitations. There is no possibility of direct communication in the survey, so if there is a misunderstanding, no additional explanation can be offered to the respondent. In this regard, in-depth interviews or a focus group meeting appear to be a better choice. The questionnaire is anonymous, so the reliability of the data cannot be asserted with certainty because it is not known who fills out the survey. The sample size is a shortcoming of the study because it does not allow full generalization. The short period of time in which the research was conducted represents a drawback, as well as the limited answers to the questions since most of them are questions with offered answers. For future research, it is definitely advisable to use more participants who will be evenly distributed by company size and conduct the survey over a longer period of time. The reasons against outsourcing were not examined, so it is recommended to do so in further studies. It is also recommended to examine the ways of solving the problems that arose during the allocation of activities.

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MANAGERIAL CHALLENGES OF UNIVERSITY DEVELOPMENT: A HISTORICAL PERSPECTIVE

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Abstract

The role of universities has changed significantly throughout history; from serving the ruling class to responsibility for the democratisation of society; from closed and elite institutions, sole "producers" of knowledge in society, to mass, open institutions, which no longer have an "enlightening" role, but are just one of the places of knowledge creation in society. Today, universities have to fight for students, research and funding, they have to pay increased attention to the development of relations with external stakeholders, which requires a complete change in their current method of management, financing, internal structure and external relations, as well as the way of performing activities. The strategic question facing higher education today is how to cope with the changes that characterise contemporary society and how to survive. The paper will provide a historical perspective of the development of the university through various aspects: through the change in the university's role in society, and changes in ownership, management, organisational and financial structure of the university. The paper also talks about the increasingly important role of the university in regional development, as well as the inevitability of creating an entrepreneurial and innovative university, as a response to the challenges facing the university.

Keywords: historical development of universities, role of universities in the development of society, managerial challenges of university development, university and regional development, entrepreneurial university

JEL classification: I23

Introduction

Universities are facing major changes. There is increasing pressure to overcome the gap between the university offers and society needs. Universities are expected to actively participate in defining and solving problems and in the development of society as a whole (Rutten and Boekema, 2009). Some of the factors, which slow down changes in higher education, and which, in combination with each other, contribute to the continuity of the university, rather than its change, are (Kerr, 1984, as cited in Oberman Peterka, 2008): conservatism of teachers in opposition to changes in areas such as curriculum, teaching methodology, standards and criteria for career advancement, difficult and lengthy decision-making processes, inevitability of involving the highest hierarchical levels in decision-making processes, lack of rewards for taking risks, subordinate position of the administrative staff to the teaching staff, and inability of the structure to accept numerous external pressures.

Considering the inadaptability of the university organisation to the development of modern technology, which enables and leads to the creation of alternative forms of higher education (virtual universities, micro-qualifications, etc.), Abeles (2001) believes that universities in their

organisational form and with their dominating functions are on the verge of collapse. To respond to the changes taking place in society, the university must be restructured (Delanty, 2001) towards a place for communicating knowledge in society, which should influence the democratisation of knowledge and the development of society (Delanty, 2001; HEInnovate Concept Note, 2018).

The aim of the paper is to show how universities throughout history have dealt with the challenges of the society in which they operated, and what challenges and problems universities face today.

The paper is structured in four chapters: after the introductory chapter, the second chapter provides a brief historical overview of the university's development, shows the development of the university's role in society, and presents a historical overview of management and ownership challenges in university development. The third chapter talks about the role of the university in regional development, and the entrepreneurial university, as an institution that actively participates in the development of its environment. The fourth chapter is also the concluding chapter of the paper.

Historical development of universities

The university as it exists today was created in the Middle Ages, in the period between 12th and 13th century in Western Europe and their influence was crucial to the development of academic freedom and the development of certain academic disciplines, as well as the development of today's universities. No other institution has spread throughout the world like the traditional form of European universities (Rüegg, 2003). The first European universities are considered to be the University of Bologna, founded in 1088, followed by the University of Paris, founded around 1150, and the University of Oxford and the University of Padua (Rüegg, 2003).

The medieval university was a place of "universal knowledge", was associated with Christian ideology (Rüegg, 2003) and in its beginnings represented the continuation of the monastery, only to later become an ally of secular rule. Scholars travelled throughout Europe to study and teach (Latin was the common language of all European universities), which gave the medieval university a cosmopolitan character. At that time, connections between the university and the surrounding world were almost non-existent, and the one that did exist were defined by the church (Delanty, 2001).

The development of the university can be traced through various aspects: through the change of role in society, and changes in ownership, management, organisational and financial structure.

The role of university in society throughout history

Universities have evolved from serving the ruling class to democratizing society. The university's core activities—teaching and research—did not change, but the content did due to the shift in responsibility for knowledge application and society development (Oberman Peterka, 2008). Universities were founded to provide the state with knowledge and preserve national cultural traditions (Delanty, 2001). This position lasted until the 1960s, when the

university underwent significant reforms in many countries, mostly related to its organization but not its functions. The 21st century university is changing both organizationally and knowledge-systemically (Delanty, 2001).

The democratization of knowledge and the opening of the university to all social classes have led to pressures for greater university responsibility and concern for the applicability of its knowledge (HEInnovate Concept Note, 2018). Universities increasingly compete for students, professors, and state funding (Gibbons, 1994; Wong et al., 2007; Sam and Van Der Sijde, 2014).

The first academic revolution from the end of the 19th and beginning of the 20th century transformed the university from an educational institution to a research institution. The originator and bearer of the idea of a research university was Wilhelm von Humboldt, who at the beginning of the 19th century made a major change in the development of the university and higher education. Humboldt believed that the university should be independent from the state, and in return for its independence, the university will supply the state with a moral and spiritual base. Universities have become important in the formation of the cultural base and national identity of the state. Education was integrated with research; research was based on argumentation and transparency; research results were published in specialised journals or books, which were available to everyone (Wissema, 2009). With the abolition of Latin as the common language of all universities, the university became crucial for the promotion and development of the national language and for the collection of national literature (Delanty, 2001; Wissema, 2009).

Humboldt believed that the only way to maintain the independence of science and its protection from corruption and influence by the authorities (political, economic and religious) is in its complete autonomy, guaranteed by the state. By giving universities autonomy, Humboldt laid the foundations for the university becoming an untouchable "ivory tower", insensitive to the needs of the environment, and thus one good intention (autonomy to serve the needs of society's development) turned into its opposite (Oberman Peterka, 2008).

In the 20th century, the pressures to create a responsible university that plays a significant role in the economic and social development of the environment in which it operates are becoming more and more pronounced. **The second academic revolution**, the inclusion of responsibility for economic development in the university's mission, is a consequence of scientists' search for the successful realisation of the goal of science: dissemination of known knowledge (Etzkowitz and Leydesdorff, 2001).

Gibbons (1994) claims that contemporary society is characterized by a new model of knowledge production, which he names Mode 2 (in contrast to Mode 1, which has existed up until now). Mode 1's specialized knowledge structure influenced university organization and management (Gibbons, 1998). Mode 2 has many knowledge producers who agree on the importance and responsibility of applying that knowledge (Sam and Van Der Sijde, 2014). Any solution must draw from multiple fields of study. Transdisciplinarity—multidisciplinarity—is becoming the norm. Mode 2 knowledge is "socially distributed, application-oriented, trans-disciplinary, and subject to multiple accountabilities" (Nowotny et al., 2003, as cited in HEInnovate Concept Note, 2018). Scientists and researchers are becoming more sensitive to knowledge's applicability. Research is not conducted only to satisfy the researchers' interest, but is the result of the need to solve a problem in the environment (Gibbons, 1994). Changes in knowledge production and scientific study have affected university management and structure. A departure from scientific fields and the university's "ivory tower" creates a "tectonic shift" in

the relationship between science and economy, creating many opportunities but also challenges (Etzkowitz et al., 2000).

At the end of the 20th century, new forms of knowledge transfer began to appear, such as university patent offices, development of a large number of programmes connecting universities and companies, sponsorship of research groups by companies, etc. As the sharp distinction between basic and applied research was lost, knowledge transfer process also changed and was no longer a simple one-way process between universities and recipients of that knowledge. Therefore, the term knowledge transfer can be replaced with the term knowledge/technology exchange (Gibbons, 1994).

The next phase of university development is characterised by the transition from an "ivory tower" university, i.e. a university primarily engaged in research, to an entrepreneurial model of the university (Etzkowitz et al., 2000; Blenker et al., 2006; Röpke, 1998; Clark, 1998; Clark, 2001; Shattock, 2010; Guerrero and Urbano, 2012; Sam and Van Der Sijde, 2014). An entrepreneurial university is based on a new mission (responsibility for social, technological and economic development), new organisational structure (interdisciplinarity, multidisciplinary) and university management structures that have the capacity to deal with the challenges of complex changes. It is a university that is expected to establish connections with key players in order to produce and advance knowledge and technology, improve its standing in society, and create new revenue streams (Sam and Van Der Sijde, 2014). The shift to an entrepreneurial university does not mean that the institution will become less focused on research, but rather that it will view research and educational endeavours as investments and anticipate making money from them, mainly through collaborations with the business sector (Blenker et al., 2006). An entrepreneurial university assumes a proactive role in the creation and use of academic knowledge. It functions in an interactive rather than a linear model of creating innovation (Etzkowitz, 2013). Nevertheless, many scientists oppose the creation of an entrepreneurial paradigm, which they see as a threat to the traditional integrity of the university (Pelikan, 1992, as cited in Oberman Peterka, 2008), and excessive emphasis on profit leads to the loss of the university's role as an independent critic of society (Krimsky, 1991, as cited in Etzkowitz et al., 2000). Brooks (1994, as cited in Sam and Van Der Sijde, 2014) even emphasises that entrepreneurial behaviour by universities can pose a threat to traditional university missions. These critics of the entrepreneurial university believe that the basic role of the university should continue to be the "production" of students and publication of research. However, despite these criticisms, the creation of entrepreneurial university is evident, although its development, organisation and management raise numerous questions.

One of the biggest innovations in higher education in recent times is the emergence of the virtual/online university, as a consequence of the increasing influence of information technology in everyday life. Although it is unlikely that virtual universities will replace traditional ones, traditional universities will have to adopt technology more quickly, taking full advantage of it and making it serve society's demands (Delanty, 2001). Christensen and Eyring (2011) also talk about the online and hybrid model of the university as an innovative model for the university, with its many advantages (reduced costs, greater control of teaching and process monitoring, enhancing student learning), but also disadvantages (inability of creating the experience of physical education, for example). Nevertheless, the authors believe that the combination of online and physical university campus is a potential, which leads traditional universities to a new level of development.

Ownership and management aspect of university development

There are two basic "models" of universities, based on which other universities in Europe, and later in America, were founded and developed: the Bologna and Paris "model".

The University of Bologna, which has an uncertain date of establishment, holds the distinction of being the oldest university in Europe. Private law schools have been present in Bologna since the 11th century. As the population of international students grew, they established distinct "nations" based on their respective countries of origin and created "universities" with a democratically elected rector to safeguard themselves against the actions of local authorities and citizens. The students of law in Bologna were typically individuals of mature age, frequently hailing from affluent social backgrounds and occupying positions that afforded them a degree of autonomy and wisdom. The pope exercised his authority over the "student university" as the guardian of "student freedom" until its secularization. The students autonomously arranged their academic pursuits. The institution employed educators on an annual basis, established their remuneration, and mandated them to peruse designated legal literature (Verger, as cited in Rüegg, 2003a).

The Bologna model, which pertains to student governance, has had a significant impact on universities in Southern Europe and Latin America. As a result, students continue to constitute the predominant governing bodies within these institutions (although they rarely improve academic standards) (Oberman Peterka, 2008).

Paris, which was established in close proximity to Bologna, exhibited notable dissimilarities. Towards the close of the 11th century, Paris was home to ecclesiastical and non-public educational institutions established by autonomous instructors who were required to obtain a permit from the chancellor of Notre-Dame. Towards the conclusion of the 12th century, there was a notable rise in the number of students hailing from England, Germany, and Italy. This trend led to the proliferation and expansion of educational institutions, albeit with attendant challenges (material, institutional and others). During the early 13th century (1208-1210), a group of professors who were responsible for managing schools, albeit with limitations imposed by the bishop and the chancellor, established an autonomous association known as the university. The primary objectives of this association were to safeguard their own status, elect new professors, and circumvent the direct control and rigidity imposed by the chancellor of Notre-Dame. According to Rüegg (2003), the university's chancellor engaged in a conflict with the professors, which persisted until 1231. It was only after the intervention of the French king and pope that the university was granted its initial official recognition.

Similar to other universities following the Paris-model, the university was organised and managed by professors. Through their councils and selected officials, professors administered the entire university. The "model" of academic governance was widely adopted by universities in the United States and Commonwealth nations. Under this model, professors were responsible for approving teaching content, exams, and diplomas, as well as appointing other professors and defining the concept of academic freedom (Oberman Peterka, 2008).

The scope of public influence has varied from complete authority and economic reliance to societal accountability and economic autonomy. The university was legitimized by various authoritative figures during the medieval era, including rulers, cardinals, popes, and city councillors.

In Germany, Italy, and Great Britain, universities were crucial to national identity, making governments major stakeholders in their operations. Humboldt believed the state was responsible for protecting the university's autonomy and appointing faculty. Humboldt emphasized the significance of research in pedagogy and introduced seminars as a complement to lectures to foster research skills and equip students for their future careers. Towards the close of the 19th century, the contemporary university model in Germany had a significant impact on universities across Europe, the United States, and Japan (Rüegg, 2004; Charle, as cited in Rüegg, 2004).

In contrast to continental Europe, universities had much less connection with the state in the United States of America, primarily because the state did not own universities, and therefore it could not have used that reason to influence them. Since the vast majority of American universities were private, they treated knowledge more from the point of view of the possibility of its application in the development of society. American universities are characterised by the "land-grant" concept, which originated in the 1862 Land-Grant Act that makes many study programs financially accessible and makes new knowledge a public good. Congress gave each state federal land to sell to fund "land-grant" colleges (Oberman Peterka, 2008).

In the beginning (the Middle Ages), the university was headed by the bishop's representative. His authority became more formal (except in England and Spain) and he gave most of his powers to the university's elected rector. The university's rector was chosen from students (Bologna) or professors (Paris) (Gieysztor, as cited in Rüegg, 2003).

From the Middle Ages, every university had a permanent or temporary office, which performed administrative tasks at the university, whose employees were neither professors nor students. This office is as old as the universities themselves and with their growth, its role also increased (given the increased need for good administration) (Gieysztor, as cited in Rüegg, 2003).

The university in Europe became a secular institution in the 19th century, but under state bureaucracy, which governed the university, as part of the national educational policy. There was a professionalization of the university career, and professors became civil servants (Rüegg, 2004).

In 20th and 21st century, universities are moving from the model of the science-based university to the "third generation university" (Wissema, 2009). Several forces influence this change (Wissema, 2009): 1. as the best universities want to continue to carry out cutting-edge scientific research whose costs are increasing above the government budgets, they are forced to collaborate with enterprises who are willing to pay for research since they consider these joint projects to be vital for their future competitiveness. As a result, academic and industrial research are starting to intertwine increasingly (Remenyi et al., 2019); 2. Globalisation is the second force influencing change of universities. Many universities used to have almost regional monopoly when thinking of student enrolment. Globalisation opened the possibility for everyone to study abroad and universities are starting to fight for students; 3. Increasing pressure for commercialization of knowledge that universities create. Governments expectation from universities is to take an active role in economic growth through activities of exploitation of the knowledge it creates. Universities are forced to behave like businesses (Mainardes et al., 2011; Christensen and Eyring, 2011) and to adopt business rules in their operations; 4. Research is becoming more interdisciplinary and transdisciplinary which requires changes in organizational forms of universities and readiness of university management to find the solution to these needs; 5. Increase in number of the students led to mass education, which diluted the

scientific element in university education. As a consequence of this situation, independent research institutions outside of universities are emerging (e.g. NASA, CERN, etc.) as a new type of competition. University is starting to lose its privileged position of the only one responsible for creating knowledge. All of these trends are becoming challenges for university management, which needs to adapt and find new ways of doing things (Mainardes et al., 2011). They do not have other options than to become open, future oriented institution with: multi-stakeholder, broadly participative management, collaborative business models, a commitment to sustainability, appreciation of the people in university community, quality and relevant study programs and support to students and contributing to regional development (Remenyi et al., 2019). The integration and interconnection of the university, technology, society, and corporate business, along with the implementation of unbundled degree programs and business-oriented models, may potentially result in the loss of the university's distinct identity. This could lead to a significant departure from the traditional concept of university (Matthews, 2022).

Financial aspect of university development

What is characteristic of all universities throughout their history, and especially emphasised in medieval universities, is a constant lack of financial resources (de Ridder-Symoens, as cited in Rüegg, 2003).

Medieval universities had internal and external income. Matriculation, graduation, fines, and tuition fees were internal sources of income, while church income, king, price, or city salaries, gifts, inheritances, and donations were external. Once or twice a year, tuition fees paid university administrators, professors, and other expenses. Middle Ages tuition was low, but professor gifts were a burden for students. Fines for non-compliance with university statutes, obligations, and disciplinary measures were a major source of university revenue (de Ridder-Symoens, as cited in Rüegg, 2003).

The university did not pay professors, but they were entitled to a portion of tuition fees, an expense allowance, and gifts. Church schools were free, and professors were paid from church endowment. In the 14th and 15th centuries, most European countries paid professors. The university's founders—the church, king, or city government—paid salaries (Verger and Gieysztor, as cited in Rüegg, 2003). Universities have received direct, fixed subsidies from the government since the Middle Ages.

In the early modern era (late 15th and early 16th centuries), universities spent most of their budgets on professors and administrators. The central, regional, and city governments paid salaries, but individuals donated for professorships (de Ridder-Symoens, as cited in Rüegg, 2003). Student scholarships, funded by donations, were the university's next priority. (de Ridder-Symoens, as cited in Rüegg, 2003).

In the 19th century, the state founded and reorganized many European universities at its own expense, and state funds met most of the universities' financial needs. Given that tuition fees were still low and costs were constantly increasing (due to the increased number of students, professors, material costs of maintenance, etc.), the gap between costs and income was increasing, and the state's intervention was necessary for the university's survival. Only universities with high donations retained financial autonomy. State control over teaching and research—abolishing and adding courses, setting salaries, controlling costs—was justified by

financial rationality. The state dominated European universities in the 19th and 20th centuries (Gerbod, as cited in Rüegg, 2004).

Over the past 25 years, there has been a change in how higher education is financed. Many countries are seeing an increase in tuition fees. In a number of nations, new financing techniques like ICLs (income-contingent loans – loans with repayments that are contingent on future income) have been introduced to provide students with the necessary resources, while limiting the risk of loan default and (de)merit fees have been added or strengthened (Diris and Ooghe, 2018, Van Long, 2019). All told, these modifications have caused students and their families to bear a greater portion of the costs and risks in many nations. Private funding of public higher education is becoming crucial, but it challenges academic traditions and creates a new model for university funding (Speck, 2010). This form of higher educational finance has come to be popularly labelled as cost-sharing (Johnstone and Marcucci, 2010). However, despite these modifications, the majority of nations' current financing still heavily relies on public funding. In Austria and the Nordic nations, the percentage of public funding is at least 90% of total expenditures. In many other nations (e.g. Australia, Chile, Israel, Japan, Korea, and the United States) it doesn't go over 50%. In the latter nations, families must contribute significant resources through loans and savings (Diris and Ooghe, 2018, Van Long, 2019).

University and regional development

In addition to the traditional roles of the university, teaching and research, the social responsibility of the university, which manifests itself through contribution to regional development, is increasingly emphasised and placed in the foreground. Success of a region is often associated with growth in knowledge-based activities, an increase in the number of small and medium-sized enterprises, an increased growth rate of small enterprises and a high rate of public-private research and development projects. Many see the university as a key institution in this scenario (Charles, 2003; Glasson, 2003, Tripl et al., 2015, Rubens et al., 2017). More and more regions are placing the university in the central position of their development strategies and policies (Rutten and Boekema, 2009). Since the 1980s, many studies have proven the connection between universities and the economic development of the region, supporting this thesis with numerous examples of regions that have developed around Stanford, MIT, and other universities (Doutriaux, 2003).

Lazzeroni and Piccaluga (2003) state that the university has 4 basic missions, which have their indicators for measuring the efficiency of the university, shown in Table 1. According to these authors, the mission of the university is to be a knowledge factory (an organisation focused on basic research and involved in the creation of new knowledge), a human capital factory (at different levels of specialisation), a technology transfer factory (an organisation that cooperates with the business world and is focused on the application of its own scientific research) and a territorial development factory (through management and implementation of programmes related to territorial innovative development).

Table 1: Indicators for measuring university efficiency

University mission	Possible indicators
Knowledge factory	- Scientific publications - Participation in conferences
Human capital factory	- Quality of educational programmes (through the quality of postgraduates and doctoral students)

University mission	Possible indicators
Technology transfer factory	<ul style="list-style-type: none"> - Joint projects between the university and the economy - Creation of spin-off companies - Informal contacts between academic and business researchers - Licensing university patents
Territorial development factory	<ul style="list-style-type: none"> - Cooperation with local economic and social actors - Creation of projects related to local innovations - Participation in local development initiatives - Provision of services to local actors

Source: Lazzeroni and Piccaluga, 2003.

Universities also must be aware of the environment's changing demands for workforce. Traditionally, universities have trained students to work in large companies. Little or almost no attention was given to small and medium-sized enterprises. However, this approach must be changed due to the changes in the labour market and changed demands of employers. Large companies are being restructured and clusters of small business units are emerging from them, the role of small enterprises in the economy is growing – small enterprises are increasingly appearing as suppliers, sub-contractors, partners, which directly affects the requirements for skills and knowledge of graduated students, to which universities should respond (Goddard, 1997).

The separation of research-oriented universities from the needs of the environment requires the transformation of the university into an entrepreneurial university (Etzkowitz and Leydesdorff, 2000; Wong et al., 2007; Sam and Van Der Sijde, 2014; Tripl et al., 2015; Barabás and Pupp, 2018) in which the university is expected to see its environment as its market and react accordingly. The process of transformation into an entrepreneurial university is inevitable if the university wants to survive and ensure development and an active place in society. However, this process does not happen overnight, especially for institutions such as universities, whose organisational culture, structure and functions have been developed over centuries and which are traditionally averse to change. Nevertheless, the force of changes that have continuously occurred in the last decade opened up the question of a different positioning of the university towards the changes in the environment, i.e., defining a new mission of the university and re-engineering the organisation, financing, functions and the culture itself, in accordance with the new mission (Sam and Van Der Sijde, 2014; Rubens et al., 2017).

The process of enhancing the entrepreneurial ability of universities varies from one university to the next due to variations in organizational culture and leadership capacity. Entrepreneurial character of universities does not mean that they become dependent on industry, nor does it turn them into "all-purpose shopping malls" (Clark 2001:10, as cited in Oberman Peterka, 2008). Entrepreneurial universities are active actor in society, influencing their environment (industry), as much as the environment influences them. These are institutions that are able to change, without compromising their mission in a complex and uncertain environment (Heinnovate Concept Note, 2018).

Conclusion

The role of university has changed significantly throughout history, from serving the ruling class to being responsible for democratising society. A time has passed when only one in twenty

people sought higher education, the research base was small, education focused on preparing students for a variety of careers, and the community did not think much about what the university does or how it can help the community develop. The basic activities of the university (teaching and research) did not change, but due to the change in responsibility for the application of knowledge and responsibility for the development of society, there were significant changes in the content of these activities.

The fundamental premise of the university's sustainable development and longevity as a key player in the growth of society as a whole is the monitoring of environmental changes, adaptation, and the inception of positive changes. In the 21st century, the changes taking place in society have led to pressures for greater responsibility of the university and concern for the applicability of knowledge it creates. Since the world is characterized by the presence of a large number of knowledge producers who are connected by a shared understanding of the significance and responsibility for the application of that knowledge, any potential problem-solving strategy needs to integrate a variety of expertise and information from across fields of study. To respond to the changes taking place in society, the university must be restructured. Universities are becoming responsible for their own destiny through responsibility for finding sources for funding their activities, hiring staff, managing research and teaching programmes, and managing their own assets. The social responsibility of the university, which manifests itself through contribution to regional development, is increasingly emphasised and placed in the foreground.

The university has the opportunity to actively contribute to the development of society through its entrepreneurial response (proactivity, innovativeness, and the ability to take risks and cope with change). Entrepreneurial response also offers a formula for the institutional development of the university in which the university defines and determines its own autonomy, ensures diversified financing, develops new departments and activities in accordance with the demand in society, and leads to structural changes that ensure better capacity of the university to respond to changes. This has led to the transition from an "ivory tower" university to an entrepreneurial model of the university.

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GLOBAL INFLATION, EXCHANGE RATES AND PUBLIC DEBT REPAYMENT NEXUS – THE CASE OF NON-EUROZONE EUROPEAN COUNTRIES

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Abstract

Global inflation, which slowly initiated during corona crisis and got fuelled after the Ukrainian war, is a novelty in macroeconomics: never has it happened before that inflation occurred globally, almost with no exception. Before, it generally lead to two main effects: tax revenues increased due to the tax base increase on one hand, and foreign public debt increased by the exchange rate depreciation rate (measured as the percentage increase of the price of Euro). A panel data was used, containing 12 European countries which are not part of the Eurozone & use floating exchange rate regime. Time dimension consisted of monthly data during the period from January 2006 – February 2023. Several models were built to investigate the relation between the exchange rate and the inflation. It is shown that COVID-19 crisis lowered the effect of the inflation on the exchange rates and Ukrainian crisis pressed this effect down even more: while before 2020 a 1% increase in the inflation would cause the exchange rates to depreciate, on average, by 0,86%, in the period of COVID-19 crisis this relation fell down to 0,49%. Finally, since the Ukrainian crisis, a 1 percentage point rise in the inflation level has caused the exchange rates to depreciate by only 0,28 percentage points. This analysis showed that, for the first time in history, the exchange rates are very stable even though inflation globally reached, on average, two-digit rates. This effect is significant since the inflation did not cause the foreign public debt to rise, while at the same time it increased tax revenues, helping the governments of the observed countries to repay their debt.

Keywords: inflation, exchange rate, public debt, tax revenue, war in Ukraine

JEL classification: E31, E62, F31, F34

Introduction

The global inflation phenomenon is a situation which has never occurred before. In times of Great depression some countries were not affected by the crisis, and some, like USSR, had the era of highest growth in that period. The inflation that appeared during the initial stages of Covid-19 crisis did not have the time to settle down, but contrary, it got fuelled up by the Ukrainian crisis.

The focus of this paper is on the effects of inflation in the recent period, when it became global, on the exchange rates. The reason for this survey is the fact that public debt, when denominated in terms of foreign currency, changes its volume in the same proportion the exchange rate changes. This effect shows what happens with the volume of the debt without the effect of the current budget deficit.

On the other hand, rise in the inflation causes the governments' revenues to increase as well. Hence, if one determines the weakening link between the exchange rate and the inflation rate, it might happen that public debt refinancing may become easier. Since the inflation became global, the basic idea of this paper is that the countries with part or most of their debt denominated in the foreign currencies will be able to refinance their debt more easily, if they maintained their exchange rates stable. Therefore the main focus of this paper is the investigation of the link between inflation and the exchange rate change, with the hypothesis stating that the effect of the inflation on the exchange rate got weaker as the inflation phenomenon got global.

This paper focuses on the European non-Eurozone countries since most of their public debt is denominated in the foreign currency: Denmark, Iceland, North Macedonia, Poland, Sweden, Serbia, Switzerland, Romania, Norway, Hungary, Czechia and Turkey. Kosovo and Albania were excluded from the analysis due the lack of data.

Literature overview

There are different perceptions about the relationship between inflation and the exchange rate of a country. The link between the exchange rate change and the level of inflation is analysed in numerous studies. However, direction of the effect is disputed. Most of the previous studies show how exchange rates affect domestic inflation. Yanamandra (2015) showed that the exchange rate of the Indian Rupee has a non-linear effect on the inflation rate in India. Bastian and Satterfield (2017) show that exchange rate shock cause permanent inflationary consequences. Forbes (2016) shows that exchange rates do have some effect on domestic prices in United Kingdom, but it differed significantly over time, and in some times it did not have any affect at all. This is in line with what Ouyang, Rajan and Li (2016) have found, who stated that the relation between the exchange rate and the inflation did not exist in developed countries, but they investigated the opposite direction of effect.

However, some researches speak more of a connection between them, without direction, simply stating that exchange rate depreciation and rise in inflation coexist. Sui, Rengifo and Court (2021) analysed effects of the hedging potential of gold in Turkey, United States and Peru. The authors show the movement of the exchange rates and the inflation and how their change is related, but without the exact direction. Şen et al. (2019) analyse the long run interrelationship between the exchange rate changes and the inflation in Brasil, South Africa, Turkey, India and Indonesia. Their findings show that exchange rate and the inflation rate co-move in the long run, but the analysis itself does not provide result on the direction of the change, but only underline the coexistence of the two effects.

Finally, some authors show the opposite direction. Rødseth (2004) developed models showing how price level targeting produces volatility of both real and nominal exchange rate, indicating that the flatter is the aggregate supply, the stronger is the effect of the inflation rate change on

the exchange rate change. Purnomo (2017) also shows that domestic inflation in Indonesia in time period from 2012 – 2016 caused the exchange rate changes which discouraged Indonesian exports. The most comprehensive study on the matter was provided by Ouyang, Rajan and Li (2016). The authors were exploring the impact of inflation targeting on real effective exchange rate volatility. The study was based on a panel data for 62 countries over the time period 2006-2012. The survey has shown that inflation targeting caused real exchange rates to be more volatile, while in developed countries no such link was found.

The link between public debt and the exchange rate is obvious and intensively covered in literature, but surveys do not cover simultaneous effects of the inflation and the exchange rate on the public debt. Alnashar (2019) shows the importance of the Egyptian exchange rate management for stable public debt, showing that the fiscal policy, in terms of budget deficit, is equally important as the exchange rate management for the public debt volume. Acosta-Ormaechea (2020) made a larger scale analysis based on the panel data for 82 countries over the period 2008-2019 and came to the same conclusion.

Inflation and exchange rate nexus model

Basic economic theory introduces a formula for the nominal exchange rate change:

$$\frac{\Delta e}{e} = \frac{\Delta e_r}{e_r} - \frac{\Delta P^*}{P^*} + \frac{\Delta P}{P} \quad (1)$$

Where $\Delta e/e$ is the nominal exchange rate change (or g_e : percentage change in the price of the foreign currency in terms of domestic currency), $\Delta e_r/e_r$ is the real exchange rate change (or g_e^r , $\frac{\Delta P^*}{P^*} = \pi^*$ is foreign inflation rate and $\frac{\Delta P}{P} = \pi$ is domestic inflation rate:

$$g_e = g_e^r - \pi^* + \pi \quad (2)$$

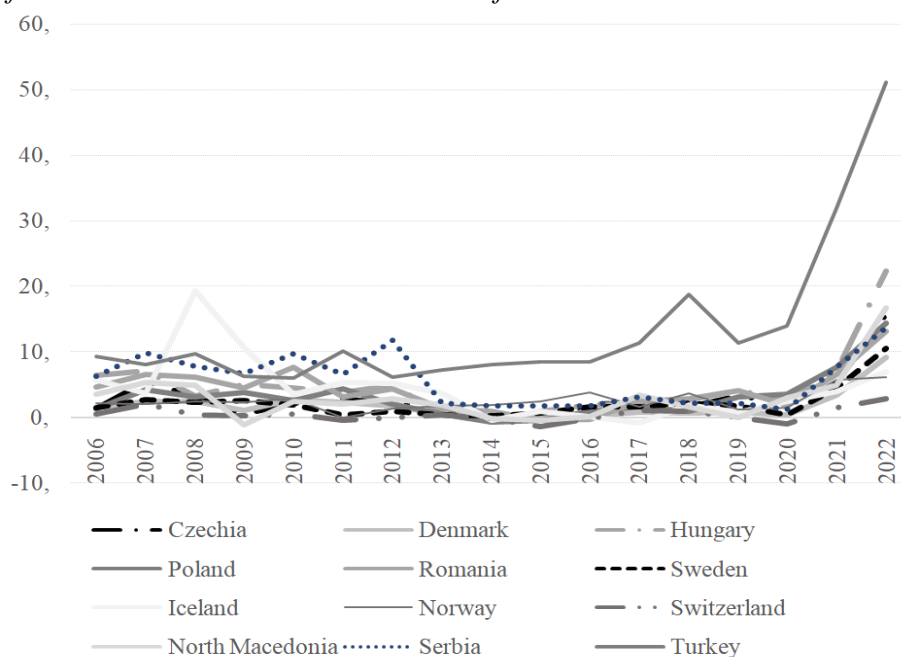
Therefore, if domestic inflation exceeds foreign inflation, without any changes in real economy, nominal exchange rate would depreciate. However, in case when both domestic and the foreign inflation rate are the same, nominal exchange rate would not change since

$$-\pi^* + \pi = 0 \quad (2a)$$

While bilateral situations of that kind did occur in history, global inflation has never before appeared on such a large scale.

In this paper the analysis of this phenomenon focuses on Europe. However, members of European monetary union are dropped out of the further analysis due to the same currency, as well as the fixed exchange rate regime countries, like Bulgaria and Bosnia and Herzegovina, and some countries for which the data were unavailable. This has formed the set of 12 European countries: Czechia, Denmark, Hungary, Poland, Romania, Sweden, Iceland, Norway, Switzerland, North Macedonia, Serbia and Turkey. This set contains six European Union countries which are not members of the European Monetary Union, three EFTA countries, two CEFTA countries and Turkey, which provides quite heterogeneous sample. In the period from January 2006 – February 2022 the inflation rate started from quite stable rates which started to increase during Covid-19 (beginning of the 2020), and exploded after the start of the Ukrainian war (Figure 1).

Figure 1: Inflation rate in 12 non-EMU countries from 2006 – 2022



Source: authors' own calculation based on Eurostat data.

Even after cutting the outlier (Turkey), the inflation rise is obvious.

Another important characteristic of the economy is that the share of the tax revenue in GDP tends to change slowly (Table 1).

Table 1: Tax revenues (% of GDP)

	2013	2014	2015	2016	2017	2018	2019	2020
Denmark	33,8%	36,5%	33,9%	33,3%	33,4%	32,2%	34,7%	34,1%
Iceland	21,7%	24,5%	22,7%	37,6%	23,9%	23,0%	21,8%	22,3%
North Macedonia	15,7%	16,2%	16,8%	17,0%	17,2%	17,6%	17,1%	16,1%
Poland	15,7%	15,7%	15,7%	16,3%	16,9%	17,4%	17,3%	17,5%
Sweden	26,5%	26,5%	27,1%	28,1%	28,1%	27,9%	27,4%	26,6%
Serbia	20,8%	22,0%	22,4%	23,3%	24,1%	23,6%	24,0%	23,5%
Switzerland	9,3%	9,1%	9,6%	9,4%	10,1%	9,7%	9,9%	9,4%
Romania	17,8%	17,9%	18,9%	17,1%	15,6%	14,4%	14,5%	14,2%
Norway	25,2%	23,6%	22,2%	22,1%	22,5%	23,5%	23,5%	21,1%
Hungary	22,9%	23,0%	23,2%	23,1%	22,9%	22,5%	22,4%	22,9%
Czechia	15,1%	14,4%	14,8%	14,9%	15,0%	14,8%	14,8%	14,3%
Turkey	18,4%	17,9%	18,2%	18,3%	17,7%	17,3%	16,5%	17,6%

Source: world development indicators.

The tax revenue share in GDP is a key indicator of the government's ability to fund its spending and provide essential services to citizens. However, there is a number of factors that cause that share to change. One important factor affecting the stability of tax revenue share in GDP is the level of economic growth. Several studies have found that countries with higher economic growth tend to have more stable tax revenue shares in GDP than those with lower economic growth. For example, a study by Bird and Gendron (2011) found that countries with higher average annual GDP growth rates had more stable tax revenue shares over time than those with lower growth rates. The authors have also found that countries with more progressive tax systems tend to have more stable tax revenue shares in GDP than those with less progressive

tax systems. This is because progressive tax systems are more responsive to changes in economic conditions and can generate a more stable source of revenue than regressive tax systems.

The stability of tax revenue share in GDP also depends on the political and institutional factors within a country. For example, research by Berg and Ostry (2011) found that countries with stronger institutions and better governance tend to have more stable tax revenue shares over time than those with weaker institutions and poor governance. This is because stronger institutions can improve tax collection and reduce tax evasion, leading to a more stable tax revenue source.

In addition, the stability of tax revenue share in GDP can be affected by external factors such as international trade and globalization. A study by Asghar and Mehmood (2017) found that higher levels of trade openness cause more volatile tax revenue shares in GDP. This is because globalization can expose countries to external shocks that can affect their tax revenue sources.

Overall, the stability of tax revenue share in GDP is a complex issue that is influenced by a variety of factors. However, all these factors take a long time to change the share of the tax revenue in GDP. Therefore one can assume rather fixed share of tax revenue in short run:

$$T = t \cdot GDP \quad (3)$$

When inflation increases, nominal gross domestic product increases by the inflation rate, above the real GDP growth rate. Consequently, in the short run when proportion t is fixed (3), tax revenues increase by the inflation rate too.

Foreign debt depends directly on the change of the exchange rates between domestic currency and the currencies of the debt denomination, according to the following equation:

$$D = D_d + \sum_{i=1}^n e_i D_i \quad (4)$$

Where D is the total public debt value, D_d is the amount of debt in domestic currency, e_i is the nominal exchange rate for between domestic currency and the currency i , D_i is the absolute amount of debt denominated in the currency i . In that case, total debt can be expressed in proportions when divided with D :

$$1 = \frac{D_d}{D} + \sum_{i=1}^n e_i \frac{D_i}{D} \quad (5)$$

Let $P_d = \frac{D_d}{D}$ be the proportion of the public debt in domestic currency and $P_i = \frac{D_i}{D}$ proportion of the public debt in currency i :

$$1 = P_d + \sum_{i=1}^n e_i P_i \quad (6)$$

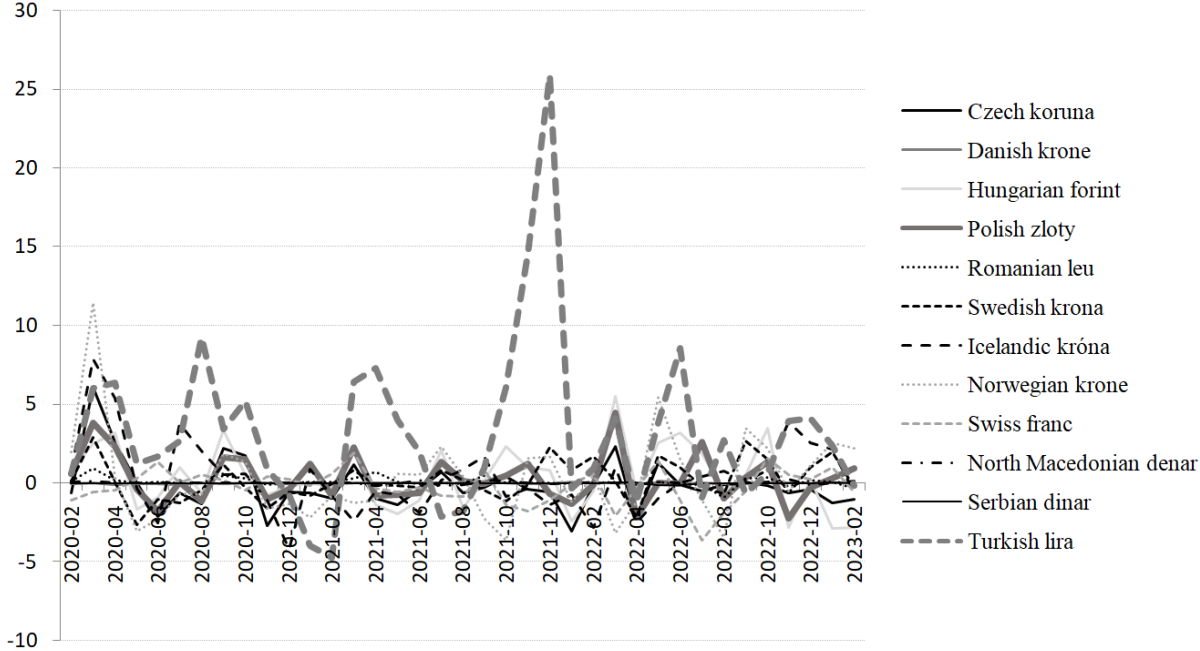
Let one observe the effect of the percentage change of the exchange rate (g_e), which can be obtained by logarithmic derivation of the expression (6):

$$\% \Delta D = \sum_{i=1}^n g_{e,i} P_i \quad (6.1)$$

The expression (6.1) shows that public debt changes proportionally to the change of the exchange rate, weighted with the share of the debt in the observed currency.

Figure 2 shows that, at least in the observed countries, exchange rates were very stable during recent and current epidemical and political crisis, except in Turkey which has been an outlier also in the dynamics of the inflation in the observed period, which is due to other factors. The inexistence of the trend on Figure 2 indicates that foreign debt, due to the stability of exchange rates, would not increase, taking (6) into account. On the other hand, the trend on Figure 1 shows that, according to (3), tax revenues would increase, at least in the short run. These two can happen only if the inflation is omnipresent (meaning (2a) holds), which can also be noticed in the dynamics of the trends of the inflation rate on Figure 1, which are quite harmonised.

Figure 2: Exchange rates in 12 non-EMU countries from Feb 2020 – Feb 2023



Source: Eurostat.

These observations indicate that relation between inflation rate one one hand, which increases tax revenues, and the exchange rates, which change the values of public debt, has weakened, which would be significant for global fiscal policy. These observations will be tested in the Methods and Model section.

Data, methods and findings

Based on the observations made previously in this paper, the analysis of the impact of inflation rate on the nominal exchange rates is made. The panel dataset includes 12 previously mentioned European non-EMU countries (cross-section dimension) from January 2006 to February 2023. The following model was tested:

$$e_t = \beta_1 p_t + \varepsilon_t \tag{7}$$

Where p is the monthly average inflation rate, e is the nominal domestic currency – Euro exchange rate percentage change. The estimates of the model were made for different time

periods: before COVID-19 crisis (January 2006 – January 2020), COVID crisis (February 2020 – February 2023), before Ukrainian crisis (January 2006 – January 2022), Ukrainian crisis (February 2022 – February 2023) and the entire time span (January 2006 - February 2023).

In the initial analyses a model with constant term was estimated, but results have shown that constant should be dropped out. In all 5 models the only regression coefficient β_1 is significant (p value of the t tests are all 0.000) and the models are properly defined, without autocorrelation and homoscedastic.

Table 2 contains results on the values of the regression coefficient for all 5 time periods. It can be shown that in the pre-COVID period there was almost unit relation between the inflation and the percentage change of the nominal exchange rate of domestic currency to Euro (0.8628), It dropped down to 0.4884 since COVID, but in its last period, since Ukrainian war began, it fell down to 0.2813, which is a drop by more than 3 times.

Table 2: Values of β_1 in the Model (7) in different time periods from Jan 2006 – Feb 2023

Before epidemics & war	Before war	Ukrainian war
Jan 2006 – Jan 2020	Feb 2020 – Jan 2022	Feb 2022 – Feb 2023
.8628	.4884	
.8468		.2813
.7000		

Source: authors’ own calculation.

These findings are very important for fiscal policies of the observed countries since inflation will help repay their public debt, which increased due to COVID crisis. On average, 1 percentage point of additional inflation causes tax revenues to increase, in the short run, by 1%, while the exchange rate would depreciate by 0.28% only. This relation is beneficial as long as the value of the public debt does not exceed the average tax revenue by more than 3.55 times. Otherwise, even such exceptional circumstances would cause negative effects on the debt repayment. However, a closer analysis should be made to check that impact for each country separately since this effect heavily depends on the structure of the domestic and foreign debt.

Conclusion

An empirically proven drop in the strength of the relation between the inflation rate and the exchange rate stability can have positive effects on the repayment of the public debt of a country. Based on the 12 non-EMU European countries it was shown that since the global inflation spiral initiated, triggered by the COVID crisis and speeded up since commence of the Ukrainian war, the connection between inflation and the exchange rate change weakened by more than 3 times. This unique situation of stable exchange rates and increasing inflation has never happened before. While inflation helps boost tax revenues, the exchange rate stability helps repay the debts, which is very important due to the high cost of fighting the epidemics. However, these effects can be felt as long as tax revenue share of a country in its public debt is no less than β_1 . Otherwise, positive effects cannot be felt, but the opposite, it would make its debt repayment even worse. These findings can help determine how detrimental, or how lucrative current inflation spiral is, but for each economy separately.

Future analysis should focus on interconnection between the inflation rate and the exchange rate change, but taking into account the average global inflation and its standard deviation.

These results might change the way how one relates the inflation and the exchange rates in general.

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THE ROLE OF PERSONAL AND SOCIAL DETERMINANTS IN ENVIRONMENTAL SELF-EFFICACY AND PRO- ENVIRONMENTAL BEHAVIOR OF YOUTH: EVIDENCE FROM CROATIA

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Abstract

Due to the accelerating global climate crisis requiring decisive and urgent changes, this study aims to explore the role of personal and social determinants in predicting self-efficacy and pro-environmental behavior (PEB) among youth, particularly the student population. Data were collected using a questionnaire from a sample of 255 students at the University of Split by convenience sampling technique. Mann-Whitney and Kruskal-Wallis tests were used to explore environmental self-efficacy and PEB based on gender, social class, previous work and volunteer experience. The results showed significant differences for promotional and proactive behavior and environmental self-efficacy related to gender and previous volunteer experience, where mean ranks were higher for females and participants with previous volunteer experience. For social class and previous work experience, no differences were shown. The main contribution of this study is to provide insight into the determinants that impact the PEB and self-efficacy of students. Limitations of the research include a relatively small sample and subjective assessment of self-efficacy and PEB. Recommendations for future research involve repeating the study on a larger sample and conducting longitudinal research with students from various countries with different approaches to sustainability issues.

Keywords: sustainability, self-efficacy, pro-environmental behaviour

JEL classification: Q5

Introduction

Economic development has put pressure on natural and social capital in the last centuries, leading to different initiatives to protect resources. Global warming resulted in global temperature increase and sea level rise, jeopardizing primarily coastal areas (Huang, 2016). Since tackling climate change requires globally coordinated actions, Paris Agreement was reached in 2015, to limit the global temperature increase in this century. This target was integrated into the 2030 Agenda for sustainable development as one of 17 SDGs and The European Green Deal. However, seven years after Paris Agreement, IPCC (2022a, 2022b) still

reports various climate risks and calls for urgent global action since the window of possible climate resilience development pathways is rapidly narrowing. UN sustainable development target 4.2 requires that by 2030 “all learners acquire the knowledge and skills needed to promote sustainable development” (UN 2022).

Muroi & Bertone (2019) stress a need for education reform which will significantly contribute to climate resilience development. In order to promote climate actions that will contribute to climate-resilient development, it can be argued that students’ (or youth in general) pro-environmental behavior will be of great importance due to their future role in society. Analyzing the difference between students and the general population, Kirby & Zwickle (2021) found a significant difference in students and the public PEB based on gender. Yusuf & Fajri (2022) argued that science students possess environmental knowledge while social sciences students are more inclined to behave pro-environmentally. Even though the sustainability issue is undoubtedly one of the critical global issues, there is no universal knowledge that might help prevent possible negative consequences of our actions today in future periods. In that sense, exploring how to impact the behaviors and beliefs of the specific target group of youth, especially students, for future sustainability may be crucial.

The main goal of this paper is to determine the role of personal and socio-economic determinants in students’ environmental self-efficacy and behavior in order to be able to better understand and shape sustainability policies and actions according to the specifics of targeted groups. The remainder of this study is organized as follows. In the second chapter, relevant literature focusing on pro-environmental behavior and self-efficacy and their interconnections are overviewed. In the third section, the research methodology is explained, followed by research results. In the last section, a conclusion grounded in research results and findings from previous research is given. In addition, the limitation of the study and recommendations for future research are emphasized.

Literature review

Significant modifications in human behavior are needed to solve climate change problems. Therefore, it is not surprising that the generally accepted definition of pro-environmental behavior (PEB) "is purposeful action that can reduce the negative impact on the environment" (Stern, 2000). According to Huang (2016) PEB can be defined by its impact and intent. Related to impact (Stern, 2000), it is a behavior that can lead to positive changes in main resources availability and improve ecosystem dynamics. The most effective forms of impact-oriented PEB are green consumption, good citizenship activities and environmental activism. Lee, Kim, Kim, & Choi (2014) examined three moderators affecting individual involvement in those PEBs: value orientation, perceived consumer efficacy and environmental concern, with the latter significantly affecting PEB. Related to the intent, PEB purpose is to change the environment from the actor's standpoint (Brambati, Ruscio, Biassoni, Hueting, & Tedeschi, 2022).

Schultz & Kaiser (2012) examine the impact of promotion on PEB and emphasizing contextual variables in activating or strengthening individual motivation for bridging the intention-behavior gap. Pongiglione (2014) concluded that a supportive social context is crucial for PEB and highlighted three significant problems in adopting PEB: perceived inaction of key institutions, procedural knowledge and feedback mechanisms insufficiency. In this vein, Huang

(2016) states that the media represents an important contextual force influencing PEBs and conclude that media use and self-efficacy are important predictors of PEB.

Most studies focus on impact-oriented PEB definition, examining one particular behavior, such as recycling or green consumption. Based on the theory of planned behavior, Yuriev, Dahmen, Paillé, Boiral, & Guillaumie (2020) state that behavior is determined by intention, which is determined by numerous factors. According to Batavia, Bruskotter, & Nelson (2020), the path from values to behavior is long and can be interrupted by many variables. Different predictors of PEB have been identified to understand and reduce the intention-behavior gap. Some of them are environmental attitudes and ecological, moral reasoning (Crumpei, Boncu, & Crumpei, 2014), personal norms and environmental self-identity (Van der Werff, Steg, & Keizer, 2013), environmental ethics (Batavia et al., 2020), idealism and relativism (Zaikauskaite, Chen, & Tsivrikos, 2020), religious and secular ethics (Zagonari, 2021), moral identity and risk perception (Misch, Kristen-Antonow, & Paulus, 2021), environmental knowledge (Liu, Teng, & Han, 2020) etc.

Determinants of PEB are, undoubtedly, numerous, and their impacts, relations and mutual effects on PEB need to be investigated further. One of the first and most important studies was the meta-analysis by Hines, Hungerford, & Tomera (1987) in which personal (e.g., locus of control, attitudes, verbal commitment) and situational variables (e.g., economic constraints, social pressures and opportunities) were identified as the most important predictors of PEB. Stern (2000) refines and groups the causal variables of PEB into four major types: attitudinal factors, contextual forces, and personal capabilities and habits. Li, Zhao, Ma, Shao, & Zhang (2019) classified determinants of PEB into two main categories: external and individual variables, which include socio-demographic and psychological variables (e.g., attitudes, motivation, self-efficacy, altruism, previous recycling experience). López-Mosquera, Lera-López, & Sánchez (2015) and Li et al. (2019) claim psychological factors are crucial in understanding PEB. Bhattacharyya, Biswas, & Moyeen (2020) have proven that personal values, moral obligations, attitudes and subjective norms are significant predictors of PEB among MBA students. Whitmarsh, Poortinga, & Capstick (2021) suggest that structural factors (such as income) may play an important role apart from psychological factors. Lavelle, Rau, & Fahy (2015) proved that there are significant socio-demographic differences (regarding employment status, income, and residential location) and attitude differences among households dominated by habitual actions compared to occasional actions of PEB. Meyer (2016) investigated PEBs of college students, and results showed that gender and race are the only important predictors of PEB in the US. Li et al. (2019) state that younger people, females and middle and upper-middle-class individuals, in general, had more environmental concerns, which is consistent with the findings of Kollmuss & Agyeman (2002) that gender and education are influential factors.

Finally, Li et al. (2019) conclude that PEB is so complex that it is almost impossible to explain in one model. Gifford & Nilsson (2014) state that PEB is influenced by numerous factors, not only personal and social, emphasizing the necessity to expand the current knowledge of the topic. They conclude that PEB is undoubtedly determined by combinations of various factors from the personal and social domains. As understanding PEB is far more complex than previously thought, there is a need to develop the profile of those individuals who are more likely to behave pro-environmentally.

Also, it is important to investigate self-efficacy, as the most prevalent psychological factor and a key predictor of PEB, using sociodemographic and psychological characteristics. Self-

efficacy is a central construct in social cognitive theory, stating that perception collection on an individual level, as well as its assessment and regulation, will shape behavior while responding to the demands of social (including environmental) systems (Jin, 2013b). Self-efficacy is a cognitive evaluation process (Jiang, 2015) that best predicts future actions or performances (Bandura, 2002). Schutte & Bhullar (2017) defined self-efficacy as the belief that one can bring about desired outcomes.

Self-efficacy was used in various contexts such as high school education (Muroi & Bertone, 2019), sports (Ouyang et al., 2020), healthcare (Vagni, Maiorano, Giostra, & Pajardi, 2020). In one of the first studies on this topic, Rice, Wongtada, & Leelakulthanit (1996) proved that there are differences in the PEB of individuals by their level of self-efficacy. Huang (2016) defined environmental self-efficacy as individuals' belief having the ability and strength to take mitigation action against climate change claiming that self-efficacy has a positive direct effect on PEB. According to Taberero & Hernandez (2011) self-efficacy and motivation predict PEB. Lauren, Fielding, Smith, & Louis (2016) have proven that self-efficacy mediates PEB spillover (graded by difficulty). They claim that engaging in relatively “easy behaviors” leads to a higher level of self-efficacy, consequently creating intentions to engage in more difficult behaviors in the future. According to Bandura (1997), higher self-efficacy indicates higher capabilities and self-confidence in task performance.

Muroi & Bertone (2019) claim that climate change education affected students' self-efficacy, which is a vital predictor of PEB and an important tool in increasing PEB. Although the authors asserted self-efficacy correlation with some socio-demographic features of the participants (e.g., age, level of education, gender), it is necessary to investigate further other personal and social factors that can influence it. This paper aims to provide practical implications for organizations so that they can focus their marketing efforts on a positive change in pro-environmental behavior and not exclusively identify the factors that influence it. Accordingly, the role of personal and psychological characteristics in predicting self-efficacy and pro-environmental behavior among the student population in Croatia is explored.

Empirical research

Research methods, sample and scope

This research purpose is to determine the role of personal and social determinants in students' pro-environmental self-efficacy and behavior. Gender, previous work experience, previous volunteer experience and social class were selected from the vast choice of personal and socio-economic determinants. Pro-environmental efficacy and behavior were operationalized based on Huang (2016) as follows:

- Pro-environmental self-efficacy (Eseff): 4 items, representing attitudes toward reduction of global warming impact, own actions for climate change, change of personal behavior despite possible inconvenience and doing best to mitigate global warming effects,
- Accommodating environmental behavior (Acobeh): 2 items representing seeking information related to climate change and discussing them with others,
- Promotional environmental behavior (Promobeh): three items related to the persuasion of others for change, participation in environmental groups and supporting policies related to climate change problems,
- Proactive environmental behavior (Proacbeh): 8 items related to proactive behavior, including recycling, electric power saving, using public transportation or alternative

transportation modes, change in eating habits, reducing usage of plastic, buying local products etc.

In order to meet the research goal, the research question was created: “Is there a difference in pro-environmental self-efficacy and behavior related to gender, social class, previous work and volunteering experience?”

The empirical research was conducted on a sample of 255 students from the Faculty of economics, business and tourism, all participating in at least one course that includes environmental topics in the syllabus. In that way, the authors tried to ensure objectivity in students’ reflections on prior actions and beliefs related to environmental problems. The student population was selected as they are good representatives of the young adult population. They learn about environmental issues through their educational curriculum, which will be a foundation for their future actions as policymakers or policy changes. In addition, this generation will have even more responsibility to cope with sustainability issues. The online questionnaire consisted of questions related to personal and socio-demographic determinants and pro-environmental self-efficacy and behavior. Previous work and volunteer experience was measured as dichotomous variables (yes/no), while social class was operationalized based on participants' perception of belonging to one of the three social classes (low, middle, high) commonly used in this research area. Self-efficacy and pro-environmental behavior were measured on a 7-point Likert scale ranging from 1 (totally disagree) to 7 (totally agree). The research was conducted from March to May 2021. Statistical analysis was conducted by the SPSS software package through descriptive analysis and nonparametric tests such as Mann-Whitney and Kruskal-Wallis due to data distribution.

Research results

The personal and socio-economic determinants of participants are shown in Table 1.

Table 1: Personal and socio-economic determinants

	N	%	Cumulative %
Gender			
Male	83	32.5	32.5
Female	172	67.5	67.5
TOTAL	255	100	100
Social class			
Lower	6	2.8	2.8
Middle	192	88.9	91.7
Higher	18	8.3	100
TOTAL	255	100	100
Previous work experience			
No	70	27.5	27.5
Yes	171	67.0	94.5
Missing	14	5.5	100
TOTAL	255	100	100
Previous volunteering experience			
No	135	52.9	52.9
Yes	107	42.0	94.9
Missing	13	5.1	100
TOTAL	255	100	100

Source: research.

Most students (67.5%) were female, belonging to the middle class (88.9%). Regarding experience, there is a difference between work and volunteering experience, 67% of respondents claim to have work experience, and only 42% have previous volunteering experience. This is expected due to the non-profit sector and volunteering practices' importance awareness in Croatia. A descriptive analysis of students' pro-environmental self-efficacy and behavior, operationalized using scales developed by Huang (2016), is shown in Table 2.

Table 2: Pro environmental self- efficacy and behavior descriptive

	CODE	N	Mean	Std. Dev.
<i>Pro environmental self- efficacy</i>				
As long as actions are taken to mitigate global warming, climate change can be effectively reduced	Eseff1	255	5.69	1.496
I believe I have the ability to take action to mitigate global warming and prevent climate change	Eseff2	255	4.91	1.637
Although it may cause inconvenience, I can still change my behavior to mitigate global warming	Eseff3	255	5.46	1.422
I can try my best in every way to mitigate global warming	Eseff4	255	4.63	1.735
<i>Accommodating environmental behaviour</i>				
Searching for information about global warming or climate change	Acobeh1	255	4.16	1.837
Discussing global warming or climate change with others	Acobeh2	255	4.01	1.836
<i>Promotional environmental behavior</i>				
Persuading others to change behavior to mitigate global warming	Promobeh1	255	4.52	1.708
Participating in environmental groups to mitigate global warming problems	Promobeh2	255	4.46	1.699
Supporting policies to mitigate global warming	Promobeh3	255	4.99	1.771
<i>Proactive environmental behavior</i>				
Recycle newspapers, plastics, cans and glass	Proacbeh1	255	5.30	1.508
Turn off or unplug electronic devices when not needed	Proacbeh2	255	5.62	1.602
Reduce air conditioning	Proacbeh3	255	5.00	1.848
Reduce driving, and walk, bike or use public transportation	Proacbeh4	255	4.23	2.144
Eat less meat and more vegetables	Proacbeh5	255	3.68	2.097
Buy local products or locally produced foods	Proacbeh6	255	5.09	1.631
Buy energy efficient appliances	Proacbeh7	255	4.68	1.661
Reduce using plastic bags, or use own bag when shopping	Proacbeh8	255	5.18	1.855
Valid N (listwise)		255		

Source: research.

Regarding pro environmental self-efficacy, the highest mean (5.69) is shown for beliefs that actions to mitigate global warming should be taken in order to reduce climate change (Esseff1), followed by recognition of the necessity to change own behavior o mitigate global warming despite inconvenience (Essef3=5.46). It should be noted that all Self-efficacy items have a mean rank higher than neutral (3.5).

Results of PEB (Table 2) show that participants are most engaged in Proacbeh2 (5.62), Proacbeh 1 (5.30) and Proacbeh 8 (5.18). The lowest means are shown for Proacbeh 5 (3.68). Values for accommodating environmental behavior (Acobeh) show the lowest values, followed by values of Promotional environmental behavior (Promobeh). It can be partially explained by the general characteristics of the young population in Croatia as well as cultural heritage and living habits. Recently, there has been a higher frequency of discussing environmental traits in public, getting into a relationship with our behavior and possible environmental impact related to global warming, pollution and sustainability. Diary habits mainly focus on meat, not

considering substitutes or including more vegetables in a diary. Due to relatively low economic standard, the main factor in choosing food, electric appliances or buying local products is price, which influences behavior. On the other side, participants show more proactive environmental behavior for costless actions with little extra effort, such as turning off electronic devices and using their own bags when shopping and recycling.

Interestingly, mean values for Accommodating environmental behavior are within the neutral range, showing that participants are not actively participating in discussing or searching for information related to global warming or climate changes. It can be explained by the availability of natural resources in Croatia and the relatively low impact of climate change on everyday life. Related to Promotional PEB, participants support local policies related to global warming, participate in groups to mitigate problems and persuade others to change their behavior to a certain level. It can be explained by the nature of the sample, which includes only students involved in classes with environmental issues in their syllabuses. Regarding pro-environmental self-efficacy, participants are evaluating it relatively above average, from 4.63 for doing their best to mitigate global warming (Eseff 4) to 5.69 for beliefs that as long as actions are taken to mitigate global warming, climate change can be effectively reduced (Eseff 1).

Based on the research framework and Huang's (2016) work, new variables were constructed as a mean of all proposed items for all environmental behaviors and self-efficacy for further analysis. Previously proposed and validated measurement scales were checked for validity by calculating Cronbach alpha coefficients, which were in an acceptable range for Eseff item (0.822), Acobeh (0.959) and Proacbeh (0.794). Only the scale for Promobeh showed low reliability (0.549), but since it was previously validated by Huang (2016) it was included in further analysis.

In the following analysis, students were grouped based on gender, economic status, and previous working and volunteering experience to examine differences related to PEB and self-efficacy. As the normality assumption is violated, Mann-Whitney and Kruskal-Wallis H rank-based nonparametric tests were used. Results are shown in the following tables.

Table 3: Descriptives and Mann-Whitney test significance results for gender

Pro environmental self-efficacy and behavior related to gender	Male			Female			Mann-Whitney test
	N	Mean	Std. Dev.	N	Mean	Std. Dev.	Sig.
ACOBEBH	83	3.92	1.618	172	4.19	1.721	.237
PROMOBEH	83	4.22	1.330	172	4.90	1.179	.000
PROACBEH	83	4.76	1.127	172	5.17	1.224	.002
ESEFF	83	4.96	1.253	172	5.31	1.206	.020

Source: research.

Table 4: Mann-Whitney test results for gender

Pro environmental self- efficacy and behavior differences related to gender	Male		Female	
	N	Mean Rank	N	Mean Rank
ACOBEBH (Mann-Whitney U=6488; Z =-1.184)	83	120.17	172	131.78
PROMOBEH (Mann-Whitney U=4929; Z =-4.017)	83	101.39	172	140.84
PROACBEH (Mann-Whitney U=5433; Z =-3.092)	83	107.46	172	137.91
ESEFF (Mann-Whitney U=5857.5; Z =-2.326)	83	112.57	172	135.44

Source: research.

As presented in Tables 3 and 4 related to gender importance in PEB and self-efficacy, differences are determined for two types of behavior (Promobeh and Proacbeh) as well as for pro-environmental self-efficacy (Eseff). Mann-Whitney U test showed a statistically significant difference in mean ranks (at the 5% significance level) regarding the gender for two out of three behaviors and self-efficacy (Eseff, $p=0.020$; Promobeh, $p=0.044$; Proacbeh, $p=0.002$). Generally, females are showing higher engagement in pro-environmental behavior (Promobeh=4.90; Proacbeh=5.17) and estimating their self-efficacy (Eseff=5.31) higher than males, while only in accommodating behavior determined difference although higher (Acobeh=4.19) is not significant. This is in accordance with other relevant studies that showed females express higher environmentally oriented awareness and readiness to adapt their behavior to achieve a common good.

Table 5: Descriptives and Kruskal-Wallis test significance results for social class

Pro environmental self-efficacy and behavior differences related to social class	low			middle			high			Kruskal-Wallis test
	N	Mean	Std. Dev.	N	Mean	Std. Dev.	N	Mean	Std. Dev.	Sig.
ACOBEBH	6	3.83	2.016	192	4.09	1.704	18	3.97	1.355	.828
PROMOBEH	6	5.11	.583	192	4.67	1.249	18	4.54	1.109	.616
PROACBEH	6	5.10	1.270	192	5.10	1.131	18	4.53	1.225	.147
ESEFF	6	5.00	1.620	192	5.27	1.156	18	5.04	1.157	.672

Source: research.

Kruskal-Wallis test's results, presented in Table 5 showed no significant difference (at the 5% significance level) in mean ranks in PEB and self-efficacy regarding social class among groups. It can be explained due to sample limitation as the majority of participants ($N=192$) were in the middle-class group. Even though the differences are not statistically significant, it is interesting to point out that the middle-class group has the highest mean for accommodating pro-environmental behavior (4.09) and self-efficacy (5.27). In contrast, the high-class group has the lowest mean for proactive pro-environmental behavior (4.53). The low-class group has the highest mean rank for promotional pro-environmental behavior (5.11). The highest mean for the middle class can be relatively logically explained by the behavior of the majority of the population belonging to the middle class. For example, the highest number of people talking about climate change within their social groups and the middle-class group is the largest one (for Acobeh) or, shaping own beliefs related to beliefs of my social group even for climate change issues (for Eseff). However, it is interesting that the low and middle classes express more engagement in proactive pro-environmental behavior. That is, to a certain degree reflection of our everyday habits and actions. One could think that higher socio-economic status will lead to more concern about nature and, thus, more environmentally friendly behavior.

Nevertheless, it is not shown here. One of the reasons for this discrepancy (besides relatively poor sample distribution among groups) could be population selection – students. Namely, most of the young adults' population (including students) in Croatia are not living alone and taking "responsibility" for their life, but with parents who are responsible for everyday activities directly connected with proactive PEB.

Table 6: Descriptives and Mann-Whitney test significance results for work experience

Pro environmental self-efficacy and behavior related to work experience	No work experience			Yes work experience			Mann-Whitney test
	N	Mean	Std. Dev.	N	Mean	Std. Dev.	Sig.
ACOBEBH	70	4.11	1.659	1	4.13	1.673	.710
PROMOBEH	70	4.68	1.277	1	4.74	1.203	.731

Pro environmental self- efficacy and behavior related to work experience	No work experience			Yes work experience			Mann Whitney test
	N	Mean	Std. Dev.	N	Mean	Std. Dev.	Sig.
PROACBEH	70	4.98	1.330	1	5.11	1.041	.841
ESEFF	70	5.09	1.308	1	5.30	1.083	.353

Source: research.

According to descriptives and Man-Whitney U test results for groups based on previous working experience shown in Table 6, it is clear that there is no significant difference (at the 5% significance level) in pro environmental behavior and self-efficacy mean ranks between groups with or without working experience. The majority of students belong to a group with previous work experience (N=171), stating that their PEB and self-efficacy are only slightly higher than students with no work experience. Still, all mean values are higher than neutral (4).

Table 7: Descriptives and Mann-Whitney test significance results for volunteering experience

Pro environmental self- efficacy and behavior related to volunteering experience	No volunteering experience			Yes volunteering experience			Mann Whitney test
	N	Mean	Std. Dev.	N	Mean	Std. Dev.	Sig.
ACOBEBH	135	3.99	1.688	1	4.32	1.643	.143
PROMOBEH	135	4.55	1.270	1	4.95	1.121	.013
PROACBEH	135	4.93	1.172	1	5.26	1.057	.029
ESEFF	135	5.09	1.218	1	5.45	1.049	.025

Source: research.

Table 8: Mann-Whitney test results for volunteering experience

Pro environmental self- efficacy and behavior differences related to volunteering experience	No volunteering experience		Yes volunteering experience	
	N	Mean Rank	N	Mean Rank
ACOBEBH (Mann-Whitney U=6435; Z =-1.463)	135	115.67	107	128.86
PROMOBEH (Mann-Whitney U=5890.5; Z =-2.472)	135	111.63	107	133.95
PROACBEH (Mann-Whitney U=6045.5; Z =-2.178)	135	112.78	107	132.50
ESEFF (Mann-Whitney U=6010; Z =-2.248)	135	112.52	107	132.83

Source: research.

The role of previous volunteering experience in PEB and self-efficacy is the last variable considered in this research. The results are shown in Tables 7 and 8. As expected, due to the relatively undeveloped nonprofit sector in Croatia and, thus, fewer options for volunteering or philanthropic activities, most students belong to a group with no volunteering experience (N=135). The group with previous volunteering experience shows higher engagement in all types of behavior (Accobeh=4.32; Promobeh=4.95; Proacbeh= 5.26) and a higher level of self-efficacy (Eseff=5.45). Mann-Whitney U test shows statistically significant differences between groups in mean ranks for two types of behavior (Promobeh and Proacbeh) and self-efficacy (Esef) regarding the previous volunteering experience. Again, like in an analysis related to gender, the difference is not significant for accommodating pro-environmental behavior (Acobeh). A higher level of PEB and self-efficacy for students with volunteering experience was expected. It can be argued that pro-social and pro-environmental behavior are likely just two aspects of an overarching shared propensity supporting both behavior types. Therefore, promoting one element through the relationship will also promote the other element.

Conclusion

The conducted analysis showed some interesting results, partly in accordance with the results of previous findings. Students are almost essential for all environmental issues and should be one of the critical groups (together with youth in general) for policymakers trying to achieve sustainability goals. In that way, specific differences must be considered, and different aspects of pro-environmental behavior should be elaborated separately. This research showed differences in behavior and self-efficacy in two of the four selected characteristics and for two types of behavior and self-efficacy. This study's main limitations are convenience sampling with participants from only one university and subjective assessment of self-efficacy and pro-environmental behavior instead of actual PEB. Recommendations for future research include conducting a longitudinal study on a representative sample with participants from various countries with different approaches to the sustainability issue. Also, future studies could get additional perspective and clarify the importance of personal characteristics and socio-economic elements in the enjoyment-friendly behavior of the youth. Only if we determine what drives youth to more effective environmental behavior and how to encourage them to change common patterns could we expect a brighter and lighter environmental future.

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BIG DATA AND TABLEAU BIBLIOMETRIC RESEARCH: PRELIMINARY REVIEW

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Abstract

An increase in technology usage with its further development has made a huge production of data daily. Due to the nature of the technology used, the data is stored in various forms depending mainly on the latency of the platforms used. Therefore, a combination of relational and non-relational databases is used. Big Data term came into use during the 90s and is one of the few fields where practical implementation was ahead of scientific research and discussion. Therefore, the scientific approach has now increased its presence with applications in various fields. Furthermore, sound analytical tools are needed for quick data visualisation. Tableau analytical tool has been chosen as the benchmark tool for Big Data visualisation in this paper. This paper aims to present the research field of “Big Data” and “Tableau” using a bibliometric analysis approach with a text mining process. Scopus database was researched using „Big Data“and „Tableau“keywords across various subject areas. The most relevant papers for the topics of “Big Data” and “Tableau” have been chosen, using transparent and consistent criteria. Using VOSviewer for bibliometric analysis and text mining process, papers have been analyzed in order to identify research trends, such as subject areas, publishing years, authors, document types, institutions, journals, conferences and countries. For the text mining process, keywords co-occurrence networks were implemented with further cluster specification. The results indicated a total number of 86 publications in the 2015 to 2023 timeframe. Big Data (Cluster 1), Data visualization (Cluster 2) and Tableau (Cluster 3) keywords were the most used ones with highest values recorded.

Keywords: big data, tableau, e-business, disruptive technologies

JEL classification: O3, MOO

Introduction

Big Data consists of structured, semi-structured, and unstructured data generated by human-machine interactions and processes. Using analytical techniques such as data mining, offers companies major benefits with insights into their business processes and enables them to advertise their products more effectively. Data mining is the process of extracting knowledge from data using algorithms to discover links and patterns that are typically not immediately

apparent (Bach et al., 2022). The data mining process is needed for artificial intelligence (AI) system implementation (Asim Khan et al., 2020). The AI with deep learning (DL) and machine learning (ML) algorithms may analyze huge data and derive insight into past or real-time occurrences, as well as predict future events, enabling strategic decisions (Xu et al., 2021).

The term "Big Data" first appeared in the 90s by John Mashey. The first publication to use the term Big Data was a 1998 data mining book authored by Weiss and Indrukya. The core of the term Big Data is the accumulation of huge amounts of data that are nowadays generated every day. Big Data can also be viewed as data sets whose sizes exceed the capability of conventional software used to acquire, curate, manage, and process data over a lengthy period of time (Ren et al., 2019). Big Data is atypical in that it was widely embraced in the business and public spheres prior to the academic discourse (Succi et al., 2018; Harper 2017). This may explain why the majority of Big Data literature has expanded over the past few years (Miklosik et al., 2020; Kun et al., 2019; Pinarbasi et al., 2019).

To be able to produce quality results, big amounts of data are needed. In today's world, the production of data is not an issue as almost 1.2 trillion megabytes of data is produced every day (Rayaprolu, 2023). A further interesting fact is that the quantity of information produced from the beginning of humankind to the end of the last decade is likely produced every few days today (Batistic et al., 2019). Due to the development in social media applications, augmented & virtual reality and the Internet of Things (IoT) it is likely that this trend will continue (Bermejo et al., 2017). Additional data will be gathered in new ways, using new technology, important to innovators and developers as pioneers of new business processes and potentially establishing new lucrative markets (Turulja et al., 2023; Curko et al., 2018). Not only are these datasets abundant, but they are also in various formats such as continuous, streaming, real-time, dynamic, and volatile. The volume, variety, and velocity of data have expanded tremendously. This phenomenon is typically characterized by the "3 Vs" of Big Data (volume, variety, and velocity) (Favaretto et al., 2020). Literature suggests that Big Data can uncover numerous new opportunities and provide operational and monetary benefits (Mikalef et al., 2019). The emergence of the Internet has caused a surge in information research (De et al., 2020). Businesses are overwhelmed with an abundance of information resulting from basic Internet browsing (Elmer 2020).

Conventional relational databases have difficulty accommodating, capturing, managing, and processing massive data with low latency. There are numerous instances in which low latency is desired, such as in the gaming industry, where low latency enables a more realistic environment (metaverse for example), and in high-frequency stock market trading, where trades are automatically executed using optimised algorithms that capture fluctuating market prices (Xu et al., 2021; Erhard et al., 2020). Non-relational, distributed, open-source and horizontally scalable (NoSQL) databases might be one of the solutions available for a low latency response in delivering information. Therefore, based on the business purpose and the latency needed, database types are chosen accordingly (Dechev et al., 2019).

Softwares for analysing data have improved and have become more accessible with various option packages provided (Zhu 2021). One of those is Tableau data visualization software. Tableau is an end-to-end data analytics tool that enables its users to prepare, analyze, collaborate, and share vital data insights (Sledgianowski et al., 2021). Tableau excels at self-service visual analysis, enabling users to create innovative ways of analyzing controlled Big Data and distribute the results with their mid or executive management of a specific organisation. Tableau collaborates closely with industry leaders to support various platforms in

use (Alasmari, 2020). Tableau enables customers to seek its company data value and maximizes the companies investments in technology to enhance their data potential (Bhardways et al., 2019). Tableau helps businesses visualize and comprehend Big Data in a quick and visually appealing way contrary to the current practice of corporate data storage on suitable devices which is mainly monotonous.

Due to the academic research expansion on various Big Data practical implementations, there is a need for bibliometric analysis. Considering the significant role of Big Data in business growth, this paper aims to develop a bibliometric analysis of Big Data and the Tableau tool covering the most fruitful subject areas. Scopus scientific database will be searched to discover Big Data research in various subject areas. The paper’s goals are to: (i) detect the most prominent subject areas, publishing years, authors, document types, institutions, journals, conferences and countries and (ii) detect the main topics of the research and research groups using the text mining process. For that purpose, bibliometric analysis and text mining process have been used. The outline of the article is as follows. After the introduction, the methodology is presented. The third part discloses the article’s findings while the conclusion and future implications are discussed lastly.

Methodology

Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) is used as a standard for reporting evidence in systematic reviews and meta analyses. PRISMA method is used in this paper through the Scopus research database to provide a broad literature review of Big Data and Tableau usage in vairous subject areas. Furthermore, the paper includes a visual map of research keyword linkages as well as complimenting them with publishing years (Skute et al., 2019). Firstly, researched data from the Scopus database through a paper search strategy will be represented. Secondly, the two methods, bibliometric analysis and text mining process will be presented.

Scopus research database has been used for the analysis of Big Data and Tableau terms. The paper's search strategy is shown in Table 1. Due to the scope of this paper, publishing years were not filtered out, but were taken as a whole. Meaning, the overall Big Data and Tableau combined keywords across the whole available period are shown. The focus is on English-language peer-reviewed literature.

Table 1: Scopus search strategy

Search strategy	Researched publications	Period
„Big Data“ and „Tableau“	86	2015-2023

Source: authors’ work.

Bibliometric analysis is conducted using the Scopus research database with a focus on various types of publications. Mainly, the focus is on showcasing the subject areas, publishing years, authors, document types, institutions, journals, confernces and countries. After the initial search input of Big Data and Tableau terms, bibliometric data is extracted which is later used for the text mining analysis through the VOSviewer tool (Liao et al., 2018).

The text mining capability of the VOSviewer tool for creating co-occurrence networks of terms/keywords (both assigned and author-assigned) collected from English-language textual data, is implemented. This method employs the Apache OpenNLP library, an open-source Java

library for Natural Language text processing. OpenNLP provides features such as tokenisation, sentence segmentation, part-of-speech tagging, named entity extraction, chunking, parsing, and co-reference resolution (Ye, 2018; Yogish et al., 2018). Distance-based approach functionality of the VOSviewer tool enables the visual representation of bibliometric linkages. Furthermore, this functionality has various representing options for network types such as based on keywords, authors, or nations with various color shading maps (Guo et al., 2019). The process is the following, firstly the items are grouped in nodes where the distance between them is normalised. Strongly related nodes will be positioned closer to each other as it is a two-dimensional space using the VOSviewer mapping technique. Using the smart local moving algorithm the nodes are allocated to the corresponding clusters. This allows the co-occurrence analysis of the most researched topics under the Big Data and Tableau researched terms. The paper's focus is on the keywords' co-occurrence using the full counting extraction algorithm (Kirby, 2023).

The keyword co-occurrence analysis showed a total of 733 keywords from the Scopus research database, but with a 5+ keyword co-occurrence only 20 publications met the threshold. This paper's threshold was than set to a minimum of 3 keywords co-occurrence, indicating that only those publications with 3 or more co-occurring keywords are retained in the analysis. Publications that met the 3+ publications threshold increased to 47 in total.

Results

The results of bibliometric analysis and text mining approach are shown below. Firstly, the bibliometric analysis is indicated, followed by the text mining process results.

Bibliometric analysis

Table 2. represents the research findings from the Scopus database for the publications timeframe. The majority of the publications were between 2018 and 2021, with an average of 13 per year. There is a slight decrease in the publications in 2022 (9 publications), while the 2023 year is still active and can not be referenced for.

Table 2: Publications timeframe

Year	Documents #
2023	1
2022	9
2021	15
2020	11
2019	15
2018	13
2017	10
2016	9
2015	3

Source: authors' work.

The publications document type is shown in Table 3. The majority of the publications on this research topics are Conference Papers (46). They are followed by Articles (24), Book Chapters (9), Reviews (4) and Conference Reviews (3).

Table 3: Publications document type

Document type	Documents #
Conference Paper	46
Article	24
Book Chapter	9
Review	4
Conference Review	3

Source: authors' work.

Table 4. presents the allocation of publications according to the subject area. The 86 is the total number of publications, although some are distributed in more than one subject area due to their various research fields. Computer Science includes the majority of publications (59). It is followed by Engineering (26), Social Sciences (17), Decision Sciences (13), Business, Management and Accounting (12), Mathematics (10), Medicine (7), Physics and Astronomy (4), Biochemistry, Genetics and Molecular Biology (3), Energy (3), Arts and Humanities (2), Earth and Planetary Sciences (2), Materials Science (2) and Neuroscience (2).

Table 4: Research subject area

Subject area	Documents #
Computer Science	59
Engineering	26
Social Sciences	17
Decision Sciences	13
Business, Management and Accounting	12
Mathematics	10
Medicine	7
Physics and Astronomy	4
Biochemistry, Genetics and Molecular Biology	3
Energy	3
Arts and Humanities	2
Earth and Planetary Sciences	2
Materials Science	2
Neuroscience	2

Note: the sum of the research publications differs from the number of papers (86) since the paper can be assigned to more than one subject area

Source: authors' work.

Journals and conferences included in this research bibliometric analysis are denoted in Table 5. ACM International Conference Proceeding Series has the highest number of publications (5). Journal of Emerging Technologies in Accounting follows by three (3) publications, International Journal Of Scientific And Technology Research by two (2), Issues in Accounting Education by two (2), Lecture Notes in Computer Science Including Subseries Lecture Notes In Artificial Intelligence And Lecture Notes in Bioinformatics by two (2), Lecture Notes In Networks And Systems by two (2), Procedia Computer Science by two (2) and Smart Innovation Systems and Technologies by two (2).

Table 5: Journals and conferences

Source	Documents #
ACM International Conference Proceeding Series	5
Journal Of Emerging Technologies In Accounting	3
International Journal Of Scientific And Technology Research	2
Issues In Accounting Education	2

Source	Documents #
Lecture Notes In Computer Science Including Subseries Lecture Notes In Artificial Intelligence And Lecture Notes In Bioinformatics	2
Lecture Notes In Networks And Systems	2
Procedia Computer Science	2
Smart Innovation Systems And Technologies	2

Source: authors' work.

The publication authors origin is shown in the Table 6. The United States of America leads with 24 publications. They are followed by India (16), China (9), Malaysia (5), Saudia Arabia (5), Indonesia (4), United Kingdom (4), United Arab Emirates (3), Portugal (2) and South Korea (2).

Table 6: Publications author origins

Country/Territory	Documents #
United States of America	24
India	16
China	9
Malaysia	5
Saudi Arabia	5
Indonesia	4
United Kingdom	4
United Arab Emirates	3
Portugal	2
South Korea	2

Source: authors' work.

Authors institutions represented in Table 7. show a vast variety. Only two institutions have more than two publications. Those are Asia Pacific University of Technology and Innovation (4) followed by King Abdulaziz University (3). The remaining institutions record two publications per institution.

Table 7: Authors' institutions

Affiliation	Documents #
Asia Pacific University of Technology and Innovation	4
King Abdulaziz University	3
Seoul National University College of Medicine	2
Kyung Hee University	2
Saint Joseph's University, United States	2
Dayalbagh Educational Institute	2
Shanghai Polytechnic University	2
Universidade do Minho	2
University of North Texas	2
Chaoyang University of Technology	2
Northwest Missouri State University	2
California State University, Los Angeles	2
London South Bank University	2
Arkansas State University	2
ABES Engineering College	2
National Taichung University of Science and Technology	2

Source: authors' work.

There are authors with more than one publication on the corresponding research subject. Albeshri, A., Mehmood, R. and Suma, S. record three (3) publications, which sets them as the

most fruitful authors on this subject. The remaining authors in table 8. show two (2) publications per author.

Table 8: Authors

Author	Documents #
Albeshri, A.	3
Mehmood, R.	3
Suma, S.	3
Balan, S.	2
Bandi, A.	2
Chang, H.	2
Chen, D.	2
Hou, H.Y.	2
Ko, I.	2
Lee, C.F.	2
Okechukwu, O.C.	2
Rastogi, R.	2
Santos, M.Y.	2
Subramanian, P.	2

Source: authors' work.

The following part of the Results chapter consists of the text mining process. Keyword co-occurrence analysis with visual mapping is shown here.

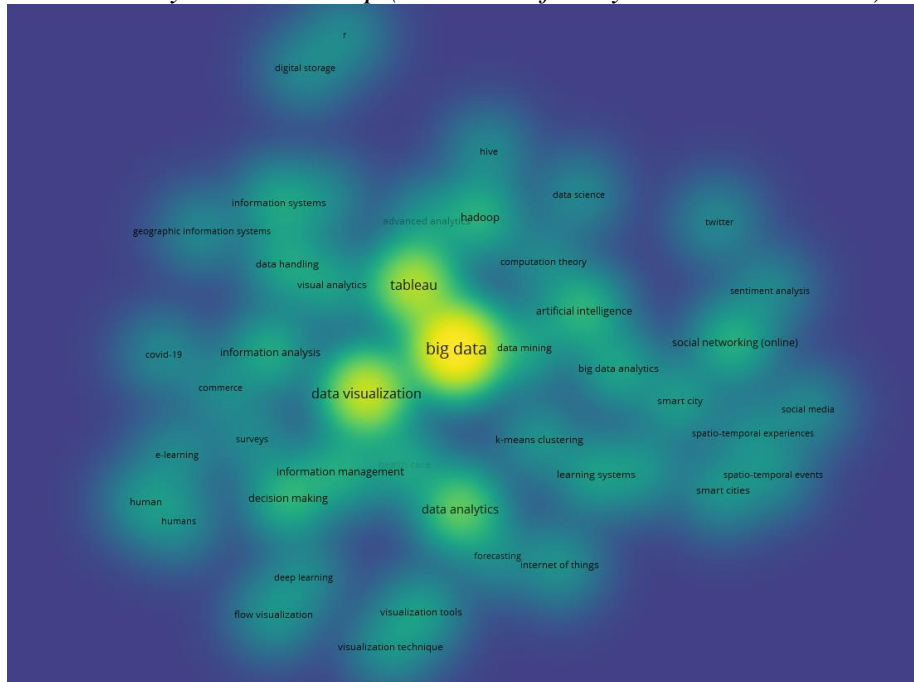
Text mining process

There are three types of maps presented, with the first one showing the actual keyword network, the second showing the same network but structured per research published year and lastly, the keyword network heatmap. Furthermore, keyword clustering is in the last section of this chapter denoting all researched keywords and afterward their average position per year, total link strength and occurrence. For the aforementioned topics, the VOSviewer tool is used with 86 publications analyzed. The main keywords detected are Big Data, Tableau, Data visualisaiton and Data analytics. The nodes are larger if they are researched more often with the link between them being thicker if they are set with a shorter distance between each other. The shorter distance between the nodes means that those keywords are mentioned regularly together (Qiang et al., 2022). The research set a minimum keyword occurrence of 3 which resulted in 47 publications, 5 clusters, 416 links and a total link strength of 864 across all keywords.

Figure 1. presents the research keyword network map. It can be seen that Big Data, Data visualisation, Visualisation, Data analytics and Tableau are the most commonly used keywords. Every colour represents a different cluster which in this case consists of five (5) of them.

Figure 3. shows the research keywords heatmap. The brighter the colour around the keyword means a higher keyword occurrence. Those highlighted keywords are Big Data, Data visualisation and Tableau.

Figure 3: VOSviewer keywords heatmap (minimum of 3 keyword co-occurrence)



Source: authors' work using VOSviewer and Scopus.

Table 9. shows the researched keywords. They are structured by cluster, links, total link strength and occurrences. The following keywords have the highest number of links. Big Data with 45, Data visualisation (37), Tableau (33), Data analysis (27), artificial intelligence (25), decision making (25), information management (25), data mining (23), advanced analytics (22) and information system with 21 links. The remaining keywords have lower than 20 links. Furthermore, Big Data, Data visualisation and Tableau keywords show the strongest links with 204 (Big Data), 124 (Data visualisation) and Tableau (100). The remaining keywords have a lower link strength than 100. The same keywords have the highest occurrence as well with 57 for Big Data, 31 for Data visualisation and 26 for Tableau. The remaining keywords have occurrences below 26. The three highest ranked keywords represent the three different clusters with Big Data in Cluster 1, Data visualisation in Cluster 2 and Tableau in Cluster 3. Those clusters represent the aforementioned keywords very well as they are interconnected with the other terms which are regularly researched together as shown in Table 9.

Table 9: All keywords per cluster, links and occurrences

ID	Label	Cluster	Links	Total link strength	Occurrences
43	artificial intelligence	1	25	41	9
59	big data	1	45	204	57
62	big data analytics	1	17	24	6
112	computation theory	1	12	16	3
162	data mining	1	23	36	6
374	internet of things	1	11	16	4
402	learning systems	1	20	35	5
421	machine learning	1	18	30	4
587	sentiment analysis	1	7	10	3

ID	Label	Cluster	Links	Total link strength	Occurrences
596	smart cities	1	15	29	4
597	smart city	1	19	36	5
610	social media	1	9	12	3
615	social networking (online)	1	20	46	8
630	spatio-temporal events	1	13	25	3
631	spatio-temporal experiences	1	13	25	3
696	twitter	1	7	10	3
146	data analytics	2	27	67	15
173	data visualization	2	37	124	31
186	decision making	2	25	51	9
268	flow visualization	2	11	19	4
272	forecasting	2	12	18	3
306	health care	2	16	28	6
352	information analysis	2	20	40	7
383	k-means clustering	2	15	24	4
652	surveys	2	12	16	3
723	visualization technique	2	13	21	4
724	visualization tools	2	16	28	5
6	advanced analytics	3	22	26	4
157	data handling	3	15	27	6
204	digital storage	3	7	9	3
282	geographic information systems	3	12	19	3
360	information systems	3	21	37	6
362	information use	3	15	22	3
538	r	3	5	8	3
655	tableau	3	33	100	26
713	visual analytics	3	16	25	5
105	commerce	4	15	17	3
132	covid-19	4	15	18	3
191	deep learning	4	16	21	3
228	e-learning	4	14	18	3
332	human	4	11	17	4
336	humans	4	11	16	3
353	information management	4	25	39	7
168	data science	5	6	7	3
300	hadoop	5	15	27	8
329	hive	5	8	12	3

Source: authors' work.

The average results for all keywords are shown in Table 10. The table consists of research clusters that have average values set for the year, total link strength and occurrences values. Cluster 1 shows the highest values for total link strength (16.5) and occurrences (1.9), followed by Cluster 2, total link strength (7.9) and occurrences (1.4), Cluster 3 total link strength (7.1) and occurrences (0.8), Cluster 4 total link strength (2.3) and occurrences (0.6) and Cluster 5 total link strength (3.1) and occurrences (0.46). On average spatio-temporal events and spatio-temporal experience from Cluster 1 show the highest total link strength (38.3) and occurrences (3.3) of all keywords. The lowest keywords link strength on average is shown for Covid-19 and Deep learning (0) keywords which also indicate (0) for occurrences. Typically, all Clusters have on average 2018. year as the most fruitful year for the research terms, while only Cluster 4 indicates 2020. year as its threshold. Cluster 4 consists of Covid-19 and Deep learning keywords among others, that have been more researched in that time period and thus explains the difference from other clusters.

Table 10: All keywords per cluster, year, total link strength and occurrences on average basis

ID	Label	Cluster	Year (on average)	Total link strength	Occurrences
Cluster 1 - average			2018.6	16.5	1.9
43	artificial intelligence	1	2018.3	8.7	0.9
59	big data	1	2018.8	7.5	1.1
62	big data analytics	1	2019.2	8.5	1.1
112	computation theory	1	2016.7	1.0	0.1
162	data mining	1	2017.3	5.2	0.6
374	internet of things	1	2020.3	26.0	2.2
402	learning systems	1	2020.4	11.2	1.7
421	machine learning	1	2019.8	14.0	1.9
587	sentiment analysis	1	2019.0	4.7	1.4
596	smart cities	1	2017.5	31.0	2.9
597	smart city	1	2017.6	25.0	2.3
610	social media	1	2019.3	23.0	3.4
615	social networking (online)	1	2018.0	16.9	1.9
630	spatio-temporal events	1	2018.3	38.3	3.3
631	spatio-temporal experiences	1	2018.3	38.3	3.3
696	twitter	1	2019.3	4.3	2.5
Cluster 2 - average			2018.7	7.9	1.4
146	data analytics	2	2019.0	6.3	1.3
173	data visualization	2	2019.0	5.5	0.8
186	decision making	2	2018.7	8.2	1.2
268	flow visualization	2	2017.5	5.5	1.0
272	forecasting	2	2018.7	9.7	2.5
306	health care	2	2019.0	24.5	2.6
352	information analysis	2	2018.6	6.6	1.4
383	k-means clustering	2	2019.3	5.8	1.6
652	surveys	2	2017.7	6.3	1.0
723	visualization technique	2	2019.3	0.5	0.0
724	visualization tools	2	2019.0	7.6	1.6
Cluster 3 - average			2018.8	7.1	0.8
6	advanced analytics	3	2017.8	11.5	1.5
157	data handling	3	2018.8	3.2	0.6
204	digital storage	3	2017.3	3.7	1.3
282	geographic information systems	3	2018.0	14.0	1.2
360	information systems	3	2018.0	6.7	0.6
362	information use	3	2018.7	9.0	0.4
538	r	3	2017.3	3.0	0.5
655	tableau	3	2019.0	3.9	0.8
713	visual analytics	3	2017.8	8.6	0.7
Cluster 4 - average			2020.1	3.08	0.46
105	commerce	4	2019.0	5.3	0.8
132	covid-19	4	2021.3	0.0	0.0
191	deep learning	4	2021.0	0.0	0.0
228	e-learning	4	2021.7	1.0	0.6
332	human	4	2018.8	5.3	0.4
336	humans	4	2019.0	6.7	0.5
353	information management	4	2020.1	3.3	0.9
Cluster 5 - average			2018.9	2.3	0.6
168	data science	5	2020.0	0.7	0.8
300	hadoop	5	2018.3	2.8	0.5
329	hive	5	2018.3	3.3	0.7

Source: authors' work.

The Tables 9. and 10. represent the research findings in full aspect, showing all the information available through the VOSviewer tool. Therefore, the findings indicate that Cluster 1 represents the highest ranking with Big Data, Data visualisation and Tableau being the three most used keywords for the research timeframe.

Conclusion

Big Data term rightfully represents its meaning, as every day huge amounts of data are created. It is one of the few fields where practical implementation was ahead of scientific research. Due to the rise in technology development new ways of gathering data, analyzing and visually presenting them are needed. One of the tools for data visualization is Tableau which enables its users to prepare, analyze, collaborate, and share vital data insights. Therefore, this paper combines both terms “Big Data” and “Tableau” to show the scientific contribution across various subject areas. Bibliometric analysis and text mining process were implemented using the Scopus research database and VOSviewer tool. The results indicated a total number of 86 publications in the 2015 to 2023 timeframe. The majority of the publications were between 2018. and 2021. years, with an average of 13 per year. The subject area with the majority of publications, 59 of them is in Computer Science. ACM International Conference Proceeding Series recorded the highest number of publications (5), while the United States of America was the most fruitful authors’ origin country. From the higher institutions’ perspective, the Asia Pacific University of Technology and Innovation attributed the most to the research findings with four (4) publications. Abeshri, A., Mehmood, R. ad Suma, S. were the most fruitful authors of the researched topics. According to the text mining process and VOSviewer mapping technique, three keywords were recorded as the most repeating ones. Those keywords are Big Data (Cluster 1), Data visualization (Cluster 2) and Tableau (Cluster 3). Furthermore, Big Data has recorded 45 links, a link strength of 204 and the highest occurrence of 57 times. The data visualization keyword follows with 37 links, a link strength of 124 and 31 occurrences. Lastly, Tableau follows with 33 links, 100 link strengths and 26 occurrences. On average, Cluster 1 showed the highest total link strength and occurrences, while Cluster 5 showed the lowest. Furthermore, 2018. year is the most fruitful year for all Clusters on average, while only Cluster 4 indicated 2020. year as its threshold. The limitations of this preliminary research are in only observing the bibliometric data of one research database. Furthermore, the expansion of this research might be an additional structure of Clusters per similar topics and an explanation of the comprehensive literature accordingly with further specifying the Cluster topic. Visual representation of Tableau software in a case study format would be a great addition too. This research is a good foundation for both practical and scientific implications which are in need of efficient Big Data analysis.

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LEGAL AND ECONOMIC ANALYSIS OF EUROZONE COUNTRIES IN THE WAKE OF HIGH INFLATION RATES: MULTIVARIATE METHOD APPROACH

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Abstract

Economic convergence and divergence are important topics in economics and finance because they offer insights into how economies develop and grow over time and can offer policymakers better understanding of underlying factors. The main research question of this paper is whether there is clear trend of convergence and divergence tendencies for most Eurozone countries. Variables used in this paper are Maastricht convergence criteria variables, so firstly we examine these criteria as an important legal framework that help ensure the stability and sustainability of the Eurozone. Secondly, we examine convergence and stability in 18 Eurozone countries from 2015-2022 by analysing changes in cluster memberships and then by analysing trends of convergence and divergence tendencies. Cluster analysis with Ward method is used based on Squared Euclidean distance metric. The fact that there are no perfect clustering results, our results point out that there are some changes in the members of the groups, but there are 4 clusters in all years. From 2015 to 2022, based on Squared Euclidean distance metric, convergence tendencies can be seen for Germany, Greece, Spain and Slovenia and divergence for Ireland. Based on our research question, the results show that there is no clear trend towards convergence or divergence for most Eurozone countries.

Keywords: Legal analysis, Cluster analysis, Squared Euclidean distance metric, Eurozone, Maastricht Convergence Criteria

JEL classification: C38, F45

Introduction

Economic convergence and divergence are important concepts in economics and finance, as they offer insights into how economies develop and grow over time. From the point of view of the countries of the European Union, convergence is important when joining the economic and monetary union and adopting the euro as the common currency so that all the countries which strive for joining would have similar legal and economic backgrounds. In order to fulfil it, countries must achieve the nominal convergence criteria in accordance with the reference values set out by European legislation. From the aspect of analysis of Eurozone countries, the focus is on stability and sustainability of their fiscal positions (fiscal nominal criteria) and the realization of real convergence in the form of real GDP.

The main research question is whether there is clear trend of convergence and divergence tendencies for most Eurozone countries using Squared Euclidean distance matrix in the period analysed (2015-2022). A further motivation for the paper is to explore clustering patterns and see changes in cluster memberships.

The main contribution of this paper is in its use of Cluster analysis as a type of multivariate method which is not typical convergence testing method and time period analysed. On the other hand, most papers focused on topics of convergence and divergence are oriented towards regression equations testing. A different approach and time period could lead to different results and conclusions.

Legal and economic background

Maastricht Treaty or the Treaty on European Union (TEU), is the foundation treaty of the European Union (EU). Named after the Dutch city of Maastricht located near the borders with Belgium and Germany, was created as a result of several years of discussions between the states on deepening European integration. The contract was signed on 7 February 1992, by representatives of 12 countries. The Maastricht Treaty entered into force on 1 November 1993, which officially established the European Union. Since then, 16 more countries have joined to the EU and accepted the provisions of the Maastricht Treaty. Treaty is significant in that it laid the foundations for monetary integration of European Union member states. The contract enables the introduction of a unique European currency, euro. The contract established the European Central Bank (ECB) and the European System of central banks (ESCB), and their goals are described in the Article 13 of TEU.

Treaty on the Functioning of the European Union (TFEU) and Treaty on European Union (TEU) are two treaties forming constitutional basis of the EU. The TFEU was originally signed in Rome in 1957 (Treaty of Rome) and has been amended several times since then, most notably by the Treaty of Lisbon in 2007. The TFEU sets out the legal framework for the nominal convergence criteria, including the procedures for assessing whether non-euro member states meet the criteria.

The nominal convergence criteria, that is, the Maastricht criteria, are the criteria that must be met by EU member states in order to enter the third phase of Economic and monetary union (EMU) and to implement the euro as an official currency. These criteria were elaborated based on the provisions of the Article 140(1) of the Treaty on functioning of the European Union (TFEU).

According to the Article 140(1) of TFEU, at least once every two years, The European Commission (EC) and the European Central Bank (ECB) reports to the European Council on the progress made by the Member States with a derogation in fulfilling their obligations regarding the achievement of economic and monetary union.

The European central bank applies the provisions of TFEU and publishes the Convergence report every two years. Last report was published in June 2022.

Focusing on framework for analysis of **price stability** developments, three best performing EMU Member States in terms of price stability has been applied by taking the unweighted arithmetic average of the rates of inflation. Three member states with lowest inflation were

France (3,2%), Finland (3,3%) and Greece (3,6%). Article 1 of Protocol (No 13) on the convergence criteria annexed to TEU and TFEU stipulates that inflation of the non-EMU country observed “must not exceed more than 1,5% the three best performing Member States in terms of price stability” (Convergence report, 2022, p. 7).

Focusing on framework for analysis of fiscal developments, Article 2 of Protocol (No 13) on the convergence criteria annexed to TEU and TFEU stipulates that **General government budget deficit**: share of the general government budget deficit in gross domestic product (GDP) must not exceed 3% at the previous financial year. If not, the deficit is allowed to be temporarily above (but still close to) the level of 3%. **General government debt** or **public debt**: share of gross general government debt in GDP must not exceed 60% at the end of the previous financial year. If not, the share must show tendency to decrease significantly and must be approaching with the satisfactory dynamics reference value. In order for a member state to be able to meet the criteria of public finances, it must not be in the process of an excessive deficit procedure (EDP) which is determined by the Article 126(2-3) of TFEU.

Focusing on framework for analysis of exchange rate developments, Article 3 of Protocol (No 13) on the convergence criteria annexed to TEU and TFEU stipulates that **exchange rate stability** is met when non-EMU member state respected “the normal fluctuation margins provided for by the exchange-rate mechanism on the European Monetary System without severe tensions for at least the last two years before the examination” (Convergence report, 2022, p. 12). By successfully participating in exchange-rate mechanism (ERM II) the country confirms that it is capable of functioning under the conditions of a stable exchange rate against the euro. To be judged successful, the state must maintain nominal exchange rate of the national currencies within a standard range of fluctuations of $\pm 15\%$ around the central parity with the euro. As a rule, the countries participating in the mechanism should keep their exchange rates very close of the central parity despite wide fluctuations (Government of Croatia & Croatian national bank, 2018).

Focusing on framework for analysis of long-term interest rate developments, Article 4 of Protocol (No 13) on the convergence criteria annexed to TEU and TFEU stipulates that nominal **long-term interest rates** does not exceed by more than two percentage points that the three best performing Member States in terms of price stability. “The long-term interest rates of the three countries with the lowest inflation rate included in the calculation of the reference value for the price stability criterion were 0.3% (France), 0.2% (Finland) and 1.4% (Greece). As a result, the average rate is 0.6%” (Convergence report, 2022, p. 14).

As of 1 January 2023, when Croatia adopted the euro as an official currency, seven countries (Bulgaria, Czech Republic, Denmark, Hungary, Poland, Romania and Sweden) are EU members but do not use the euro. Protocol (No 16) on certain provisions relating to Denmark, annexed to the TEU and TFEU, provides that, in view of the notice given to the Council by the Danish Government on 3 November 1993, Denmark has no intention to participate in the third stage of economic and monetary union. Of the member states outside the euro area, only Denmark has “*opt-out*” clause.

Table 1: Fulfilment of convergence criteria and compatibility of legislation

Countries with derogation	Price stability criterion	General government budget deficit	General government debt	Exchange rate stability criterion	Long- term interest rates	Legal compatibility
Bulgaria	NO	NO	YES	YES	YES	NO

Countries with derogation	Price stability criterion	General government budget deficit	General government debt	Exchange rate stability criterion	Long- term interest rates	Legal compatibility
Czech Republic	NO	NO	YES	NO	YES	NO
Hungary	NO	NO	NO	NO	NO	NO
Poland	NO	YES	YES	NO	NO	NO
Romania	NO	NO	YES	NO	NO	NO
Sweden	YES	YES	YES	NO	YES	NO

Source: authors, based on Convergence report (June 2022).

Table 1. shows fulfilment of nominal convergence criteria and law compatibility of member states outside the euro area. Not a single country meets the criteria from an economic and legal point of view. Sweden is the only country which meets the economic criteria, but does not participate in exchange- rate mechanism (ERM II) and does not have a harmonized legal framework.

Achieving legal convergence is a condition for full membership in the economic and monetary union. In order to achieve legal convergence, it is necessary to harmonize nationally the legislation of the EU member state, including the statute of its central bank, with the TEU and TFEU and with the statute of ESCB and ECB.

On the other hand, Eurozone countries have faced different types of sanctions over the years for failing to comply with the criteria. Excessive deficit procedure (EDP), which is determined by the Article 126(2-3) of TFEU is launched when a member state's budget deficit exceeds the 3% of GDP limit. The procedure requires the country to submit a plan to reduce its deficit to an acceptable level within a given timeframe. If the country fails to comply with the plan, the European Commission can impose fines and other sanctions. Out of the 19 Eurozone countries, 17 countries have been at least once in a procedure between 2000 and 2019 (Vespermann & Zuber, 2021).

As a sort of continuation of the Maastricht criteria, the Stability and Growth Pact (SGP) represents a set of rules which aim to ensure that EU countries pursue sound public finances, coordinate their fiscal policies and avoid excessive deficits and debt. The Pact was introduced by the adoption of the Resolution of the European Council in Amsterdam, in June of 1997. The Pact entered into force on January 1 1999. If the country is in EDP, the corrective arm (Regulation 1467/97) of the SGP is applied. Šimović (2005) believes that the Pact, in the long-term, is the best way to achieve stability in international frameworks.

The Maastricht convergence criteria are important for Eurozone countries. They are legal and economic framework that help ensure the stability and sustainability. Violation of the provisions of the criteria by the member state may face sanctions and corrective measures from the EU. According to the Article 260(1-2) of TFEU, European Commission may impose fines on member states that do not comply with the rules.

Brief literature overview

There are numerous studies that use the cluster analysis method for the purpose of proving convergence between the countries of the European Union or the Eurozone.

Haynes & Haynes (2016) used cluster analysis method to explore whether there is convergence between countries that share euro after 2002. 13 different variables were used that include nominal convergence criteria variables, labour economy indicators, trade and investment indicators. The research in this paper shows that there are important differences in the detail of how Southern European countries have evolved inside the euro area and that variable labour productivity per hour worked had major influence on differentiating euro cluster memberships. “The paper concludes that in the last decade the convergence of countries sharing the euro has been limited, by the joining of new countries and circumstances of the global economic crisis” (Haynes & Haynes, 2016, p. 1).

Burian & Brčak (2014) and Burian & Frydrych (2017) tested Optimum currency area theory set by Mundell (1961), McKinnon (1963) and Kenen (1969). Both papers used OCA variables (openness of countries, long-term interest rates, GDP in PPP, position in business cycle, flexibility in labour market and price level) to explore convergence in the EU. Theory was tested by cluster analysis method on selected EU countries. Both papers draw a conclusion that there is no permanent significant convergence process in the EU.

Zimkova, Farkašovsky & Szostak (2018) focused on two different cluster analysis. First analysis is focused on nominal convergence criteria variables solely, illustrating the extent to which the countries being investigated (26 EU countries excluding UK and Denmark) meet the convergence criteria set out in the Maastricht treaty. The second analysis includes attitudes and perception toward the euro (Eurobarometer reports). The paper concludes that strong economic standing is coupled with positive attitudes toward the common currency while, on the other hand, that an economic downturn need not be associated with negative perceptions of the euro – which is evidenced by examples of Greece and, to a lesser degree, Portugal or Spain.

Krčilkova (2006) focused on three cluster analysis of EU-25 countries (first 1993-1997; second 1998-2001; third 2002-2005). Both nominal and real variables are used to prove convergence between countries. The paper concludes with evidence for significant convergence in the economies of the member countries during the period analysed (1997-2005).

On the other hand, Irac & Lopez (2015) used cluster analysis method to explore convergence (first period 1999-2007; second period 2007-2012) between 12 Eurozone countries who have joined euro area before 2007. Authors used 22 structural factors split in 4 fields (regulation, quality of institutions, knowledge, labour mobilization). The paper concludes with no evidence of between-clusters convergence over the 1999-2012 period, a worrying point for European integration.

Miron, Dima & Paun (2009) tested Romania’s real convergence for a period of 9 years (1999-2007) based on Euclidean distances and cluster methods. Author used real variables such as real GDP growth, inflation rate, GDP in PPP, unemployment rate, real interest rate and public budget deficit to find evidence for convergence towards the euro area average. Study shows important distance towards euro area. “A lot of things should be improved, such as productivity level, external competitiveness or technological and innovative level” (Miron et al., 2009, p. 15).

Methodology and data

Hierarchical cluster analysis is used to explore Eurozone country patterns in order to obtain information on which country is converging and which is diverging from the Eurozone (euro area) average. One of the methods of measuring convergence is based on Squared Euclidean distances.

$$d_E^2(x_k, x_l) = \sum_{j=1}^m (x_{kj} - x_{lj})^2$$

Same method was used by Miron et al. (2009) to find evidence of Romania's real convergence towards the Eurozone average and by Burian & Frydrych (2017) to test Optimum currency area theory.

The clustering algorithm used is Ward's clustering algorithm (Ward, 1963). It is a hierarchical clustering algorithm that minimizes the variance within each cluster. "Method starts from the assumption that all countries are different and then seeks to group them into hierarchical clusters on the basis of their similarity" (Haynes & Haynes, 2016, p. 5).

8 cluster analyses were performed, one cluster analysis for every year from the period 2015-2022, which are applied to 18 countries + Eurozone (euro area) average (objects) and five variables. Four variables (inflation rate, long-term interest rates, general government net lending/borrowing and general government gross debt) represent the 4 Maastricht criteria variables and real GDP per capita represents the fundamental variable of real economic convergence.

The exchange rate stability criterion is excluded from the analysis because it is important criterion for countries that are not member of the Eurozone. Also, Estonia was excluded from the analysis due to the lack of data on long-term interest rates on the Eurostat database. This data is not directly applicable to Estonia due to very low level of general government gross debt (Parlement, 2010).

Table 2: List of variables used in analysis

VARIABLES	VARIABLE MEASUREMENT	SOURCE
<i>MAIN ECONOMIC VARIABLE</i>		
Real GDP per capita	Chain linked volumes, euro per capita	EUROSTAT (CODE: SDG_08_10)
<i>MONETARY VARIABLES</i>		
Inflation rate - HICP	Annual average rate of change	EUROSTAT (CODE: TEC00118)
Long-term interest rates - EMU convergence criterion series	Annual yields	EUROSTAT (CODE: TEC00097)
<i>FISCAL VARIABLES</i>		
General government net lending (+)/net borrowing (-)	Percentage of gross domestic product (%GDP)	IMF WORLD ECONOMIC OUTLOOK DATABASE (OCTOBER 2022)
General government gross debt	Percentage of gross domestic product (%GDP)	IMF WORLD ECONOMIC OUTLOOK

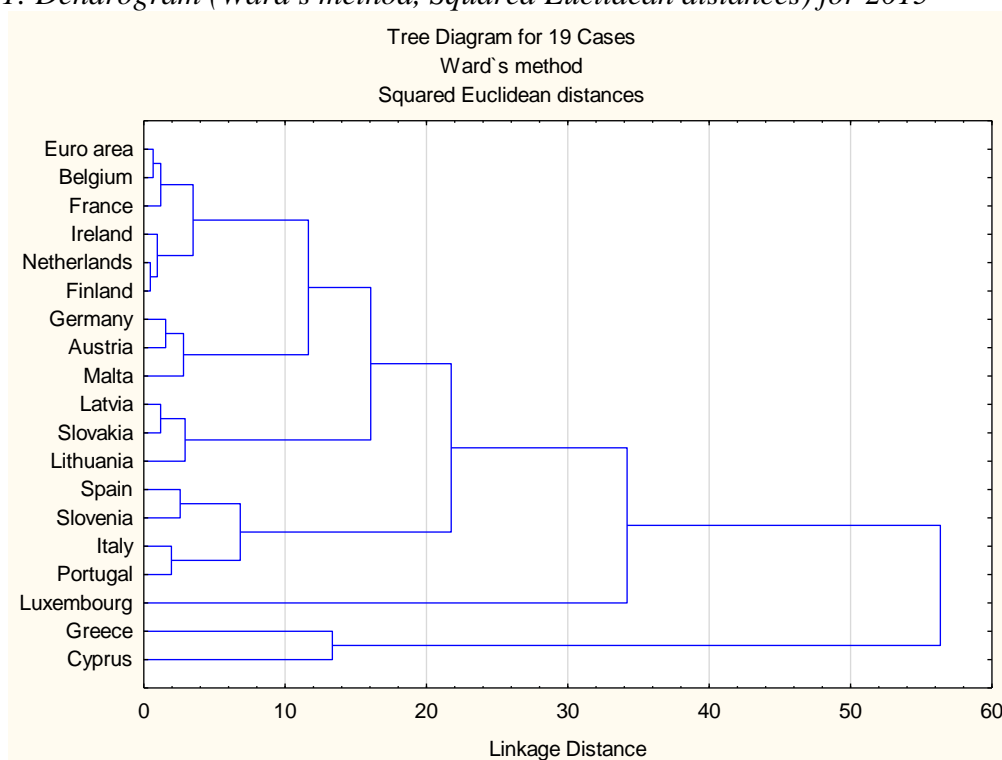
VARIABLES	VARIABLE MEASUREMENT	SOURCE
		DATABASE (OCTOBER 2022)

Source: Eurostat and IMF database.

Analysis results

The hierarchical cluster analysis was applied on the standardized variables (real GDP per capita, inflation rate – HICP, long-term interest rates, general government net lending/net borrowing and general government gross debt). By transforming the original values into standardized variables, Z-scores allows to compare and analyse data from different sources and to reduce the impact of any variable with a greater variance having more impact on the model. Using Eurozone average as a reference point in Cluster analysis, the analysis can provide a standardized reference point for comparing the performance of countries within the Eurozone and can help identify patterns that may not be apparent when looking at individual countries.

Figure 1: Dendrogram (Ward's method, Squared Euclidean distances) for 2015



Source: software calculation (TIBCO Statistica version 14).

The four-cluster solution given by the Ward's method with Squared Euclidean distances was chosen as the best solution. Cluster results are presented in figures called dendrograms. Figure 1. shows the dendrogram obtained for 2015. The analysed countries are listed along the left vertical axis and linkage distance on the horizontal axis. In the four-cluster solution for 2015, the first cluster consists of the following 11 countries: (Belgium, Germany, Ireland, France, Latvia, Lithuania, Malta, Netherlands, Austria, Slovakia, Finland and Eurozone (euro area) average), the second cluster of 1 country (Luxembourg), the third of 4 countries (Spain, Italy, Slovenia, Portugal), and the fourth of 2 countries (Greece, Cyprus).

Portugal, Slovenia) and the fourth of 2 countries (Greece and Cyprus). Chosen 4 clusters were categorized into 4 groups: “Core of the Eurozone (Cluster 1)”, “Advanced Eurozone countries (Cluster 2)”, “Mixed Periphery countries (Cluster 3)”, “South Periphery countries (Cluster 4)”.

In 2015, Core of the Eurozone (Cluster 1) includes countries with high real GDP p/c (except Latvia, Lithuania, Malta and Slovakia), low inflation rates, low long-term interest rates, low rates of general government budget deficit and low general government gross debt (except Belgium and France). Advanced Eurozone countries (Cluster 2) includes countries with highest real GDP p/c, low inflation rates, low long-term interest rates, low rates of general government budget deficit and low general government gross debt. Mixed Periphery countries (Cluster 3) includes both countries of South and New Periphery with below average real GDP p/c, low inflation rates, high average long-term interest rates, above average rates of general government budget deficit and government gross debt. South Periphery countries (Cluster 4) includes countries with below average real GDP p/c, low inflation rates, above average long-term interest rates, high rates of general government budget deficit and high general government gross debt.

Squared Euclidean distance metric measures distance between two data points, in our case countries and calculates distances between variables selected in the model. The result is the single value that represents this distance. As Luxembourg is the most distant country of all in the distance matrix, it is connected in a separate cluster and represents outlier in the model.

Table 3. shows comparison of the Eurozone cluster patterns from 2015-2022. The fact that are no perfect clustering results, our results point out that there are some changes in the members of the groups, but there are 4 clusters in all years.

In 2020, when COVID-19 pandemic began, significant changes in cluster formations can be seen. For the first time in observed period, Germany moved from Core of the Eurozone (Cluster 1) to Mixed Periphery countries (Cluster 3). The reason for the shift lies in the fact that for the first time Germany realized a general government budget deficit (-4,3%) which is above the threshold of Maastricht criterion (3%), but still lower than the euro area (Eurozone) average (-7,1%). All the countries of the first cluster had larger general government budget deficits, so Finland also found itself in the third cluster for the first time. It is important to note that the clusters defined by characteristics in 2015 are not the same from 2020 onwards. Clusters with the same characteristics are Advanced Eurozone countries (Cluster 2) and South Periphery countries (Cluster 4).

In 2022, the world witnessed a tumultuous year marked by the intensifying Russian- Ukrainian conflict and a sharp rise in inflation rates, causing widespread economic uncertainty and geopolitical tensions. The formed clusters give us a clearer picture of the countries position in the Eurozone. Once again, Ireland and Luxembourg formed Advanced Eurozone cluster based on highest Real GDP p/c, inflation rates that are lower than Eurozone average (8,4%), lower long-term interest rates than Eurozone average (1,9%), adequate general government budget deficit and general government gross debt which is below the threshold of Maastricht criteria (-3%; 60%) and below Eurozone average (-3,8%; 92,9%). Latvia and Lithuania formed Mixed Periphery cluster based on extremely high inflation rates. Inflation rate for Lithuania is 18,9% and for Latvia 17,2% and the Eurozone average rate is 8,4%. Greece and Italy formed South Periphery cluster based on above average general government budget deficit (-4,4%; -5,5%) and highest rates of general government gross debt (177,6%; 147,2%). Other 12 countries

formed Core of the Eurozone cluster. Cluster is formed based on higher Real GDP p/c, lower long-term interest rates than Mixed Periphery cluster and South Periphery cluster.

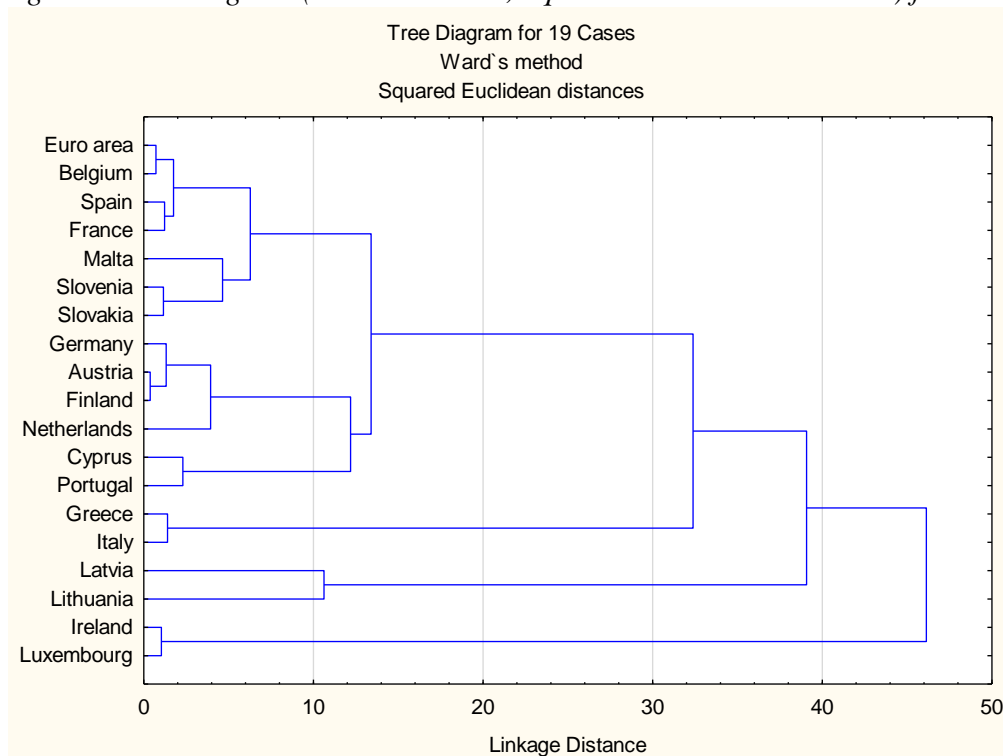
Results of cluster formation show interaction of all variables in the model. Implications of high deficit and gross debt in final two clusters cannot be attributed solely to these variables but are likely result of interactions with other variables. This analysis allows for a more comprehensive assessment of variables driving economic performance and enables policymakers to identify clusters of countries that share similar economic challenges so they could implement specific policies.

Table 3: Comparison of the Eurozone clusters from 2015-2022

Cluster 1	Core of the Eurozone						
Cluster 2	Advanced Eurozone countries						
Cluster 3	Mixed Periphery countries (South + New Periphery countries)						
Cluster 4	South Periphery countries						
2015	2016	2017	2018	2019	2020	2021	2022
Euro Area	Euro Area	Euro Area	Euro Area	Euro area	Euro area	Euro Area	Euro area
Belgium	Belgium	Belgium	Germany	Belgium	Belgium	Belgium	Belgium
Germany	Germany	Germany	Ireland	Germany	France	Germany	Germany
Ireland	Ireland	Ireland	Malta	Spain	Lithuania	Spain	Spain
France	Latvia	Cyprus	Netherlands	France	Malta	France	France
Latvia	Lithuania	Malta	Austria	Cyprus	Austria	Latvia	Cyprus
Lithuania	Malta	Netherlands	Slovenia	Malta	Slovenia	Lithuania	Malta
Malta	Netherlands	Austria	Finland	Austria	Slovakia	Netherlands	Netherlands
Netherlands	Austria	Slovenia	Luxembourg	Portugal	Ireland	Austria	Austria
Austria	Finland	Slovakia	Belgium	Slovenia	Luxembourg	Slovenia	Portugal
Slovakia	Luxembourg	Finland	Spain	Finland	Germany	Slovakia	Slovenia
Finland	Spain	Luxembourg	France	Ireland	Latvia	Finland	Slovakia
Luxembourg	France	Spain	Latvia	Luxembourg	Netherlands	Ireland	Finland
Spain	Italy	France	Lithuania	Latvia	Finland	Luxembourg	Ireland
Italy	Portugal	Italy	Slovakia	Lithuania	Greece	Cyprus	Luxembourg
Portugal	Slovenia	Latvia	Greece	Netherlands	Spain	Malta	Latvia
Slovenia	Slovakia	Lithuania	Italy	Slovakia	Italy	Portugal	Lithuania
Greece	Greece	Portugal	Cyprus	Greece	Cyprus	Greece	Greece
Cyprus	Cyprus	Greece	Portugal	Italy	Portugal	Italy	Italy

Source: authors construction.

Figure 2: Dendrogram (Ward's method, Squared Euclidean distances) for 2022



Source: software calculation (TIBCO Statistica version 14).

One of the methods of measuring divergence or convergence effects is based on Euclidean distances. As mentioned above, all values must be standardized or normalized. A higher Euclidean distance between different countries (or group of countries) means a lower convergence. Through the distance matrix, we assessed the convergence or divergence between individual Eurozone member countries and euro area (Eurozone) average. In Appendix A-1 distance matrix is shown for 2015, the year when Lithuania adopted the euro as its official currency. We could notice that Greece is farthestmost country towards Eurozone by indicators used in this study (distance 25.7). Closest country towards Eurozone is Belgium (distance 0.7).

In general, a distance of 0 indicates that two observations are identical in terms of their variable values. The diagonal elements of the matrix are all zero because the Squared Euclidean distance between an observation and itself is zero (see Appendix). As the distance between two observations increases, it means they are becoming more dissimilar. If we take the example of Belgium in 2016 (distance 6.8) it means that Belgium diverged from the Eurozone average, i.e. the distance between Belgium's vector and the Eurozone's vector grew.

From 2015 to 2019, based on a table of Euclidean distances of individual countries from the Eurozone average (Table 4.), convergence for Greece and Cyprus can be seen. Greece lowered distance from 25.7 to 17.6 and Cyprus from 10.7 to 3.5, which is evidence of strong convergence in that period. Slight convergence can be seen for Germany (from 4.0 to 3.6), Spain (from 5.5 to 3.2) and Slovenia (from 3.0 to 1.6). Strong divergence is noticeable for Netherlands (from 0.9 to 8.1) and Slovakia (from 2.6 to 6.3).

Table 4: Synthesis of Euclidean distances toward Eurozone 18 (2015-2022)

Convergence with euro area	2015	2016	2017	2018	2019	2020	2021	2022
Belgium	0.7	6.8	1.1	1.1	1.1	1.1	0.6	0.7

Convergence with euro area	2015	2016	2017	2018	2019	2020	2021	2022
Germany	4.0	3.1	2.5	3.0	3.6	3.0	2.6	1.6
Ireland	1.6	2.1	4.6	6.3	3.9	6.1	7.4	12.1
Greece	25.7	22.4	21.1	21.3	17.6	19.3	17.3	11.1
Spain	5.5	3.7	2.3	2.0	3.2	3.3	1.8	1.0
France	1.0	1.8	1.6	1.6	2.9	1.0	0.7	1.3
Italy	1.6	2.0	2.8	6.0	7.2	8.0	7.5	6.4
Cyprus	10.7	8.4	5.2	7.7	3.5	6.2	2.8	5.7
Latvia	3.3	3.3	6.0	4.5	6.6	4.3	2.7	11.0
Lithuania	5.6	4.4	11.5	5.2	4.6	3.1	8.9	16.6
Luxembourg	17.6	18.0	15.3	16.5	16.5	14.9	19.1	12.6
Malta	3.6	4.7	7.1	3.6	2.4	3.3	7.5	3.0
Netherlands	0.9	1.8	2.9	2.7	8.1	4.9	3.6	5.7
Austria	1.3	1.8	1.1	0.8	1.4	2.5	0.5	0.7
Portugal	4.2	3.6	5.0	2.9	3.1	2.2	5.2	2.0
Slovenia	3.0	1.0	0.8	1.1	1.6	1.1	0.9	0.8
Slovakia	2.6	3.4	1.7	3.2	6.3	6.1	1.6	2.7
Finland	1.1	0.8	1.6	1.8	0.8	1.2	2.0	1.6

Source: software calculation (TIBCO Statistica version 14).

In Appendix A-2 distance matrix is shown for 2020, the year marked by the COVID-19 crisis and the gradual growth of inflation. We could notice that Greece is still farthermost country (distance 19.3) and the closest country is now France (distance 1.0).

In Appendix A-3 distance matrix is shown for 2022, the year marked by the Russian-Ukrainian conflict and a sharp rise in inflation. We could notice that Lithuania is now farthermost country (distance 16.6) and the closest countries are Austria and Belgium (both with distance 0.7).

From 2020 to 2020, based on a table of Euclidean distances of individual countries from the Eurozone average (Table 4.), convergence for Germany (from 3.0 to 1.6), Greece (from 19.3 to 11.1), Spain (from 3.3 to 1.0), Italy (from 8.0 to 6.4) and Slovenia (from 1.1 to 0.8) can be seen. Divergence tendencies can be seen for Ireland (from 6.1 to 12.1) and Lithuania (from 3.1 to 16.6).

Finally, from 2015 to 2022, convergence tendencies can be seen for Germany, Greece, Spain and Slovenia and divergence for Ireland. Ireland, as one of the most developed countries of the Eurozone, diverged from the Eurozone average due to the fact that at the time of the COVID-19 pandemic, it left a good fiscal position compared to the other countries and in 2022 during high inflation, it had a lower inflation rate than the Eurozone average. On the other hand, in countries like Spain and Greece, convergence towards the Eurozone average is visible, not as a tendency to improve the overall fiscal position, but as a driving value in determining the average itself.

Conclusion

Hierarchical cluster analysis was used to explore Eurozone country patterns in order to obtain information on which country is converging and which is diverging from the Eurozone (euro

area) average. Although there were no perfectly defined clustering results and changes in group membership were observed, the hierarchical analysis consistently identified four clusters across all years.

Divergence or convergence among Eurozone countries was measured using the Squared Euclidean distance metric. Through the distance matrix, we assessed the convergence or divergence between individual Eurozone member countries and Eurozone (euro area) average. From 2015 to 2022, convergence tendencies can be seen for Germany, Greece, Spain and Slovenia and divergence for Ireland.

Although mentioned Eurozone countries showed evidence of convergence or divergence, the majority of countries did not display noticeable movements in either direction. Therefore, it was inconclusive for our research question whether there was a clear trend towards convergence or divergence in the distance between individual Eurozone countries and the Eurozone (euro area) average.

In order to reach clear conclusions in testing convergence and divergence among the countries of the Eurozone, it may be necessary to try different combinations of distance metrics, linkage and scaling methods to determine the most appropriate methodology to test convergence and divergence tendencies. In conclusion, results of this paper can be interesting to policymakers to design targeted economic policies to a certain cluster. They may consider to implement policies to reduce debt levels, such as fiscal consolidation measures in countries of Mixed and South periphery.

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Appendix

Table A-1: Distance matrix 2015

Case No.	Squared Euclidean distances (2015)																		
	Euro area	Belgium	Germany	Ireland	Greece	Spain	France	Italy	Cyprus	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Austria	Portugal	Slovenia	Slovakia	Finland
Euro area	0.0	0.7	4.0	1.6	25.7	5.5	1.0	1.6	10.7	3.3	5.6	17.6	3.6	0.9	1.3	4.2	3.0	2.6	1.1
Belgium	0.7	0.0	4.8	2.2	28.4	6.6	1.1	1.6	15.5	5.8	9.9	18.7	3.9	1.6	1.0	3.5	5.8	5.2	2.6
Germany	4.0	4.8	0.0	5.1	40.0	18.7	8.5	8.4	15.7	5.5	7.3	11.1	3.0	3.9	1.6	14.4	11.2	8.4	5.8
Ireland	1.6	2.2	5.1	0.0	29.8	7.5	2.3	4.5	12.5	6.6	8.1	10.3	6.8	0.6	2.4	8.7	5.2	5.1	1.1
Greece	25.7	28.4	40.0	29.8	0.0	20.4	26.0	18.8	13.3	35.2	31.2	61.5	37.9	32.6	34.2	19.4	20.6	29.6	29.9
Spain	5.5	6.6	18.7	7.5	20.4	0.0	2.5	4.4	14.0	10.1	12.1	34.1	14.8	7.2	11.6	3.7	2.6	4.9	5.0
France	1.0	1.1	8.5	2.3	26.0	2.5	0.0	1.8	14.0	5.5	8.8	21.8	6.6	1.7	3.5	2.8	2.9	3.0	1.4
Italy	1.6	1.6	8.4	4.5	18.8	4.4	1.8	0.0	10.5	8.0	9.9	26.2	7.8	4.4	4.2	2.0	3.9	5.8	4.2
Cyprus	10.7	15.5	15.7	12.5	13.3	14.0	14.0	10.5	0.0	13.8	6.8	28.6	20.0	13.7	16.2	17.3	6.5	11.1	11.2
Latvia	3.3	5.8	5.5	6.6	35.2	10.1	5.5	8.0	13.8	0.0	2.4	21.7	2.8	3.6	4.7	9.8	4.5	1.2	3.1
Lithuania	5.6	9.9	7.3	8.1	31.2	12.1	8.8	9.9	6.8	2.4	0.0	20.9	8.4	6.1	8.5	14.9	3.7	2.6	4.5
Luxembourg	17.6	18.7	11.1	10.3	61.5	34.1	21.8	26.2	28.6	21.7	20.9	0.0	19.9	12.2	13.6	36.7	25.8	23.4	14.7
Malta	3.6	3.9	3.0	6.8	37.9	14.8	6.6	7.8	20.0	2.8	8.4	19.9	0.0	4.0	2.0	9.1	10.2	6.0	5.8
Netherlands	0.9	1.6	3.9	0.6	32.6	7.2	1.7	4.4	13.7	3.6	6.1	12.2	4.0	0.0	1.5	7.6	4.4	3.0	0.5
Austria	1.3	1.0	1.6	2.4	34.2	11.6	3.5	4.2	16.2	4.7	8.5	13.6	2.0	1.5	0.0	7.6	8.0	6.0	3.1
Portugal	4.2	3.5	14.4	8.7	19.4	3.7	2.8	2.0	17.3	9.8	14.9	36.7	9.1	7.6	7.6	0.0	6.2	7.3	7.3
Slovenia	3.0	5.8	11.2	5.2	20.6	2.6	2.9	3.9	6.5	4.5	3.7	25.8	10.2	4.4	8.0	6.2	0.0	1.4	2.3
Slovakia	2.6	5.2	8.4	5.1	29.6	4.9	3.0	5.8	11.1	1.2	2.6	23.4	6.0	3.0	6.0	7.3	1.4	0.0	1.6
Finland	1.1	2.6	5.8	1.1	29.9	5.0	1.4	4.2	11.2	3.1	4.5	14.7	5.8	0.5	3.1	7.3	2.3	1.6	0.0

Table A-2: Distance matrix 2020

Case No.	Squared Euclidean distances (2020)																		
	Euro area	Belgium	Germany	Ireland	Greece	Spain	France	Italy	Cyprus	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Austria	Portugal	Slovenia	Slovakia	Finland
Euro area	0.0	1.1	3.0	6.1	19.3	3.3	1.0	8.0	6.2	4.3	3.1	14.9	3.3	4.9	2.5	2.2	1.1	6.1	1.2
Belgium	1.1	0.0	5.4	8.2	18.5	2.6	0.1	8.3	9.7	8.9	5.2	17.4	4.1	7.8	2.1	4.6	2.4	8.7	3.2
Germany	3.0	5.4	0.0	4.8	35.4	11.9	5.3	20.1	12.6	2.9	6.0	8.7	9.5	1.1	4.4	7.2	5.1	6.2	0.6
Ireland	6.1	8.2	4.8	0.0	32.3	12.8	9.0	18.9	10.5	9.4	12.9	3.1	13.0	6.3	9.8	10.9	7.9	16.8	3.7
Greece	19.3	18.5	35.4	32.3	0.0	8.8	18.6	4.3	10.2	32.5	28.4	54.5	21.5	42.2	30.1	12.5	17.0	39.4	29.3
Spain	3.3	2.6	11.9	12.8	8.8	0.0	2.6	3.2	5.6	11.6	7.4	27.0	4.1	16.0	7.8	3.8	2.1	14.6	8.1
France	1.0	0.1	5.3	9.0	18.6	2.6	0.0	8.2	9.8	8.4	4.6	18.5	3.8	7.5	1.9	4.2	2.3	7.7	3.2
Italy	8.0	8.3	20.1	18.9	4.3	3.2	8.2	0.0	5.2	18.3	12.6	35.3	8.0	23.2	14.1	5.1	8.0	19.9	14.8
Cyprus	6.2	9.7	12.6	10.5	10.2	5.6	9.8	5.2	0.0	9.1	11.9	24.1	10.3	16.7	15.9	2.7	4.9	19.4	9.5
Latvia	4.3	8.9	2.9	9.4	32.5	11.6	8.4	18.3	9.1	0.0	4.0	16.7	7.8	4.5	8.4	5.7	4.1	6.1	3.0
Lithuania	3.1	5.2	6.0	12.9	28.4	7.4	4.6	12.6	11.9	4.0	0.0	21.5	1.4	5.9	3.2	6.4	3.7	2.1	3.9
Luxembourg	14.9	17.4	8.7	3.1	54.5	27.0	18.5	35.3	24.1	16.7	21.5	0.0	23.4	8.0	15.7	23.4	18.9	22.5	9.0
Malta	3.3	4.1	9.5	13.0	21.5	4.1	3.8	8.0	10.3	7.8	1.4	23.4	0.0	10.2	4.0	6.8	3.2	6.2	5.9
Netherlands	4.9	7.8	1.1	6.3	42.2	16.0	7.5	23.2	16.7	4.5	5.9	8.0	10.2	0.0	4.1	10.2	8.6	4.3	1.6
Austria	2.5	2.1	4.4	9.8	30.1	7.8	1.9	14.1	15.9	8.4	3.2	15.7	4.0	4.1	0.0	8.2	5.5	3.5	2.8
Portugal	2.2	4.6	7.2	10.9	12.5	3.8	4.2	5.1	2.7	5.7	6.4	23.4	6.8	10.2	8.2	0.0	2.7	10.1	5.2
Slovenia	1.1	2.4	5.1	7.9	17.0	2.1	2.3	8.0	4.9	4.1	3.7	18.9	3.2	8.6	5.5	2.7	0.0	9.3	3.1
Slovakia	6.1	8.7	6.2	16.8	39.4	14.6	7.7	19.9	19.4	6.1	2.1	22.5	6.2	4.3	3.5	10.1	9.3	0.0	5.5
Finland	1.2	3.2	0.6	3.7	29.3	8.1	3.2	14.8	9.5	3.0	3.9	9.0	5.9	1.6	2.8	5.2	3.1	5.5	0.0

Table A-3: Distance matrix 2022

Case No.	Squared Euclidean distances (2022)																			
	Euro area	Belgium	Germany	Ireland	Greece	Spain	France	Italy	Cyprus	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Austria	Portugal	Slovenia	Slovakia	Finland	
Euro area	0.0	0.7	1.6	12.1	11.1	1.0	1.3	6.4	5.7	11.0	16.6	11.1	12.6	3.0	5.7	0.7	2.0	0.8	2.7	1.6
Belgium	0.7	0.0	2.2	14.3	11.3	1.3	1.9	6.3	8.9	9.1	15.2	14.2	4.7	6.9	1.8	4.0	2.2	3.1	3.7	
Germany	1.6	2.2	0.0	9.8	20.6	4.6	3.4	14.1	10.0	13.0	12.2	9.9	6.0	3.2	0.9	4.9	1.8	4.2	1.3	
Ireland	12.1	14.3	9.8	0.0	33.8	18.9	17.0	27.2	12.0	30.6	25.6	1.0	19.1	5.0	7.5	14.2	12.3	17.6	6.3	
Greece	11.1	11.3	20.6	33.8	0.0	6.7	11.5	1.4	9.8	21.0	39.9	36.9	13.5	26.5	15.2	8.3	13.8	14.2	18.1	
Spain	1.0	1.3	4.6	18.9	6.7	0.0	1.2	2.9	7.1	10.8	21.4	19.4	2.8	11.0	3.2	2.7	2.5	3.6	4.8	
France	1.3	1.9	3.4	17.0	11.5	1.2	0.0	6.2	10.1	16.3	24.5	17.0	3.4	11.3	3.1	4.4	3.7	6.6	4.1	
Italy	6.4	6.3	14.1	27.2	1.4	2.9	6.2	0.0	8.8	15.6	34.4	28.2	7.3	20.9	10.1	6.6	9.1	9.5	12.6	
Cyprus	5.7	8.9	10.0	12.0	9.8	7.1	10.1	8.8	0.0	18.8	25.1	15.6	9.0	8.6	5.3	2.3	5.0	7.6	5.1	
Latvia	11.0	9.1	13.0	30.6	21.0	10.8	16.3	15.6	18.8	0.0	10.6	28.6	11.5	14.6	12.7	15.4	8.7	3.6	15.9	
Lithuania	16.6	15.2	12.2	25.6	39.9	21.4	24.5	34.4	25.1	10.6	0.0	26.5	25.5	8.7	14.6	19.2	12.8	10.1	16.6	
Luxembourg	12.6	14.2	9.9	1.0	36.9	19.4	17.0	28.2	15.6	28.6	26.5	0.0	17.6	6.3	8.3	17.5	13.1	17.6	7.4	
Malta	3.0	4.7	6.0	19.1	13.5	2.8	3.4	7.3	9.0	11.5	25.5	17.6	0.0	12.5	4.8	6.5	3.2	4.3	5.2	
Netherlands	5.7	6.9	3.2	5.0	26.5	11.0	11.3	20.9	8.6	14.6	8.7	6.3	12.5	0.0	2.8	7.3	4.1	6.2	2.7	
Austria	0.7	1.8	0.9	7.5	15.2	3.2	3.1	10.1	5.3	12.7	14.6	8.3	4.8	2.8	0.0	2.6	0.9	3.5	0.4	
Portugal	2.0	4.0	4.9	14.2	8.3	2.7	4.4	6.6	2.3	15.4	19.2	17.5	6.5	7.3	2.6	0.0	2.1	4.7	3.1	
Slovenia	0.8	2.2	1.8	12.3	13.8	2.5	3.7	9.1	5.0	8.7	12.8	13.1	3.2	4.1	0.9	2.1	0.0	1.2	1.5	
Slovakia	2.7	3.1	4.2	17.6	14.2	3.6	6.6	9.5	7.6	3.6	10.1	17.6	4.3	6.2	3.5	4.7	1.2	0.0	4.9	
Finland	1.6	3.7	1.3	6.3	18.1	4.8	4.1	12.6	5.1	15.9	16.6	7.4	5.2	2.7	0.4	3.1	1.5	4.9	0.0	

QUO VADIS? SUSTAINABILITY IN SMALL- AND MEDIUM-SIZED ENTERPRISES

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Abstract

Sustainability increasingly become a part of the policies and programs of all countries of the European Union. This results in that the importance of this area is growing apparent in the strategy and operation of companies. However, it does not appear in every company in the same way, with the same strength, through the same sustainability elements and along the same lines of efforts. Nowadays, sustainability-relevant activities are still primarily associated with large companies, though customer, employee, competitor, legal and banking pressure has started to persuade micro-, small- and medium-sized enterprises to consider participating in such efforts and related programs. Our questionnaire-based research specifically focuses on the Hungarian micro-, small- and medium-sized enterprises, and highlights their interpretation of sustainability. It also unveils which stakeholders motivate these organizations to start participating in sustainability efforts. Based on our results, the examined companies prioritize economic sustainability and only deal with environmental and social sustainability after achieving a desired economic sustainability level, except in the case of a direct pressure. If organizations carry out sustainability activities in environmental direction, it entails that they also develop in terms of the social pillar, and vice versa. The respondent enterprises mostly feel the sustainability pressure from customers, society and employees, but the strong pressure and regulation from the legal side are increasingly coming to the fore. Currently, they do not feel pressure from banks and competitors in general. Our proposal is to increase the number of Hungarian banks' green initiatives and programs, and in addition, to start to move in the direction of social sustainability with various actions. We also propose to make micro-, small- and medium-sized companies aware of the sustainability consciousness of customers and society as a whole, thereby opening their eyes to the changing expectations of the primary stakeholders.

Keywords: sustainability, small- and medium-sized enterprises (SME), Hungary, stakeholder, pressure

JEL classification: C83, D22, Q01, Q56

Introduction

Sustainability plays an increasingly important role in the strategy and objectives of companies operating in the European Union (EU) and EU countries, and more and more sustainability

efforts are being launched. For the period up to 2030, member states of the European Union have committed to prioritize the transition to a safe, climate-neutral, climate change-resilient, more resource-efficient and circular operation for the sake of a long-term, competitive economy, which greatly influences and induces change in all kinds of organizations as well.

Organizations have a fundamental role in spreading sustainability goals, developing and following best practices. The appearance of these changes and efforts in strategy and real operation is primarily the characteristic of large companies, and the related regulations affect mainly them. However, considering, among other things, their supplier and partner relationships with micro-, small- and medium-sized enterprises (micro-sized, small-sized, and medium-sized enterprises, SMEs), as well as the expanding scope of EU and national regulations, SMEs are also increasingly dealing with the issue.

The impact of the SME sector on the environment and economy cannot be ignored and their role should not be underestimated in any country (Ropret, Aristovnik, & Ravselj, 2018; Vörösmarty & Dobos, 2020). Approx. 95-99% of the organizations in the European Union and in Hungary are SMEs, therefore, it is extremely important that they feel their relevance and importance in making the country and thus the EU more sustainable. (However, as Edőcsényi & Harangozó (2021) also highlighted, only a small proportion of the literature deals with the relationship between sustainability and SMEs which might be the result of their size, their number of employees and their focus on survival.) Still, the question arises as to which of the stakeholders the so-called sustainability pressure should come from. This pressure could show the SMEs the importance of sustainability efforts, persuade them to start working towards those, and to participate in them in addition to their basic operation. After all, many SMEs are just fighting for basic survival, for minor economic advances, so sustainability is not necessarily part of their general operation, unless the parties concerned put pressure on them.

Recent studies (e.g. Gast, Gundolf, & Cesinger, 2017; Singla, Ahuja, & Sethi, 2019; Diófási-Kovács, 2020; Claro & Esteves, 2021) points out that the legislation, consumers and customers (partners and suppliers), competitors, society, employees and banks exert pressure on the organizations to change and start new efforts. Top managers of the organizations are expected to set an example towards and must initiate these changes and efforts.

The primary goal of SME top managers is to ensure economic stability, i.e. to increase an organization's financial position and to ensure efficiency (at least in the short term). In addition to reaching the desired economic level, extra "projects" with a different focus are often launched only under the pressure of the stakeholders. The direction and operation of these "projects" vary from company to company, considering, e.g. the diversity and number of sectoral regulations and innovation opportunities related to the organizational processes. (González, 2009) Moreover, economic, environmental and social problems are typically present in different proportions and degrees in each country, and in a more specific context, in the operation of businesses (Claro & Esteves, 2021). However, the question is not only whether such efforts are launched, but also how much of the company's profit they are willing to sacrifice for e.g. sustainability projects. After all, it has not yet been proven that, in the case of SMEs, the improvement of the company's sustainability performance (often examined only on the environmental side) would result in higher economic profits (Gast et al., 2017; Peattie & Charter, 2003). Recently, society and an increasing number of market players turn towards some elements of sustainability, which sooner or later will put more and more pressure on top managers of all companies, including SMEs, to think through their opportunities to participate in these efforts and to include them in the organization's strategic goals and to become

committed to them (e.g. Bake, 2002).

The SME sector is typically forced to use outside capital, especially in order to implement larger-scale investments. In the last few years, SMEs have been receiving higher and higher sustainability pressure from banks, mainly in relation to loan opportunities. An example of this is the financing of green investments from the lender's side - discounted green loan projects, green bond issues - which is only available to them if the investment in question supports environmental sustainability. (Yang, Ou, & Hsu, 2019)

And such a deal can be favourable for both the lender and the investor:

- the costs of green financing are more favourable, bond issuers can obtain funds on more favourable terms,
- the marketing value of the green bond issue, i.e. emphasizing the commitment towards the environmental pillar of sustainability,
- the possibility of increasing media presence and thus visibility for companies, attracting e.g. the attention of customers and partners (Tang & Zhang, 2020).

Consumers, customers and partners are also putting increasing pressure on SMEs, actually turning the existence and practice of sustainability efforts into a competitive advantage (Acciarini, Borelli, Capo, Cappa, & Sarrocco, 2021; Kelley et al., 2022). Customers and consumers, as well as partners, demand quality products and high-level services from companies. However, nowadays, in addition to these, organizations are also expected to take steps towards all elements of sustainability, to make sacrifices for sustainability (Gast et al., 2017). This is also important for consumers and customers when choosing companies and brands. Today, mainly large (multinational) companies are able to achieve breakthrough results in the field of sustainability, due to their size and influence, but they are also the ones who (rightly) expect their partners and suppliers to contribute to these results. With this, sustainability has become a strong point in the relationship between them.

When choosing and keeping a job, one of the most important things for employees is the creation and maintenance of a calm workplace atmosphere that ensures a predictable livelihood, taking into account the possible career and promotion opportunities (Ederer, 2008). In a very small number, but organization's commitment to global sustainability can already be noticed among the job selection criteria, and it is expected that this will continue to strengthen with the spread of digitalization and the increasingly strong appearance of sustainability in education (e.g. Nagy, Tasner, & Kovács, 2021). For example, in the case of recruitment and selection processes in restaurants, the characteristics and treatment of waste and packaging materials, the purchase and use of appropriate (e.g. environmentally and socially sustainable) raw materials come to the fore these days. Klenert, Mattauch, Combet, Edenhofer, Hepburn, Rafaty, & Stern (2018) highlight that there is a U-shaped relationship between an employee's GDP per capita and his environmental impact. That is, if the person reaches a certain GDP level, he or she will pay an increasing level of attention to reducing the environmental burden he or she causes.

According to Chikán, Czakó, Losonci, & Kiss-Dobronyi (2019), legal regulation is the most important trigger for sustainability-oriented organizational improvements. Although, they point out that most improvements in this direction focus on only two pillars of the three-pillar model of sustainability – the economic and environmental aspects. From sustainability point of view, Hungarian organizations have an obligation to provide information and data to the authorities on the one hand, and they are obliged to pay taxes, contributions and fees in accordance with their economic activities on the other hand (Bubanic & Simovic, 2021). For example, environmental taxes have a key role in the transition to a greener and more sustainable economy

(environmental tax reforms). (European Environmental Agency, 2020) Environmental taxes also help to establish the objectives of the European Green Agreement. The commitment of large companies in the direction of the environmental pillar of sustainability is motivated not only by their own values, but also by the legal regulation, according to which, starting in 2022, they are bound to provide information on how and to what extent the company's activities are related to economic activities that are considered environmentally sustainable (Directive 2013/34/ EU, 2013). The Corporate Sustainability Reporting Directive (CSRD) addresses the fact that users also have an increasing demand for sustainability-related information, so additional categories of companies must report on sustainability-related information (Directive (EU) 2022/2464, 2022). In the long term, environmental sustainability must be independent of company size, all market players must contribute to protecting the environment. From January 1, 2026, the directive on CSRD stipulates that small- and medium-sized enterprises with securities introduced to the EU regulated market are also subject to the obligation to report on sustainability.

The purpose of our study is to present the interpretation of sustainability in the Hungarian SME sector, considering that individual stakeholders do not necessarily influence companies in the direction of all sustainability pillars and elements. On the other hand, it emphasizes that from which direction and from which stakeholder the pressure should come for the stronger appearance of SME sustainability efforts.

The structure of the study is as follows. The next chapter of the article highlights the design and details of the developed questionnaire. Then, after introducing the sample, we present the results of our analyses. We conclude the study with a summary of the results, the interpretation of sustainability by the Hungarian SMEs and the identification of stakeholders pressuring the SMEs towards sustainability efforts, referring to the research limitations as well.

Materials and methods

During our research, we focused on the sustainability-related viewpoints of the SME sector in Hungary. In recent years, many international articles have been published on the topic of sustainability. These studies emphasize that the interpretation of sustainability and sustainable business is not uniform, and that the stakeholders see sustainability as environmental processes coming to the forefront in addition to economic ones (Environmental, Social and Governance strategy – ESG) (Johnston, Everard, Santillo, & Karl-Henrik, 2007; Gast et al., 2017). However, it is possible to set an organization in the direction of sustainability, and to implement sustainability elements and aspirations in its operation more effectively, if the aspects of all three pillars are taken into account during the processes (Edőcsény & Harangozó, 2021).

After the literature review, we created an online questionnaire to collect data on what (which pillars) Hungarian SMEs mean by sustainability, and from which stakeholders they feel pressure to start sustainability efforts.

We asked the top managers of Hungarian SMEs to fill in the questionnaire, as typically they are the ones making decisions about improvement opportunities, the organizational goals and the sustainability efforts, and only with their participation can these efforts be included in the organization's mission, vision, strategy (Miklian & Barkemeyer, 2020; Akadiri & Fadiya, 2013; Burawat, 2019; Ónodi & Répácki, 2022).

The questionnaire consisted of three main parts, demographic and basic data, sustainability interpretation and sustainability-focused pressure. The general part of the questionnaire focused on the demographic characteristics, as well as the form of the company, its headquarter, ownership structure, size (employees), scope of activity (sector) (based on Dick-Forde, Oftedal, & Bertella, 2020; Gupta, Dangayach, & Singh, 2018; Erin, Bamigboye, & Oyewo, 2022). The interpretation of sustainability section dealt with both the external and internal sustainability and the importance of the three pillars. In the case of the question focusing on the three-pillar model, respondents had the opportunity to indicate whether they understood one of the three pillars by sustainability, or all of them at the same time. In the case of the question focusing on internal sustainability, the respondents could choose from quite a few pre-specified areas, or they could specify their own idea. The pressure part focused on whether the organizations feel pressure to initiate sustainability efforts from the following directions: legal and/or legislative, customer/consumer, competitor, social, employee/worker and banking.

Results

Data collection for our research took place in the spring of 2022, in the framework of an online questionnaire. The questionnaire was sent to 70,000 SMEs randomly selected from the OPTEN company database of the Hungarian organizations. Regarding the number of responses in the sample, 808 companies' responses were processed, which in the case of questionnaires carried out in the corporate sector is a suitable number of items for formulating all our findings (see e.g. Ónodi & Répáczki, 2022; Vörösmarty & Dobos, 2020; Chikán et al., 2019).

Table 1 presents the results of the demographic questions. Top managers who filled in the questionnaire had several years of experience (80 percent of them were 43 years old or older). Based on the year of foundation, 58.4% of the companies included in the sample was developed after 2009. In terms of the form, LTD (limited-liability company) dominates (92.2%). 96.2% of the companies are fully owned by Hungarians.

Table 1: Demographic characteristics of the respondents

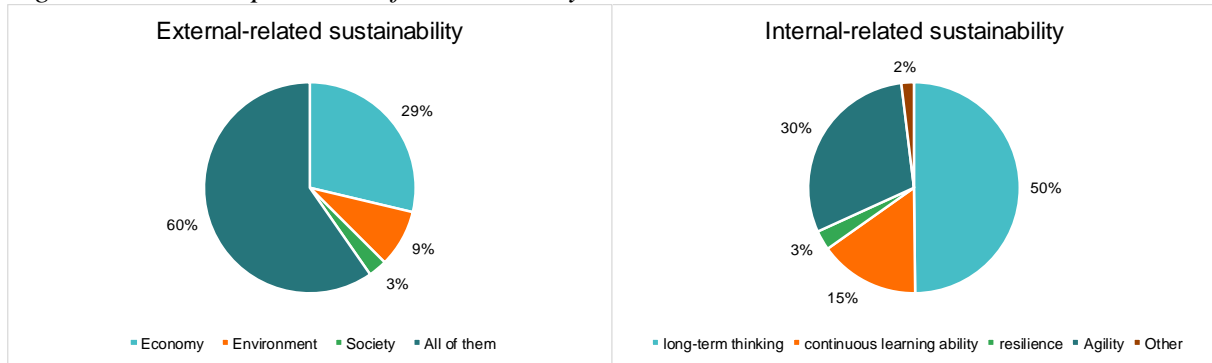
Respondents profile	Number	%	Respondents profile	Number	%
<i>Gender of the CEO</i>			<i>Year of foundation</i>		
male	607	75,12	before 2000	187	23,14
female	201	24,88	1999<x<2010	224	27,72
<i>Year of birth of the CEO</i>			2009<x<2020	297	36,76
1936-1959	138	17,08	after 2019	100	12,38
1960-1979	515	63,74	<i>Number of employees</i>		
1980-1996	149	18,44	50 people or less	760	94,06
1997-2010	6	0,74	above 50 people	48	5,94
<i>Headquarter of the company</i>			<i>Size</i>		
Budapest	101	12,5	micro	587	72,65
other	707	87,5	small	160	19,80
<i>Ownership structure</i>			medium	46	5,69
completely Hungarian	777	96,16	big	15	1,86
other	31	3,84			

Source: authors' work.

Sustainability in organizational operation

We examined the interpretation and definability of sustainability based on the external and internal characteristics of the companies (Figure 1).

Figure 1: The interpretation of sustainability



Source: authors' work.

Nearly 60 percent of those who filled in the questionnaire see the three pillars – economic, environmental and social impacts – together as external sustainability. At the same time, it should be noted that a third of the respondents see the success of sustainable improvement only in economic growth (which is somewhat opposite to the results of Edőcsényi & Harangozó (2021), according to which the economic aspect has started to take a back seat to the environmental and social aspects, although, they confirm this finding specifically defined for the fashion industry).

For 50 percent of the respondents, the internal sustainability of organizations only means long-term thinking. But, the adaptability and agility were also highlighted by nearly a third of the respondents.

Companies focus on economic sustainability in the case of sustainability pillars. They consider economy to be a fundamental condition for the other two pillars, environmental and social efforts to appear in the operation of their organization.

Table 2: Relationship between sustainability pillars (Spearman's rank-order correlation, the p-value was 0.000 in all cases)

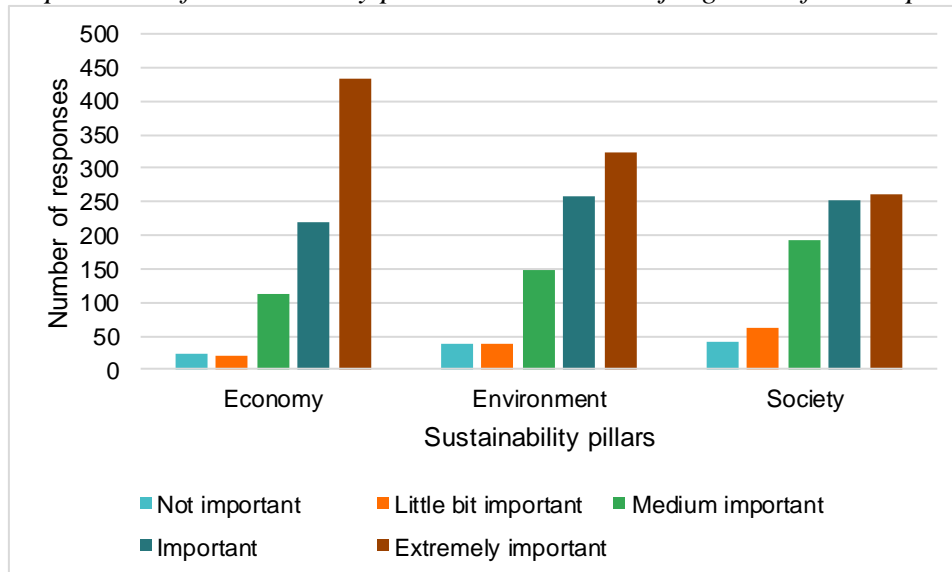
	Economy	Environment	Society
Economy	1.000	.200	.242
Environment		1.000	.538
Society			1.000

Source: authors' work.

Based on Spearman's rank-order correlation, a significant and medium correlation is demonstrated between environmental and social sustainability (Table 2), indicating the existing, but not very strong, relationship between them. As can be seen, the economic pillar is separated, its importance and appearance in the company's operation is much more significant (as e.g. the answers to the question about external sustainability show).

We also examined the importance of the sustainability pillars (economic, environmental, social) separately, related to the company's operation, on a five-point Likert-scale (Figure 2).

Figure 2: Importance of sustainability pillars - based on the judgment of the respondents



Source: authors' work.

All three pillars of sustainability were considered (very) important by the respondents, but the economic aspect was more important than the other two. The relevance of the answers was reinforced by the answers given to the previous question – during which we asked what sustainability means to them – because here, too, economic sustainability was considered the most important, ahead of environmental and social sustainability.

Sustainability-focused pressure

The evaluation of the last part of the questionnaire presented partially surprising results.

Table 3: Pressure for sustainability efforts from different stakeholder groups

Pressure	Legal	Customer	Competitor	Society	Employee	Bank
Feeling (%)	56.56%	73.27%	39.85%	69.80%	66.34%	37.25%
Not feeling (%)	43.44%	26.73%	60.15%	30.20%	33.66%	62.75%

Source: authors' work.

An interesting examination area was to analyse the stakeholder pressure on companies' top managers, and thus on the operations of the companies, related to efforts in the direction of sustainability (Table 3). Based on the results, the drive and pressure towards sustainability are primarily felt by Hungarian SMEs from the customers (consumers, partners), but social and employee pressure also represent a relatively high proportion. They feel much less pressure from their competitors, they probably don't think that they can be at a disadvantage in market competition if they push their sustainability efforts into the background (although this somewhat contradicts the importance of customer pressure, if customer satisfaction is considered the basis of competition). The banking expectation appears in the smallest proportion, which is definitely noteworthy and at the same time indicative. Regarding the future, the role of banks in this field is expected to increase in value, considering the growing number of green and sustainability loans, therefore, they can play a significant role later in the transformation and development of SMEs' sustainability attitude.

Comparing the answers given in the two questionnaire sections, it can be seen that those companies that consider environmental and social sustainability less important in terms of their operations, feel less external pressure – either from the point of view of customers (consumers, partners), employees or competitors – to take more drastic steps in the direction of sustainability.

Examining whether there is a correlation between pressures from different directions (see Table 4), we found that organizations feeling customer pressure are more likely to feel competitive pressure (and vice versa). This is understandable, since they compete with their competitors for customers, consumers, and their opinion. At the same time, it is interesting that relatively fewer companies feel competitive pressure than customer pressure. Those that feel competitive pressure are likely to feel banking pressure as well (and vice versa), this may be in line with the amount of money and capital needed to stay competitive. And finally, organizations that feel legal and legislative pressure probably also feel banking pressure (and vice versa). This can partly be explained by the close relationship between the state, the legal system and the banking system. This correlation study points out amongst others, that if the state introduces legal regulations to promote sustainability efforts, this pressure can strengthen competition between organizations through the banks, thus raising customer expectations in the direction of sustainability.

Table 4: Spearman rank-order correlation between stakeholders (p-value was 0.000 in all cases)

Spearman rank-order correlation	Legal	Customer	Competitor	Society	Employee	Bank
Legal	1.000	.238	.254	.207	.221	.355
Customer		1.000	.326	.194	.298	.246
Competitor			1.000	.211	.270	.330
Society				1.000	.262	.150
Employee					1.000	.289
Bank						1.000

Source: authors' work.

Segmentation tests

Segmenting the responses by the gender of the respondents, a significant difference can only be identified in terms of social and employee pressure, however, more male respondents feel pressure from all directions. This result could be connected to the men-women ratio of Hungarian top managers.

Focusing on the location of the company, it can be seen that, in the case of all examined directions, less organizations with headquarters other than Budapest (capital city) feel the pressure to move in the direction of sustainability. This is understandable as the capital city is one of the most improved cities in Hungary and the related decision makers are closer to these organizations.

In terms of the ownership structure, significantly more managers feel pressure in fully Hungarian-owned organizations from customers and employees to move in the direction of sustainability, that might be related to the customer and employee base.

In terms of the year of foundation, a significant difference can only be identified in the case of

pressure from competitors and employees. Less organizations founded between 2000 and 2010 feel a pressure from the perspective of competitors, while significantly more that was founded before 2000. Those founded after 2019 feel the pressure mainly from the perspective of employees.

Based on the number of employees, more organizations feel a pressure with fewer than 51 employees from all directions, and significantly more from the legal and customer directions.

By comparing micro and small-medium enterprises, the results support the former statement, i.e. more micro enterprises feel pressure from all sides. It is interesting that no significant difference can be identified here in the case of customers.

We found significant differences in the interpretation of sustainability depending on which direction organizations feel the pressure from. The respondents who judged the pressure directions the most extreme were those who understood the social pillar primarily under the concept of sustainability. Much less of them feel the legal, social and employee pressure, and much more of them the pressure from customers, competitors and banks. And significantly more of those who mean economic sustainability feel the legal and social pressure, and what is interesting is that significantly fewer feel the banking pressure.

No trend or significant difference could be identified in terms of the year of birth of the respondent and the form of the company (see Table 5). In terms of industry, responses were received from all sectors, but the sample size of each sector makes statistical comparisons void.

Table 5: Segmentation tests (Kruskal Wallis tests and Mann Whitney U tests)

Segmentation criteria	Legal	Customer	Competitor	Society	Employee	Bank
Gender	0.300	0.155	0.189	0.003	0.019	0.125
Headquarter	0.126	0.810	0.254	0.082	0.500	0.019
Nationality of the owner	0.362	0.029	0.323	0.514	0.035	0.179
Year of foundation	0.184	0.305	0.018	0.200	0.038	0.810
Number of employees	0.018	0.022	0.139	0.419	0.104	0.337
Size	0.007	0.106	0.006	0.416	0.006	0.000
Sustainability pillars	0.183	0.091	0.010	0.000	0.026	0.263

Source: authors' work.

Conclusion

During our research, we investigated the sustainability pillars among Hungarian SMEs, and according to our results, economic sustainability is the most important for them, environmental and social effects are secondary. Among the pillars of sustainability, we regard the environmental and social dimensions as the next milestones, which assumes a conscious corporate leadership and management committed to sustainability. In order to promote sustainability elements within the company, management must work in accordance with these efforts (ethical behaviour, selection of partners and suppliers), and must also help society through voluntary undertakings.

The economic pillar is the most important, it works separately from the other two pillars. If the company operates at the level determined by the management in this pillar, only then

environmental and social efforts can begin. After the economic pillar comes the environmental pillar in terms of importance, but our results also highlighted that two pillars are related to each other, environmental sustainability efforts can indirectly help social efforts and vice versa.

As for the pressure exerted by stakeholders, organizations that feel a competitive pressure also feel customer pressure, but the reverse is not necessarily true. This suggests that few SMEs connect directly the satisfaction of customers' needs with the competitive situation. A connection can also be discovered between banking and legal, and banking and competitive pressure. It goes without saying that banks must inflexibly follow the latest regulations and legislation and provide services to organizations based on those. Organizations that feel legal pressure also feel some banking pressure and vice versa. What is interesting, however, is the similar "strength" of the relationship between the perception of competitive and banking pressure, which is likely attributable to the recently perceived Hungarian "loan competition" primarily.

Overall, company size seems to be the most influential segmentation aspect, but the perception of the importance of sustainability pillars also show a significant difference in several cases. Both of these results are very interesting and needs further research, as most of the official sustainability promoting programs and regulations are focused on the large companies, we assumed that the bigger the organization is the more it feels the pressure from either stakeholder and participates in related programs and efforts.

We must not ignore the fact that during the time of the questionnaire, all actors of economic life were "touched" by sustainability issues. Today's events – the new geopolitical and energy market situation, the energy crisis – affect businesses in particular, and the promotion of clean energy investments has become the focal point. All of this encourages SMEs to contribute to the successful implementation of the green transition. The appearance of all three pillars of sustainability is given top priority, as are all previously less known sustainable development goals.

In summary, we can conclude that in order for enterprises (SMEs) to be (also) committed to sustainability in the long term, economic stability is a necessity, they must see that the relationship between efficiency and sustainability is mutually reinforcing and mutually reciprocating. All of this requires an elaborate legal system, expert advice and presumably non-reimbursable support (not full outside capital). And if they reach the given economic level, legal pressure alone (e.g. Article 9 of Decree 2020/852, 2020) will not be enough, however, much more pressure can be exerted on them by the banks directly, but also indirectly. Indirectly, for example banking services could exert pressure through competitors or customers. This is extremely important, considering that most companies feel pressure from customers (73%), who are part of society and can also be part of the workforce. Thus, in order to promote the sustainability efforts of Hungarian SMEs, it is recommended to the Hungarian state to review, improve and support the sustainability-related services of Hungarian banks. With improvements in this direction, the sector, and in the long run, the country could advance in not only the economic, but also the other two pillars.

When generalizing our findings, it is necessary to take into account that although our research has a sufficient sample size for a questionnaire focused on the corporate sector, it only covers a small proportion of the entire Hungarian SME sector. Another limitation of our research is that we were not able to check whether company managers actually filled in our questionnaire, however, considering that 40% of those who completed it asked us to inform them about the

results of our research, we could assume that it was largely filled out by company managers (or employees in similar position) who are interested in the improvement of their organization.

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PRELIMINARY STUDY OF THE GENDER DIFFERENCES IN THE HABITS OF SOCIAL MEDIA USAGE ACROSS THE STUDENT POPULATION

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Abstract

For many decades, gender differences have intrigued many researchers across various areas of science. Nowadays, the idea of exploring gender differences persists as it might provide valuable insights in terms of targeting and segmentation while running different kinds of businesses. In that sense, many modern companies are interested in reaching out to their customers and clients through social media. Therefore, this paper presents the preliminary results gained through an empirical study of the gender differences in the habits of social media usage, focused on students. The data was collected using a questionnaire on a sample of third-year university students. The results revealed which social media is mostly used by the students, what types of devices they use the most and the level of their social media activities. Also, some statistically significant differences between genders were noted. Based on the results of this study, practical implications were provided.

Keywords: gender differences, social media, students, targeting, segmentation

JEL classification: J16, M20, M29, M30, O33

Introduction

Gender differences have been a topic of discussions and studies for many decades in different areas such as entrepreneurship (e.g. Malach Pines, Lerner & Schwartz, 2010; Pejić Bach, Merkač Skok & Suša, 2016), leadership and management (e.g. Moran, 1992; Burke & Collins, 2001; Martinčević, Pejić Bach and Klopotan, 2019; Cuevas-Vargas, Velázquez-Espinoza and Colín-Salgado, 2022), workplace (e.g. Delfgaauw, Dur, Sol & Verbeke, 2013; Salin, 2021), paychecks and employment (e.g. Blau & Kahn, 2000; Hogue, Dubois & Fox-Cardamone, 2010; Pejić Bach, Zoroja and Miloloža, 2021); education (e.g. McWhirter, 1997; Pekkarinen, 2012; Pejić Bach, Zoroja and Nikolić, 2020; Zhang, Gros and Mao, 2021), creativity (e.g. Baer & Kaufman, 2008), mental health (e.g. Afifi, 2007) and many more. There is also a large number of researchers that conduct studies and examine if there are gender differences when it comes to the usage of information technology (IT) (e.g. Ono & Zavodny, 2005; Thomas & Allen, 2006; Goswami & Dutta, 2016; Qazi et al., 2022), and, specifically, the usage of social media,

which has been growing in popularity in recent years (e.g. Kraft & Weber, 2012; Hou, Bi, Jiao, Luo & Song, 2020; Karatsoli & Nathanail, 2020).

The main goal of this study is to examine the gender differences in the habits of social media usage across the student population. In order to examine the said topic, an empirical study has been conducted on a sample of third-year students of Business Economics. The preliminary results of the study shed some light on the habits of social media usage among students, revealing that, for example, Whatsapp, YouTube, and Instagram are the top three most used social media platforms and that there are some statistically significant differences between females and males in terms of social media usage. In that sense, by taking into consideration other findings as well, this paper provides some interesting insights that might serve companies as guidelines for targeting and segmentation, which are explained in more detail in the discussion.

After this introduction, the rest of the paper is structured as follows. The second section provides a short theoretical background of this study, while the third section explains the used methodology. The fourth section presents and discusses the findings of the empirical research conducted for the purpose of this study. The paper ends with a conclusion in which the main ideas are summarised and limitations are given alongside the plans for future research.

Theoretical background

As previously indicated, social media is a very hot topic which has intrigued many researchers for many years now. Proof of that claim can be found in a simple database search, e.g. Scopus search for the term “social media” in the title, abstract or keywords results in 148866 documents, while the same search settings in the Web of Science database results in 99603 publications (in March 2023). The term itself dates back to 1994 when Darrell Berry used it in reference to an online media environment which he was developing, called Matisse (Bercovici, 2010). Berry (1995) envisioned social media spaces as “cybercafes” with physically isolated access to virtual “space” (often merely access to internet-connected web clients) and non-existent or severely limited virtual access to the architecture of the actual space (usually only via email and/or IRC). Nowadays, Carr and Hayes (2015, p. 8) define social media as “Internet-based channels that allow users to opportunistically interact and selectively self-present, either in real-time or asynchronously, with both broad and narrow audiences who derive value from user-generated content and the perception of interaction with others”. A bit simpler definition is given by The Economic Times (2023), which defines it as “a computer technology that lets people share ideas, opinions, and information through online networks and communities”.

According to Maryville University (2023), the need for communication among people and the development of digital technology have both contributed to social media’s evolution, which is presented as the creation and maintenance of interpersonal connections on a large scale. These days, 42% of the world’s population uses social media (Khoros, 2023). Statistics for Europe show that Northern Europe is the region with the highest social media reach and that Europeans spend 26% of their time on social media (Dixon, 2022). When observing the number of users in Europe, the most popular social media is Facebook with 456.95 million users, followed by Instagram with 281.3 million users in 2022 (Dixon, 2023a). Forecasts for the coming period till 2027 show that all social media, except Tumblr, will increase the number of their users in comparison to 2022 (Dixon, 2023a). Eurostat (2022) revealed that, in 2021, social networks were the most used form of social media and that 59% of the businesses in the European Union

used at least one type of social media, which is an increase from the previously noted 37% in 2015. In Croatia, the percentage of businesses using social media went from 38% in 2015 to 54% in 2021 (Eurostat, 2022). In that sense, it is visible that social media is gaining popularity amongst both private users and businesses.

According to Goswami and Dutta (2016), gender has been identified as a key component in explaining human technology acceptance behaviour. In that sense, Idemudia, Raisinghani, Adeola & Achebo (2017) conducted an empirical study on the effects of gender on the adoption of social media, concluding that males have a higher impression of pleasure and information quality while utilising social media than females, while females have a higher and more significant sense of ease of use, compatibility, relative advantage, and danger when utilising social media than males.

Nowadays, social media represents an important part of doing business since customers and clients expect businesses to be present and available through social media. On the other hand, by using social media, and, especially, by having insight into the gender and age structure of their customers and clients, businesses can improve their targeting and segmentation, and, thus, improve their organisational performance. Moreover, The Economic Times (2023) argues that “social media is the most important thing a business needs.”

Methodology

Research instrument

The research carried out in this paper is part of the research on digital trace, information literacy, and habits in using social media. The research instrument used in the named research is based partly on the work of Harjule, Manva, Mehta, Gurjar and Agarwal (2023) and partly on the work of Surmelioglu and Seferoglu (2019), with some authors’ ideas as well. Overall, the data contained 76 attributes. However, in this paper, only the data on students’ habits in using social networks were analysed with regard to the gender of the students. Therefore, for this study, 10 attributes were used.

The research instrument used for this paper is presented in Table 1.

Table 1: Research instrument

Category	Variable ID	Statement	Source
Social media (SM) usage and habits	PerceptionCapabilityToUseSM	Please select the level of your agreement with the following statement: "I feel capable of using online tools, social media and networks."	Surmelioglu and Seferoglu (2019)
	Device_X	What devices do you use to access online tools, social media and networks?	Surmelioglu and Seferoglu (2019)
	SM_X	What social media and networks do you use?	Authors’ work
	ActivityLevelSM	What is your level of activity on social media and networks?	Harjule et al. (2023)
	FrequencySM	How often do you use social media and networks?	Harjule et al. (2023)
	TimeSpentSM	How many hours a day do you spend using social media and networks?	Harjule et al. (2023)
Demography	Gender	Sex	Authors’ work
	Age	Age	Authors’ work
	YearOfStudy	Year of study	Authors’ work

Category	Variable ID	Statement	Source
	Settlement	Most of my life I live in...	Inspired by Surmelioglu and Seferoglu (2019)

Note: X in Device_X and SM_X represents various possible choices that variable can take (as presented in Table 3).

Source: authors' work (2023).

Data collection and sample description

The data collection process was carried out in March 2023 via an online questionnaire using Google Forms, targeting third-year students at the Faculty of Economics & Business, University of Zagreb, Croatia. The questionnaire was distributed through Google Classrooms.

Table 2 shows the structure of respondents by demographic variables. The majority of respondents are students between 18 and 22 years old (95.36%) and third-year students (95.03%). The percentage of female students is 65.56% compared to male students, who represent 34.44% of the respondents. In terms of place of residence, 75.38% of the respondents have lived in an urban area for most of their lives.

Table 2: Structure of respondents according to demographic variables

Variable	Category	Number of Students	% of Total Number of Students
Age	18-22	288	95.36%
	23-26	13	4.30%
	27-32	0	0.00%
	33 and more	1	0.33%
Year of Study	1	0	0.00%
	2	10	3.31%
	3	287	95.03%
	4	4	1.32%
	5	1	0.33%
Gender	Female	198	65.56%
	Male	104	34.44%
Settlement	Rural area	73	24.17%
	Urban area	229	75.83%

Source: authors' work (2023).

Data analysis

In this research, the analysis was performed using data collected from 302 respondents. The data were analysed using MS Excel and StatSoft Statistica. Table 3 represents the dataset variables, that is, the data categories of the variables, the type of data for each variable, and the modalities of the examined variables.

Table 3: Dataset variables

Category	Variable	Type of Data	Modalities
Demography	Gender	Dichotomous	Female, Male

	Age	Ordinal	18-22, 23-26, 27-32,33 and more
	YearOfStudy	Ordinal	1, 2, 3, 4, 5, finished
	Settlement	Nominal	Urban area, Rural area
Social media (SM) usage and habits	PerceptionCapabilityToUseSM	Ordinal	Likert scale 1-5; 1-Strongly disagree, 5-Strongly agree
	Device_DesktopComputer	Dichotomous	Yes, No
	Device_Laptop	Dichotomous	Yes, No
	Device_Tablet	Dichotomous	Yes, No
	Device_Smartphone	Dichotomous	Yes, No
	Device_SmartWatch	Dichotomous	Yes, No
	Device_SmartTV	Dichotomous	Yes, No
	Device_OtherDevices	Dichotomous	Yes, No
	SM_Facebook	Dichotomous	Yes, No
	SM_Twitter	Dichotomous	Yes, No
	SM_Instagram	Dichotomous	Yes, No
	SM_TikTok	Dichotomous	Yes, No
	SM_YouTube	Dichotomous	Yes, No
	SM_LinkedIn	Dichotomous	Yes, No
	SM_Snapchat	Dichotomous	Yes, No
	SM_Pinterest	Dichotomous	Yes, No
	SM_Whatsapp	Dichotomous	Yes, No
	SM_Viber	Dichotomous	Yes, No
	SM_Messenger	Dichotomous	Yes, No
	SM_OtherSocialMedia	Dichotomous	Yes, No
ActivityLevelSM	Ordinal	Likert scale 1-5; 1-Not active at all; 5-Extremely active	
FrequencySM	Ordinal	0-2 times per day, 3-5 times per day, 6-8 times per day, 8-11 times per day, 12 and more times per day	
TimeSpentSM	Ordinal	0-2 times per day, 3-5 times per day, 6-8 times per day, 8-11 times per day, >=12 times per day	

Source: authors' work (2023).

First, frequencies were calculated for all variables. Then, a Chi-square analysis was performed for dichotomous variables (see Table 3) to estimate whether there was a significant difference in social media usage and habits (Device and SM) between female and male students.

Next, Kolmogorov-Smirnov (K-S) test has been used to investigate the validity of the assumption that distributions are normal. Nonetheless, Levene's test has been applied in order to verify the hypothesis that variance is homogeneous. Since neither the assumption of normality of the data distribution nor the assumption of the homogeneity of variance were tenable, the nonparametric Mann-Whitney U Test has been used in the further data analysis to test if the noted gender differences are statistically significant. The Mann-Whitney U test is used for ordinal variables with more than two modalities: PerceptionCapabilityToUseSM, FrequencySM, TimeSpentSM and ActivityLevelSM.

Results

Table 4 describes how many students use each of the observed social media. Most students use WhatsApp (96.36%), YouTube (95.36%), and Instagram (92.38%). The least used social media is Viber (20.53%). Additionally, the table shows the most frequently used combinations of social media for both males and females. In 94.04% of the cases, students use YouTube and

WhatsApp simultaneously. Instagram and WhatsApp are used together by 90.07% of students. The results presented in Table 4 show that YouTube, WhatsApp and Instagram are used simultaneously in almost 90% of cases. Facebook is also used simultaneously with YouTube, WhatsApp or Instagram in more than 70% of cases.

Table 4: Frequently used social media and combinations of social media by students

Social media and combinations of social media	Frequency	% in Total Number of Student
WhatsApp	291	96.36%
YouTube	288	95.36%
YouTube, WhatsApp	284	94,04%
Instagram	279	92.38%
Instagram, WhatsApp	272	90,07%
Instagram, YouTube	270	89,40%
Instagram, YouTube, WhatsApp	266	88,08%
Facebook	232	76.82%
Facebook, WhatsApp	228	75,50%
Facebook, YouTube	225	74,50%
Facebook, YouTube, WhatsApp	223	73,84%
Facebook, Instagram	220	72,85%
Facebook, Instagram, WhatsApp	217	71,85%
Facebook, Instagram, YouTube	214	70,86%
Facebook, Instagram, YouTube, WhatsApp	212	70,20%
TikTok	151	50.00%
Messenger	150	49.67%
Snapchat	124	41.06%
Pinterest	121	40.07%
LinkedIn	91	30.13%
Twitter	75	24.83%
Viber	62	20.53%
Other	2	0.66%

Source: authors' work (2023).

Table 5 shows that most students use smartphones (96.69%) and laptops (92.72%) to access online tools, social media, and networks. Smart TV is likely to be used to access YouTube services. Desktop computers are less popular than smart TVs. Tablets are used by less than one-third of students, and smartwatches are the least used devices. A Chi-square analysis was conducted to determine that there is no significant difference between genders in device usage. The least popular devices among female students are smartwatches, and tablets are the least popular devices among male students.

Table 5: Devices used by students to access social media and networks

Device	Number of Students	% of Total Number of Students	% of Total Number of Female Students	% of Total Number of Male Students
Smartphone	292	96.69%	96.46%	97.12%
Laptop	280	92.72%	93.43%	91.35%
Smart TV	136	45.03%	46.46%	42.31%
Desktop computer	119	39.40%	36.36%	45.19%

Device	Number of Students	% of Total Number of Students	% of Total Number of Female Students	% of Total Number of Male Students
Tablet	81	26.82%	29.29%	22.12%
Smart watch	61	20.20%	18.18%	24.04%
Other devices	0	0.00%	0.00%	0.00%

Source: authors' work (2023).

Table 6 compares the use of social media by female and male students, regardless of whether or not they use each social media. There are no significant differences between genders in the use of Facebook, with a slightly higher percentage of female students (79.29%) than male students (72.12%). The most popular social media among students are WhatsApp and YouTube. The percentage of WhatsApp users is about 96% for both genders. Similarly, male students are YouTube users in 98.08% of cases and compared to them, female students do not differ much. Female students are YouTube users in 93.94% of the cases. There are also no significant differences between genders in the use of Snapchat, Messenger, LinkedIn and Viber. It can also be noted that LinkedIn and Viber are the least popular social media among students.

Apart from this, it can be noted that female and male students differ significantly in the use of Twitter at a 1% level of significance (Pearson Chi-Square 13.6317; p-value 0.0002). Male students are more likely to use Twitter (37.50%) than female students (18.18%). In general, Twitter is used more by male users than other social networks, which are mainly used by female users. On most social networks, female users tend to communicate in more interactive and contextual ways, such as using hashtags to express emotions and posting content such as photos and videos (Harjule et al., 2023). On Twitter, on the other hand, information sharing is based on faster, shorter, and more concise retweets, which can be described as more traditionally masculine and functional tags that include when, who, what, and where.

In contrast to male students, 95.45% of female students use Instagram (Pearson Chi-Square 7.7041; p-value 0.0055) at the 1% significance level. Therefore, in our research, in terms of sharing habits, female students are more present on Instagram than male students.

In addition, the difference between female and male students is also significant in the use of TikTok (Pearson Chi-Square 15.0179; p-value 0.0001). Almost 60% of female students use TikTok. Male students use TikTok about 35% of the time. TikTok is very attractive to female students. The platform promotes humour and creative expression, which is in contrast to posts on Instagram that promote unrealistic standards and "live my best life" content. Even though male students use TikTok, many of them prefer to spend their time on other social media such as YouTube.

Finally, the largest gender difference is found on Pinterest (Pearson Chi-Square 50.1972; p-value 0.0000). More than half of female students use Pinterest, compared to only 12.5% of male students. Pinterest is mostly used by female users. Female and male users use Pinterest for very different reasons and in different ways. Female students use Pinterest as a source of inspiration and motivation, to get ideas on fashion, aesthetic topics, art, DIY projects, and lifestyle, and to create a wish list. Male students use Pinterest like a visual book collection to showcase things they already own.

The most popular social media among both male and female students is WhatsApp. Twitter is the least popular social media among female students, while Pinterest is the least popular among male students.

Table 6: Gender by use of individual social media

Social Media (Yes)	Gender		Chi-square / (p-value)	M-L Chi-square / (p-value)
	Female	Male		
Facebook	79.29%	72.12%	1.9727 (0.1602)	1.9359 (0.1641)
Twitter	18.18%	37.50%	13.6317 (0.0002**)	13.1831 (0.0003**)
WhatsApp	96.46%	96.15%	0.0188 (0.8910)	0.0186 (0.8915)
Instagram	95.45%	86.54%	7.7041 (0.0055**)	7.2517 (0.0071**)
TikTok	58.08%	34.62%	15.0179 (0.0001**)	15.2022 (0.0001**)
YouTube	93.94%	98.08%	2.6404 (0.1042)	3.0346 (0.0815*)
Pinterest	54.55%	12.50%	50.1972 (0.0000**)	55.4448 (0.0000**)
Snapchat	44.44%	34.62%	2.722 (0.0990)	2.7495 (0.0973*)
LinkedIn	29.80%	30.77%	0.0306 (0.8612)	0.0305 (0.8614)
Viber	19.70%	22.12%	0.2444 (0.6210)	0.2424 (0.6225)
Messenger	51.52%	46.15%	0.7840 (0.3759)	0.7846 (0.3757)

Note: ** statistically significant at 1%; *10%.

Source: authors' work (2023).

Table 7 shows that more than half of students use social media and networks more than 8 times per day. Nearly 40% of students use social media and networks 12 or more times per day. One-third of students spend more than 4 hours per day using social media. They rate their activity level on social media and networks as high or very high. Moderate activity was perceived by 28.48% of students. 62.91% of the students fully agree that they feel able to use online tools, social media and networks.

Table 7: Students' social media use habits in terms of frequency, time spent on social media, and perceptions of social media use and ability to use social media

Variable	Modalities	% of Students in Total (N=302)	% of Females (N=198)	% of Males (N=104)
FrequencySM	0-2 times per day	2.32%	0,51%	5,77%
	3-5 times per day	14.90%	12,63%	19,23%
	6-8 times per day	28.48%	29,80%	25,96%
	8-11 times per day	15.89%	17,68%	12,50%
	>=12 times per day	38.41%	39,39%	36,54%
TimeSpentSM	<= 2 hrs per day	11.26%	8,08%	17,31%
	> 2 hrs and <= 3 hrs per day	26.49%	21,21%	36,54%
	> 3 hrs and <= 4 hrs per day	28.81%	30,81%	25,00%
	> 4 hrs and <=5 hrs per day	15.56%	17,68%	11,54%
	> 5 hrs per day	17.88%	22,22%	9,62%
ActivityLevelSM	1-Not active at all	2.32%	1,52%	3,85%
	2	11.59%	9,60%	15,38%
	3	28.48%	30,30%	25,00%
	4	38.74%	36,87%	42,31%
	5-Extremely active	18.87%	21,72%	13,46%
PerceptionCapability ToUseSM	1-Strongly disagree	1.66%	2,02%	0,96%
	2	1.32%	1,01%	1,92%
	3	6.95%	6,57%	7,69%
	4	27.15%	28,28%	25,00%
	5-Strongly agree	62.91%	62,12%	64,42%

Source: authors' work (2023).

Table 8 shows the results of the Mann-Whitney U test for the variable gender. The summed values provide information about the two groups tested, male and female students. The results indicate that the female student group rated higher in the ability to use social media, frequency of social media use, time spent on social media, and overall activity level on social media.

The values for the U statistic as well as the p-value for the Z statistic show that female students' time spent on social media was statistically significantly higher than that of male students (U = 7249, Z = 4.2249, p-value 0.000; Z adjusted = 4.3425, p-value 0.000). However, the genders do not differ significantly in their perceived ability to use social media, frequency of social media use, or level of activity on social media.

Table 8: Results of the Mann-Whitney U test by variable Gender

Variable	Rank Sum Female	Rank Sum Male	U	Z / p-value	Z adjusted / p-value	Valid N Female	Valid N Male
FrequencySM	31147	14606	9146	1,5941 (0,1109)	1,6685 (0,0952*)	198	104
TimeSpentSM	33044	12709	7249	4,2249 (0,0000**)	4,3425 (0,0000**)	198	104
ActivityLevelSM	31050	14703	9243	1,4596 (0,1444)	1,5297 (0,1261)	198	104
PerceptionCapabilityToUseSM	29813,5	15939,5	10112,5	-0,2538 (0,7997)	-0,2969 (0,7665)	198	104

Note: ** statistically significant at 1%; *10%

Source: authors' work (2023).

Discussion

Scientific implications

When observing the world's statistics regarding social media popularity, the most popular social media is Facebook, followed by YouTube, WhatsApp, and Instagram (Dixon, 2023b). Croatian social media statistics show that Facebook is the most popular social media platform (StatCounter, 2023). Our results show that these social media platforms are the first four in popularity, but in the student population, the order is different. WhatsApp is the most popular, followed by YouTube, Instagram, and Facebook. Compared to Khoros (2023) statistics on the percentage of social media in the student age group, our results show a lower percentage of students using Facebook, Twitter, and Snapchat, a higher percentage of students using Instagram, YouTube, LinkedIn, and Pinterest, and the same percentage of students using TikTok. Comparing the global statistics for females to those of the female students in our study shows that Facebook, Instagram, and YouTube are more popular among female students, while Twitter, TikTok, LinkedIn, and Pinterest are less popular. Male students in our study use social media less compared to global statistics for men. According to Zote (2023), Instagram's gender statistics show that male users outnumber female users (51.8%), but with not that that significant difference, suggesting that Instagram isn't necessarily superior for addressing a male audience. However, these comparisons might look quite different if we could compare the statistics for the world's student population by gender. In that sense, and in a contrast, our research revealed that more female students use Instagram than male students. Still, our research is in line with some of the existing literature, such as Murnane, Forte and Magner

(2023), which report that, in comparison to males, females tend to use more social media in general, and specifically TikTok, Pinterest and Instagram.

In their work, Surmelioglu and Seferoglu (2019) conducted research on a sample of 508 higher education students aiming to examine the level of feeling sufficient for using online tools and devices used by students to connect to online environments. They report that the majority of their respondents (38%) feel completely sufficient for using online tools (Surmelioglu & Seferoglu, 2019). Our results are in line with those findings since the majority of our respondents (around 63%) also fully agree that they feel capable to use online tools. In addition, the results of Surmelioglu and Seferoglu (2019) research indicate that the most used devices for connection to online environments are smartphones (78.54%) and laptops (66.73%), which complies with our research as well, where smartphones and laptops are also the most used devices for accessing online tools.

Harjule et al. (2023) researched social media usage in a sample of 369 college students. They report the majority of students are moderately active on social media (Harjule et al., 2023), while the majority of our respondents turned out to be very active social media users. Next, the majority of students in the Harjule et al. (2023) research (54.6%) reported using social media between 3 and 8 times a day, which is not in line with our research where the majority of our respondents (38.41%) reported using social media 12 and more times a day. Finally, when observing the number of respondents who spend between 0 and 2 hours a day using social media, in our study such students represent the minority (11.26%), while in Harjule et al. (2023) they represent the majority (59.3%). On the other hand, in our study, the majority of students spend between 3 and 4 hours a day using social media.

However, although previously mentioned studies by Surmelioglu and Seferoglu (2019) and Harjule et al. (2023) did ask respondents for their gender, they did not compare the results between males and females in terms of social media usage, feeling capable to use online tools nor the devices used for connecting to online environments. Therefore, one of the scientific contributions of our paper is the examination of gender differences across named variables.

In addition, to the best of our knowledge, there is no previous scientific research conducted in Croatia dealing with gender differences in the habits of social media usage across the higher education student population based on the literature used to develop the questionnaire for this study. Hence, this paper also contributes to the body of knowledge regarding the named topic revealing the current state of students' social media usage patterns. For that reason, the second scientific contribution of our study lies in developing and testing the research instrument for examining the habits of using social media among students, concerning their gender.

Practical implications

Companies may be interested in which platforms are more popular with female students and which are more popular with male students. When planning marketing campaigns and posts on social media, companies could consider the results of this and similar studies. They could use these results to align their business goals with the responsiveness of content on social media and measure the success of campaigns for male and female students separately when targeting both audiences.

It might be interesting for businesses to note that students use social media almost equally on their smartphones and laptops. This means that they should design the content of their posts to be visually appealing on both devices.

In addition, knowing which social media is more popular among the student body, in general, can be a valuable source of data about their behaviour, habits, and attitudes toward specific products or a company. A larger digital footprint means more data that can be collected, stored and analysed by a company. Social media analysis can provide new insights into the target segment. Based on these insights, management, especially marketing and sales, can make data-driven decisions. Ultimately, this leads to better process management and more effective digital marketing and sales.

Information about which social media is used differently by female and male students can be valuable to companies. This means they can apply a segmentation strategy to improve their marketing and sales efforts, use resources effectively, and engage only in the social media they expect to see a return on investment. For example, a company may decide not to engage on Twitter to reach female students. Instead, it will focus on Pinterest or Instagram.

Since WhatsApp, Instagram, and YouTube are particularly popular with students, companies and universities should focus their efforts on these social media. The benefits of WhatsApp use for students can be both private and public to communicate with faculty. Privately, it provides a secure tool for chatting, creating groups, and sharing photos, videos and other data. WhatsApp also supports free voice and video calls so faculty and students can communicate. Faculty can send reminders about due dates for homework or exams and engage students in the learning process.

Instagram can use reels, a way to create short video content. Businesses could continue to use Instagram as the main social channel for influencer marketing. If businesses are using or considering using influencers in their marketing strategy, they will most likely use Instagram and Instagram Reels to share engaging content that resonates with students. In terms of universities and faculties, it should be noted that their current and potential students on Instagram interact with university or faculty accounts, suggesting that they should post photos and student social media takeovers.

YouTube isn't usually considered a social media platform. For many people, YouTube is associated with videos. However, students use YouTube to learn about businesses and universities. They watch their YouTube accounts, but usually don't comment. However, they do comment on videos from the channels they follow, such as product reviews and hauls content, as well as personal student accounts.

Facebook is an important channel for alumni engagement. Current students use it less than Instagram or YouTube, but it can still be part of universities' and companies' content strategies. For example, universities can use Facebook groups to connect students with prospective students and build relationships with them.

Twitter is the preferred platform for the university community, but it is little and moderately used by a broader audience: only 24% of students use the platform. It is also more popular with male students than with female students. Despite this low percentage, it can be a valuable resource for gathering students' thoughts on various topics.

TikTok is becoming increasingly popular and is used by 50% of students. User-created short videos are posted on the platform, with content ranging from challenges to various educational clips. TikTok is used to find entertaining content, post or share videos or images, and keep up to date with news and viral content. Businesses and universities could be successful with TikTok users, but their content must be creative. Since there are differences in TikTok usage between male and female students, with female students more likely to be on TikTok, content creators should consider this fact when deciding on a TikTok content strategy.

When it comes to Pinterest, businesses and universities could focus more on female students, since more than half of them use it compared to male students. Pinterest can be a place where they can visually showcase their businesses and activities, as it is the only social media that currently supports visual search. Pinterest can be used to make female students aware of their brand, which can ultimately help them make a purchasing decision based on what they have seen about a product on Pinterest.

Furthermore, insights into the social media combinations most frequently used by students can be used by companies and universities to decide on which social media they want to publish their content simultaneously and plan digital marketing activities more efficiently.

Because female students rated their ability to use social media, frequency of social media use, time spent on social media, and overall activity level on social media higher, companies and universities can expect them to be more engaged when it comes to commenting and responding to the content they post on social media. In addition, this means they will collect a larger digital footprint or data from social media.

Conclusion

This paper presented the preliminary results of the empirical study of student habits in using social networks between male and female students at the Faculty of Economics & Business, University of Zagreb. The obtained research results showed that the most popular social networks among students are WhatsApp, YouTube and Instagram, while Viber is the least used. There is no statistical difference in using Whatsapp, YouTube and Facebook among female and male students. However, in the use of Whatsapp and YouTube, there is a slightly higher percentage of male students than female students, while a slightly higher percentage of female students use Facebook. A statistically significant difference in the use of social networks was obtained for the following social networks: Twitter, Instagram, TikTok, Pinterest, Snapchat and YouTube. According to the obtained results, Twitter is used the most among the male population, while Pinterest is more represented among female students. Moreover, the research showed that students mostly access social networks using smartphones and laptops. Taking into account the difference between genders, female students use smartwatches the least while male students use tablets to access social networks the least. Likewise, the research showed that students of both genders visit social networks more than 8 times a day, with female students spending more time on social networks than male students.

The obtained results of this research are significant for business practice, which is explained in the previously described practical implications of this work.

This study has two major limitations that could be addressed in future research. First, the study focused on a sample drawn from a population of third-year students in the Business

Administration programme at the Faculty of Economics & Business, University of Zagreb, which limits the generalizability of the results to the entire student population. The conclusions might be somewhat different if the sample was evenly distributed across all years and programmes. Second, only students from the Faculty of Economics & Business at the University of Zagreb, Croatia, were included in this study. Social media usage habits may differ among students from different universities and faculties.

For future research, this study should be extended to a larger population of students, across different years of study and different areas of study. It would also be interesting to investigate possible differences in results between different countries. In addition, future research should consider students' sharing habits and digital footprint on different social media to identify gender differences.

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E-LEARNING SYSTEMS FOR ONLINE LEARNING

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Abstract

E-learning systems for online learning are an excellent and modern way of learning that will certainly become more popular in the future and become one of the primary sources of knowledge. In today's dynamic time when everyone has access to cell phones, personal computers or other technology that has access to the Internet, this method is easily and quickly available to everyone. E-learning systems are a reliable, fast and efficient way of learning new technologies. This paper presents a created web application for e-learning written using the Django framework. Due to its MVT (Model-View-Template) architecture, Django has proven to be an excellent framework because it is fast, reliable and adaptable. The programming language used to write the Django application is Python. HTML, CSS and SQLite database were also used in the work. A survey of interest and familiarity with the e-learning learning method was conducted, and certain results were extracted from the data obtained.

Keywords: Django framework, web application, Python, MVT, e-learning, research

JEL classification: D83, L86

Introduction

The paper has three main parts. The first part introduces the topic of e-learning systems, their advantages, and their increasing popularity. The author describes the benefits of e-learning systems and how they are being used in modern times. The second part of the paper is focused on describing the creation of a web application for e-learning using the Django framework. The author explains why Django is a good choice for developing an e-learning system and discusses the programming languages and software support used in the project. Additionally, the author mentions that research was conducted on the knowledge and use of e-learning systems, but no further details are provided about the research. Overall, the structure of the paper is divided into an introductory section and a technical section that describes the creation of the e-learning web application using Django. The third part is structure of the research section and it is broken down into the following parts:

- Introduction to the research: This part will give a brief overview of the research conducted on e-learning systems for online learning and the methodology used.
- Sample population: This part will describe the sample population and will provide statistical information about the respondents, such as their age group, education level, and scientific or professional field.
- Results by age: This part will present the results of the survey by age group, including the average rating of familiarity and interest for each group and the conclusion.

- Results by education: This part will present the results of the survey by education level, including the average rating of familiarity and interest for each group.
- Results by scientific or professional field: This part will present the results of the survey by scientific or professional field, including the average rating of familiarity and interest for each group and the conclusion.

E-learning systems for online learning are an excellent and modern way of learning that will certainly become more popular in the future and become one of the primary sources of knowledge. In today's dynamic time when everyone has access to cell phones, personal computers or other technology that has access to the Internet, this method is easily and quickly available to everyone. E-learning systems are a reliable, fast and efficient way of learning new technologies.

The use of information and communication technology to improve or upgrade one's own knowledge is today a matter of general culture, and the time of working from home has proven to be very productive in this sense because, apart from individual trainings, modern technologies have been very much used by companies holding various webinars for their employees who were forced to work from home. Distance school showed that this way of learning is very interesting and productive, considering that most of the teachers were extremely creative in creating teaching materials and assignments. The biggest advantage of online learning lies in the fact that numerous and different materials for learning and repetition are available to students on digital educational platforms.

This paper describes the creation of a web application for e-learning written using the Django framework. Due to its MVT (Model-View-Template) architecture, Django has proven to be an excellent framework because it is fast, reliable and adaptable. The programming language used to write the Django application is Python. HTML, CSS and SQLite database were also used to create the software support. In addition to the implementation of the software solution, research was also conducted on the knowledge and use of the e-learning system.

The aim of this research was to obtain a general insight into the awareness and interest of respondents towards e-learning systems for online learning. The study will use a created Google survey to independently collect data over a ten-day period.

Development framework Django

Django is a framework for developing Internet applications written in the Python programming language. It encourages rapid development and clean, pragmatic design and is free and open source. One of the main characteristics of Django is that it is extremely fast. Django helps you write programs that are responsive, secure, changeable/scalable, maintainable, and portable. Django groups web applications into pieces of code that handle each of the following steps in separate files. This architecture is called MVT (Model-View-Template) as shown in figure 1.

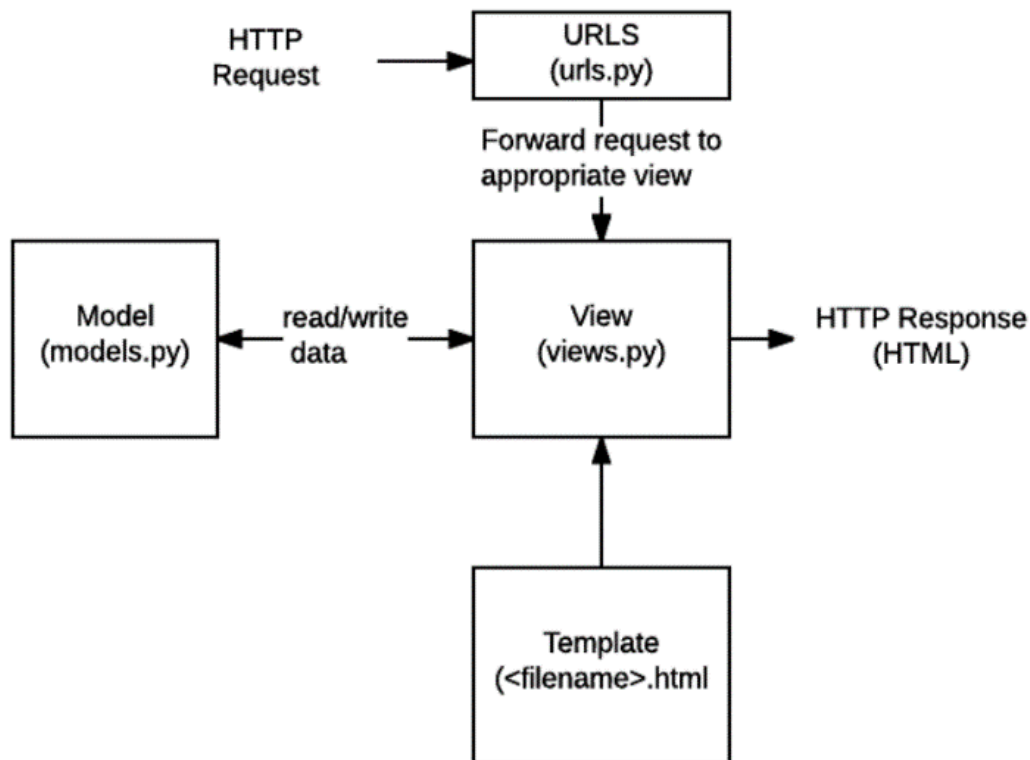
The architecture consists of the following parts:

- URLs, where the URL sends the request to the correct view. Although it is possible to handle requests for each URL through a single function, it is much more efficient and easier to maintain separate view functions to handle each of the resources. URL mapping via the `urls.py` file is used to redirect HTTP requests to the appropriate display based on

the request. URL mapping can pass the specific name or string of digits that appear in the URL to the display function as data.

- Views, where a View is a request processing function that receives HTTP requests and returns processed HTTP responses. The view accesses the data needed to satisfy the requests obtained from the model and sends a processed response to the template.
- Models, where Models are objects written in Python that define the application's data structure and provide mechanisms for managing (adding, changing, deleting) and writing queries to the database.
- Templates, where a Template is a text file that defines the structure or layout of a file (most commonly HTML pages), and placeholders or forms are used to display the actual content obtained from the view. A view can create a dynamic HTML page using an HTML template, populating it with data from the model. A template can be used to define the structure of any type of file, it doesn't have to be HTML.

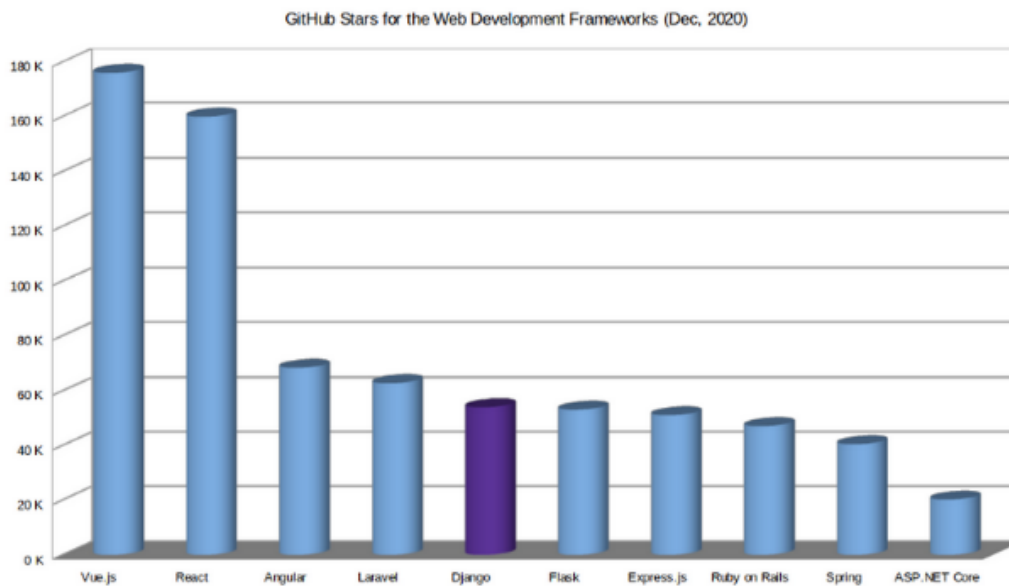
Figure 1: Django-MVT architecture



Source: <https://stacksecrets.com/wp-content/uploads/2020/04/mvt.png>, 09/03/2021.

There is no available solution and definitive results for the popularity of server-side frameworks, although popularity can be estimated by the number of GitHub projects and questions on the StackOverflow page for each platform. Based on the high number of quality and well-known websites and applications using Django, the number of people contributing to the code, and the number of people providing both free and paid support, it can be said that Django is a popular framework as can be seen at figure 2.

Figure 2: Popularity of the Django framework in 2020.



Source: https://miro.medium.com/max/1400/1*Hp9QIWDK7tTA_iTicv_ZdQ.png, 27.08.2021.

Some of the major websites and applications using Django are Disqus, Instagram, Knight Foundation, MacArthur Foundation, Mozilla, National Geographic, Open Knowledge Foundation, Pinterest and Open Stack.

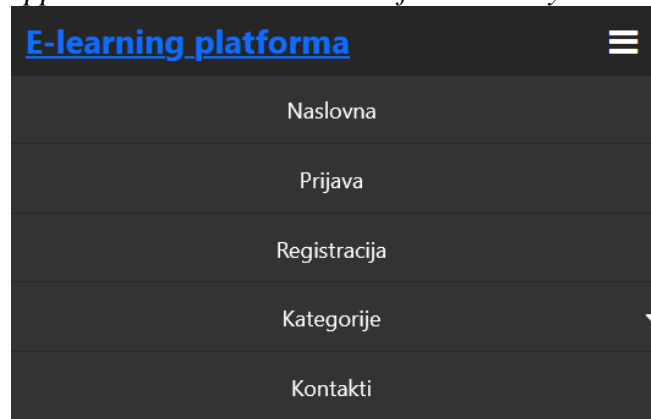
E-learning application

The developed e-learning application is used so that users can visit the pages of the online learning platform and study and attend courses online. Within the application, there are two types of users, lecturers and course participants. The course participant has the right to watch and listen to the course, while the lecturer has the right to add video content. The application consists of several different parts. On the entire page there is a navigation menu with all parts of the page. When the application is launched, the home page opens. On the front page there is an option to log in and a list of recently added courses. The user has the option of logging in and registering on the page, the data of which is recorded in the SQLite database. Once the user has registered, he will always be able to enter the site with his existing username and password. A newly registered user can only be a course participant. In order for a user to become a lecturer, this must be done with administrative rights on the Django administration pages. The main part of the page is about Categories. All courses available on the e-learning page can be found under the categories. Each course consists of video content and, if the user is registered as a lecturer, a section for adding video content.

The restriction functionality is obtained by checking whether the user is logged into the session as staff within the Django admin interface, and if not, the form for adding content will not be enabled. A user can only be allowed to add content within the Django admin interface.

Category pages are the most important part of this application. It contains all currently available courses on the site. A drop-down menu has been created on the navigation menu that displays the available courses, as can be seen from Figure 3. Currently, the page has two available courses, Python tutorials and Django tutorials.

Figure 3: E-learning application - reduced window functionality.

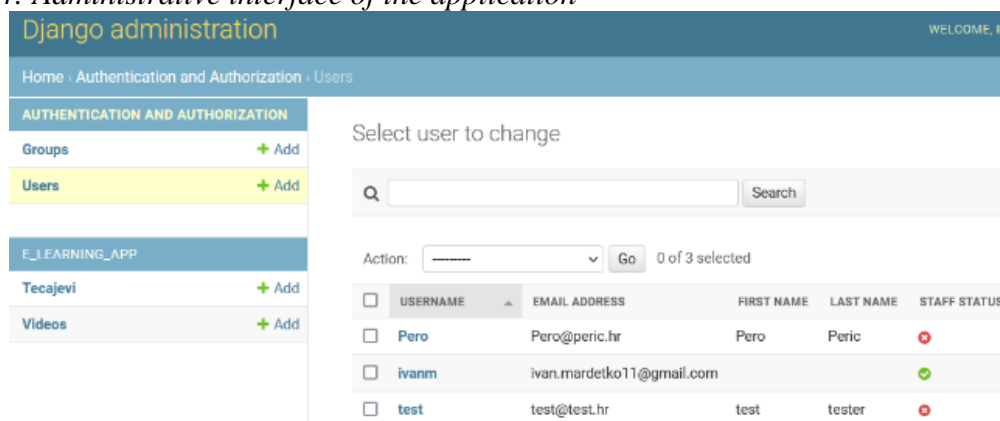


Source: authors.

When you enter one of the courses, the page first displays a welcome message with your username. After that, all the video content available for the selected course is printed, sorted by the selected order in the Django admin interface. Each video has a start button, video duration, a mute button which is on by default, a volume bar and a full-screen zoom button as shown in Figure 4. When the video is started, the start button turns into button to pause the video. It also turns the zoom button into a button to exit full-screen projection. Within the app, there is a model for each video. The model inherits the Model function and consists of a name, a file that represents the video, an image that is visible before the video starts, and a link to one of the courses.

One of the most powerful parts of Django is the automatic admin interface Django admin. Django admin reads metadata from the application model to provide a fast, model-driven interface where selected users can manage content on the site. The admin within the Django admin has many settings to customize, but they should be used with care. If it is necessary to provide an interface that summarizes the details of database tables and fields, then views should be used.

Figure 4: Administrative interface of the application



Source: authors.

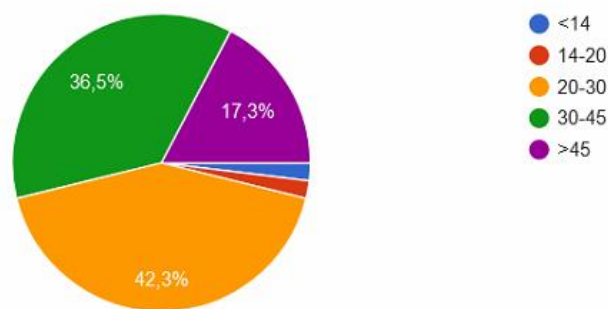
Within the Django admin of the e-learning application, users are created and their status is assigned, whether they are Staff or not, as can be seen. Those who are, have the right to upload video content to the application, while those who are not do not. Tables for videos and courses were also created. Each video has a link to a specific course, and it is possible to extract only a certain part of the video content from the link.

Research and results

On the subject of e-learning systems for online learning, research was conducted that included independent data collection through a created Google survey. The goal of the research was to get a general insight into the awareness and interest of the respondents. The survey was conducted over a period of ten days.

The survey was completed by fifty-two respondents, and the statistics of the respondents are shown in the continuation of the paper. Most respondents in the age group of 20 to 30 participated in the survey (Figure 5) and most of them were highly educated (Figure 6) and from the field of IT (Figure 7).

Figure 5: The age of the respondent



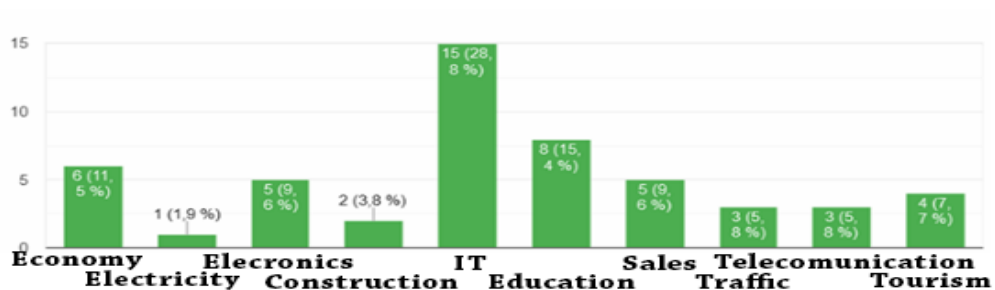
Source: authors.

Figure 6: Education of the respondents



Source: authors.

Figure 7: Scientific/professional field of the respondent



Source: authors.

The obtained research results were analyzed by age, education and by scientific or professional field of the respondents.

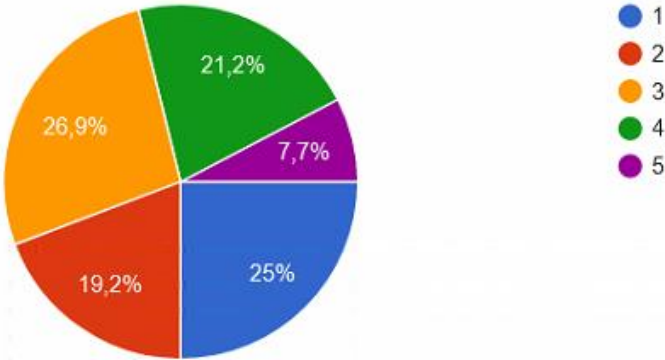
Only two respondents belong to the group of people under the age of twenty. The mean rating of familiarity is 2.5, while the mean rating of interest is 3.5. A total of twenty-three respondents belong to the group between the ages of twenty and thirty. The average rating of familiarity is 3.1, while the average rating of interest is 4.2. A total of nineteen respondents belong to the group between the ages of thirty and forty-five. The average rating of familiarity is 2.6, while the average rating of interest is 3.7. A total of nine respondents belong to the group over forty-five years old. The average rating of familiarity is 1.7, while the average rating of interest is 2.9. From the obtained results by age, it can be concluded that the younger population is more informed and interested than the older population.

Seventeen respondents belong to the group with secondary school education. The average rating of familiarity is 1.7, while the average rating of interest is 2.8. Twenty-three respondents belong to the group with a bachelor's degree. The average rating of familiarity is 3.1, while the average rating of interest is 4.3. Thirteen people belong to the group with specialist and master's degrees. The average rating of familiarity is 3.2, while the average rating of interest is 4.2. From the obtained results by education, it can be concluded that with higher education comes greater familiarity and interest in e-learning.

The group of respondents from the field of information technologies includes the most respondents, fifteen of them. The average score of their familiarity is 4, while the average score of interest of the high is 4.8. There are seven respondents in the group of respondents from the field of economics. The average rating of familiarity is 3.1, while the average rating of interest is 4.1. There are eight respondents in the group of respondents from the field of upbringing and education. The average rating of familiarity is 1.6, while the average rating of interest is 2.7. There are five respondents in the group of respondents from the field of electrical engineering. The average rating of familiarity is 2.6, while the average rating of interest is 4.2. There are five respondents in the group of respondents from the field of sales. The average rating of familiarity is 1.2, while the average rating of interest is 2.4. There are four respondents in the group of respondents from the field of telecommunications. The average rating of their familiarity is 2.25, while the average rating of interest is 3.75. There are five respondents in the group of respondents from the field of transport and construction. The average rating of their familiarity is 3, while the average rating of interest is 4. There are four respondents in the group of respondents from the field of tourism. The mean rating of familiarity is 1.5, while the mean rating of interest is 2.5. From the obtained results by scientific field, it can be concluded that in the field of information technology, economics and electrical engineering, the average rating of familiarity and interest is higher, in the field of telecommunications, transport and construction it is medium, while in the field of education, sales and tourism, familiarity is slightly lower and interest in e-learning way of learning.

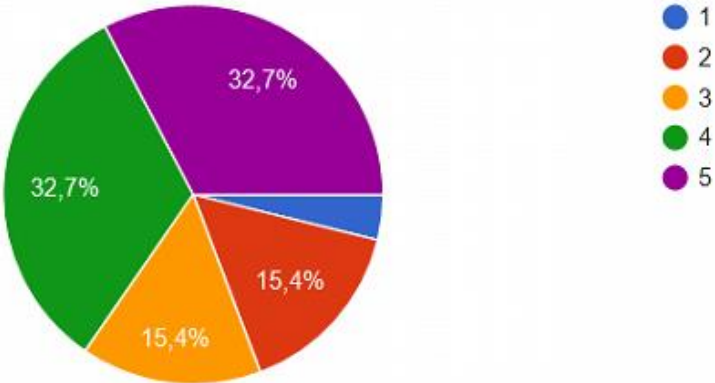
The overall average rating of familiarity of all respondents is 2.7, while the overall average rating of interest is 3.8. From the above, it can be concluded that interest is greater than familiarity and that a large number of people want to try and continue learning in this way.

Figure 8: Knowledge of respondents (on a scale of 1-5, how familiar are you with the e-learning learning method)



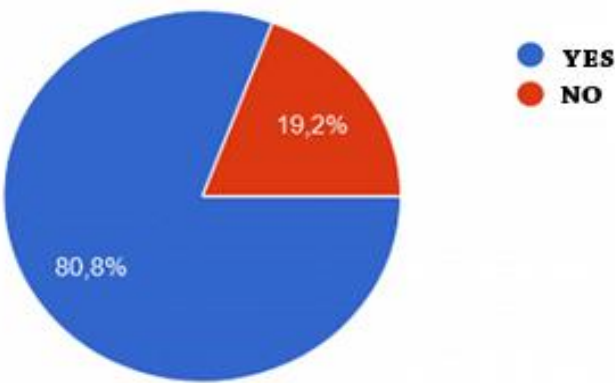
Source: authors.

Figure 9: The interest of the respondents (on a scale of 1 - 5, how interested are you in e-learning)



Source: authors.

Figure 10: Respondents' interest in future use of the system



Source: authors.

The survey was completed by fifty-two respondents, who were analysed by age, education and scientific or professional field.

The research found that the younger population is more informed and interested than the older population, and that with higher education comes greater familiarity and interest in e-learning. The field of information technology, economics, and electrical engineering had higher familiarity and interest levels, while familiarity was slightly lower in the fields of education, sales, and tourism.

The research showed that interest in e-learning systems for online learning is greater than familiarity, and a large number of people want to try and continue learning in this way.

Conclusion

E-learning systems for online learning are an excellent and modern way of learning that will become one of the primary sources of knowledge in the future. They are a reliable, fast and effective way of learning new technologies. Compared to the formal way of education, e-learning additionally motivates the participants because when learning, the user can choose lessons, skip them or return to those that he feels he has not mastered well. Online course participants can choose their own learning pace, which is a big advantage. Online courses are a reliable source of knowledge and skills available in a modern and interactive way.

The Django framework proved to be an extremely positive and simple solution for creating this application. The development of the application and the conducted research provide a good foundation for the creation of a quality e-learning platform. Additional content can be added to the application and a payment method can be implemented and levels of paid membership can be defined. For progress, it would be necessary to investigate how much the users are willing to invest in this type of education.

An original research was conducted on the topic of e-learning systems for online learning, in which the goal was to get an answer to the question of whether online learning will come to life in the future and to get a general insight into the awareness and interest of the respondents. From the obtained results of the research by age, it can be concluded that interest and familiarity with online learning is greater among younger people, mostly people between the ages of twenty and thirty. Such a result is not surprising because internet access is available to today's youth from early childhood. From the obtained results of research by education, it can be concluded that the interest and familiarity with online learning is greater among people with higher education. From the results by scientific field, it can be seen that professions that deal with newer technologies such as IT, electrical engineering or economics are more familiar with online learning, while in professions such as tourism and sales, the interest is much lower.

Nowadays, the use of digital technologies is necessary for one's own progress. With the advancement of technology, new opportunities are provided, and e-learning platforms have become an extremely high-quality and productive way of learning. The results of the research are encouraging; from which it can be seen that the interest in this way of learning is great.

The conducted research on e-learning systems for online learning has several contributions for both practice and academy. First, the research provides a general insight into the awareness and interest of respondents regarding e-learning systems. This information can be useful for educational institutions and e-learning platform developers to understand their target audience better and tailor their offerings accordingly. Secondly, the research highlights the importance of higher education in increasing familiarity and interest in e-learning systems, which can guide

educational institutions in their efforts to promote e-learning to students. Finally, the research findings can be a starting point for further investigations into e-learning adoption and effectiveness.

However, the paper also has some limitations that need to be addressed. Firstly, the sample size of 52 respondents may not be representative of the wider population. Therefore, caution should be taken in generalizing the findings to other populations. Secondly, the research relies on self-reported data, which can be subject to biases and inaccuracies. Thirdly, the research does not examine the reasons behind the respondents' familiarity and interest in e-learning systems, which can provide useful insights into their decision-making processes.

In terms of future research, several possibilities can be explored. Firstly, a larger sample size can be used to increase the representativeness of the findings. Secondly, more objective measures can be used to assess familiarity and interest in e-learning systems. Thirdly, qualitative research can be conducted to explore the reasons behind respondents' familiarity and interest in e-learning systems. Finally, future research can investigate the effectiveness of e-learning systems in improving learning outcomes, which can provide valuable insights into their impact on education.

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PUBLIC DEBT TRENDS OF THE WESTERN BALKAN COUNTRIES IN THE LIGHT OF RECENT CRISIS

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Abstract

Post-pandemic inflation has worsened monetary stability and threatened public finances around the world. The war in Ukraine is further straining public finances while countries are still recovering from the pandemic. The above circumstances have led to an appreciation of the U.S. dollar in 2022, which poses a challenge to the further development of public debt costs. The dynamics of public debt growth, which exceeded GDP growth in most countries in recent years, has highlighted the importance of efficient public financial management. The public debt of most countries is expressed in the strongest world currencies, mainly the euro and the U.S. dollar. At the same time, the world economy faces a steady appreciation of the dollar, which has peaked against other major currencies. Many developing countries have substantial dollar debts, and when the dollar appreciates, the cost of servicing debt in local currency increases, leading to debt crises. This research analyzes the increase in sovereign debt repayment costs and the potential risk of default as a consequence of the global crisis. We have conducted a comparative analysis of the Western Balkan countries, based on which we explain the impact of inflation and the strengthening of the U.S. dollar on the growth of external debt and, consequently, total public debt. We use the methodology of the World Bank and the Maastricht fiscal criteria to determine the degree of indebtedness of observed countries. We have singled out basic indicators, namely the ratio of external debt to GDP, external debt to exports and public debt to GDP. The objective of this research is to assess the impact of a strong dollar on external debt and challenges in future debt servicing. This paper emphasizes the importance of monitoring the currency structure, interest rate structure, and maturities, in addition to adherence to public debt criteria.

Keywords: public debt, fiscal policy, external debt, inflation, U.S. dollar

JEL classification: H20, H30, H63, E40, E50

Introduction

We can say that the last few years have been challenging for the global economy as well as for economic theory and practice. The economic recovery after the debt crisis has slowed down and faced uncertain shocks caused by the virus pandemic. Economies overcame the aftermath of the crisis triggered by the coronavirus primarily through the policy mix of monetary and fiscal management. The results of the recovery began to take shape when the war in Ukraine showed once again that the economy is inseparable from geopolitical and global trends.

Inflation resulting from post-pandemic quantitative easing (Alipanah & Kiss, 2022) was the result of the world's major central banks reacting to the global crisis. These measures included an unconventional monetary policy, reducing significantly the key interest rate and changing the previous euro area monetary policy. During the financial crisis, unconventional monetary

policy primarily refers to various forms of monetary or quantitative easing. Most of these empirical studies have applied the monetary model to examine the causes of inflation. But with the onset of the Ukrainian war, inflation took on the contours of the Keynesian doctrine of inflation generation, well known as the cost-push theory and the supply-shock theory of inflation (Dastgerdi, 2020). Such inflation in the late crisis pointed to excessively high input prices and costs as the primary cause of inflation.

The global economy faced a sustained appreciation of the dollar, which peaked against other major currencies. The dollar is pegged to energy trade, creating a new challenge to anyone buying dollar-denominated goods outside the United States. At the same time, FED was among the first to raise reference interest rates in the fight against strong inflation, continuing the upward spiral of demand for the U.S. dollar. The dollar has strengthened primarily because there has been strong demand for dollars. These factors have caused investors to turn away from European markets and emerging markets and seek safe-haven investments in U.S. dollar-denominated assets. The war in Ukraine triggered an initial appreciation of the U.S. dollar against other world currencies. The current economic crisis generated by the pandemic and war, has led to significantly higher public debt and lower economic activity in many countries.

The position of developing countries as foreign currency debtors is a constant source of vulnerability to external shocks. This is because servicing external debt requires generating sufficient revenues from exports or other forms of income. The exchange rate volatility could affect the value of external debt and the value of export revenues in opposite directions. Although the appreciation of strong currencies against the depreciated domestic currency can lead to an increase in export revenue, at the same time there is a risk of an increase in the value of debt denominated in foreign currency.

The objective of this research is to assess the impact of a strong dollar on the public debt costs of the observed countries. Developing countries will be particularly affected by a stronger dollar, through the borrowing costs that countries pay on dollar-denominated debt and SDRs, as well as through the negative impact of rising central bank interest rates. Borrowing in foreign markets, especially for small transition economies, is usually in foreign currencies to reduce exchange rate risk through diversification.

In order to accelerate economic growth, economic theory suggests that developing countries need a certain level of external debt. Governments borrow to invest and raise the level of public services. If the public debt exceeds a certain threshold, it further puts pressure on private investments and reduces the competitiveness of the national economy. In addition to the need to finance increased investments in infrastructure and public spending, but also due to the lack of long-term sources of financing in the country, governments often borrow abroad (Stiglitz, J. E., 2004).

In this paper, we present the currency structure of external debt as part of total public debt in a geographical framework that includes the countries of the Western Balkans. A comparative analysis of the observed countries shows the growth tendencies of debt in the previous period. The methodology of the World Bank was conducted to determine the criteria for ranking the degree of indebtedness. Two basic indicators, namely the ratio of external debt to GDP and the ratio of external debt to exports were presented. We have focused on examining the causes and effects of the rise of the dollar in the recent crisis and, in particular, its impact on public debt.

The theoretical concept of public debt and public debt management

Classical economics treated government debt as an explicit income for budgetary difficulties and to cover extraordinary public expenditures. The monetary theory of public debt, rejecting the classical doctrine, developed the concept of modern functions of public debt. As an instrument of fiscal policy, public debt is assumed as the function in balancing budget expenditures, the function of economic stabilization and the function of economic development.

Regional contemporary literature deals with the issue of public debt dynamics, the methodology for assessing debt sustainability, and the possibility of quantifying debt sustainability (Krajisnik & Stevanović, 2018). In the Republic of Croatia, Šimović & Batur (2017) contributed to the popularization of this topic within the framework of the project Sustainability of Public Finances on the Road to Monetary Union. Šimović and Batur analyzed fiscal sustainability and public debt sustainability, distinguishing between indicators of fiscal stability, fiscal vulnerability, and a complex indicator.

Public debt can also be defined as the accumulated budget deficit of the past, since borrowing finances the budget deficit created by higher budget expenditures than revenues during a given period (Bajo & Pezer). Government debt can also be considered as the extraordinary income of the state, which is used as one of the sources to finance its functions. Although the main objective of government borrowing is to raise funds for state needs, it is also used to implement economic policies and balance the tax burden (Jurković, 2002). The problem of debt sustainability in Serbia was studied by Andrić, Arsić & Nojković (2016). They observed the structural fiscal deficit and dynamics of Serbian public debt, as well as the problem of sustainability of Serbian public debt before and during the global economic crisis.

Significant research that addressed the issue of debt sustainability at the European Union level (Bouabdallah, Checherita-Westphal, Warmedinger, De Stefani, Drudi, Setzer & Westphal, 2017) established a methodological framework for the analysis of debt sustainability and fiscal risks of European Union countries.

Public debt can be considered according to several criteria: institutional coverage, origin (residence of creditors), maturity structure, currency structure, interest rate structure and usability of public debt instruments. For further analysis, it is important to explain some of the commonly used criteria. Public debt can be internal or external, depending on the origin of the funds. Internal debt is the amount that a country owes to its citizens which means that does not indebt future generations because they owe each other (Rosen & Gayer, 2009). External debt is the amount the country owes to foreign lenders, including commercial banks, governments, or international financial institutions. External credit allows the import of real assets, and in this way, the government obtains additional equipment without directly reducing the funds available for other purposes, both consumption and accumulation. The realization of the opportunity cost is postponed to a later date, when the debt is paid off, causing an outflow of funds at that time (Musgrave, 1959).

Under the currency structure criterion, government debt can be denominated in domestic and foreign currencies. The risk associated with the change in the exchange rate of the foreign currency further demotivates the issuance of foreign currency debt. However, it is not desirable to denominate all government debt in domestic currency for several reasons - stability of the monetary system and crowding-out effect in other sectors. Borrowing in foreign markets,

especially in small transition economies, is usually denominated in foreign currency, i.e. it is better to spread it over several currencies to reduce exchange rate risk (Bajo et al, 2011).

Analyzing the methods and approaches to generating inflation and its impact on the country's economy, Šimurina & Nadoveza (2010), reviewing relevant research, states the conclusion that the country's external vulnerability depends on the influence of the exchange rate on prices, as well as on their conditioning through shocks to the exchange rate and shocks on the aggregate supply side.

The characteristics of public debt are of great importance for the overall economic development of the country, but also for the political and social situation in the country. Public debt management is the process of defining and implementing a strategy for government debt management in order to develop appropriate sources of financing, achieve a sustainable balance between risk and financing costs, and realise other objectives set by the government, such as developing and maintaining an efficient market for government bonds (Kumhof & Tanner, 2005).

Recent literature focuses its research on whether a high level of public debt negatively affects the economic growth of a country. After the extensive research conducted by the authors Reinhart and Rogoff in 2010, relevant scientific studies devoted attention to this issue. The authors Reinhart and Rogoff (2010) determined the existence of a reference level of about 90% of the share of public debt in GDP, up to which the effect of public debt on growth is positive. But at a higher level than this, the growth of public debt significantly slows down the further growth of GDP. These findings were confirmed by a group of authors (Woo & Kumar, 2015; Casaresu, 2015; Gómez-Puig & Sosvilla-Rivero, 2017; Bacovic, 2021). They pointed out that although developing countries need a certain level of external debt in order to accelerate economic growth, if the debt rises above a certain limit, then public debt puts pressure on private investment, reduces the competitiveness of the real economy and production, and slows down GDP growth in a large number of countries.

However, another group of authors in their research finds a weak causal effect and a low level of linkage between the level of public debt and subsequent GDP growth (Yang and Su, 2018; Ash et al. 2020; Bentour 2021). The authors point to systematic differences in the (non-linear) impact of public debt on growth among countries, which implies a lack of evidence for defining a universal threshold of the ratio of public debt to GDP above which economic growth slows down. These questions and discussions are especially pronounced in crisis conditions.

The global economic and geopolitical environment

The global macroeconomic environment has been severely affected by the recent crises. As a result, economic growth has slowed and pressures on monetary and public finances are increasing. While the main focus of economic policymakers was on growing inflation, with the slowdown of the world economy came the war.

In general, we can say that two main causes have led to global inflation. The first relates to quantitative easing in the post-pandemic period, especially by the European Central Bank. The second relates to rising commodity prices, production costs, and supply chain disruption due to the war in Ukraine. In recent years, the sharp decline in production and international trade due to the coronavirus has drastically affected global economic performance. A new responsibility

has been placed on countries to find solutions to mitigate the damage caused by the covid virus crisis. The measures taken by countries are a combination of supporting the economy and providing liquidity on the one hand and social relief measures on the other. On the other hand, the world's largest central banks have adopted new monetary policy measures in the form of quantitative easing in response to the COVID-19 pandemic and to mitigate its consequences (Topić and Šoja, 2023).

Since the dollar exchange rate plays a very important role globally, the U.S. currency has a significant impact on developing countries for several reasons. First, a stronger dollar tends to slow the growth of world trade because it has a dominant role in currency invoicing of global trade. Developing countries are small and open economies that are particularly dependent on world trade, and additional pressure on the dollar can have significant negative effects on them. The appreciation of the dollar tends to affect the creditworthiness of developing countries whose debt is denominated in US currency. A stronger dollar means higher costs to buy the dollars needed to pay debts.

Trends in public debt are the result of historical movements. After the financial crisis of 2008, countries began to borrow, followed by large injections of liquidity from central banks, which also flowed into emerging markets in search of yield. As a result, the average developing country is now much more exposed to financial markets and reverse risk (liquidity). Over the past decade, as debt has grown rapidly, income growth has stagnated and growth has begun to slow. For developing countries, this means that they will need to access stable and cheap financing, and for some countries, such an approach will need to be preceded by debt restructuring (Lars, 2021).

Emerging economies are vulnerable to capital outflows as a result of rising interest rates in advanced economies. Corporate and sovereign debt also remains a concern in some countries, as higher interest rates will increase the cost of servicing debt.

Characteristics of external debt in Western Balkan countries

The reasons for taking external loans are determined by the situation of each debtor country, but can usually be reduced to a lack of equity and aspirations in terms of development, consumption and expansion. They depend mainly on the country's development level and are therefore different for economically well-developed and developing countries. We focus on developing countries, especially the Western Balkans region.

In the last two decades, the WB countries have gone through a major transitional phase. Although the resulting borrowing was mostly focused on capital and development projects, new technologies and improvement of the efficiency of the main institutions a significant part went to cover budget deficits and spending.

The countries we observed within the Balkans are the closest countries of the region, namely Bosnia and Herzegovina, Croatia, Serbia Montenegro, North Macedonia, and Albania. Although Croatia is already a member of the EU and, more recently, of the European monetary union, we have included it in this analysis because of its economic and territorial links. For these countries, we can say that they have a high degree of euroization, from the convertible B&H mark, which is pegged to the euro through the Monetary Board, to Montenegro, which uses the euro in parallel with its national currency, to Croatia, which recently joined the single

European currency zone. In addition, most of the external debt of the observed countries is denominated in euros. Nevertheless, a certain part of the debt is also expressed in the currency of the U.S. dollar, and it is necessary to monitor and manage the debt taking into account the movements of these two largest world currencies.

Indicators of the country's indebtedness

In this part of the research, we conducted a comparative analysis using external debt indicators. The first part refers to the World Bank's methodology to determine the criteria for classifying debt levels, distinguishing two basic indicators. According to the methodology of the World Bank, the two most important criteria for classifying the level of debt are compared for each country - the ratio of external debt to GDP and the ratio of external debt to exports. The second part includes defining the level of indebtedness according to the Maastricht convergence fiscal criterion.

The ratio of external debt to GNI

External debt as a percentage of gross domestic product (GDP) is the ratio of a country's debt to foreign creditors to its nominal GDP. Part of the country's total debt to foreign creditors, including international financial institutions, governments and commercial banks, is external debt. The indebtedness criterion according to the methodology of the World Bank (World Bank and International Monetary Fund, 2003) is: when the external debt to GDP ratio exceeds 80%, the country is considered seriously indebted. A ratio between 48% and 80% means moderate indebtedness, while a country with a ratio of less than 48% is considered less indebted.

Although the World Bank methodology previously defined the debt level as the ratio of external debt to GDP, the World Bank now uses GNI instead of GDP as a more meaningful indicator. We can define the difference between GDP and GNI in fact that GDP refers to income from domestic sources, while GNI includes net primary income from abroad. At the same time, GDP addresses the concept of production, where value is added, while GNI is the concept of income. Today, the World Bank prefers to use GNI for operational purposes and for defining debt levels and debt service ratios. Accordingly, in Table 1 we present data for the past ten-year period in the Western Balkan countries.

Table 1: External debt/GNI ratio - countries of the Western Balkans (in %)

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Bosnia and Herzegovina	81.9	65.7	74.9	74.8	69.9	71.1	68.7	72.7	64.5	63.1	70.1	58.1
Croatia*	111.8	109.4	107.0	108.9	111.1	106.3	95.2	88.6	82.4	74.1	86.02	74.4
Serbia	80.4	66.8	82.1	76.6	70.9	80.0	72.6	74.9	64.6	65.9	73.5	67.8
North Macedonia	55.6	59.5	67.9	63.8	64.9	69.4	73.3	78.7	71.3	74.8	90.4	82.0
Montenegro	109.4	120.6	148.6	158.1	142.2	151.4	140.9	145.6	144.1	153.2	216.6	177.9
Albania	46.0	50.3	60.4	66.5	63.8	73.3	70.7	75.1	63.8	61.0	70.4	61.6

*Note: In the case of Croatia, we did not find data for the ED/GNI ratio, so the ED/GDP data was shown.

Source: World Bank, International Debt Statistic.

We note that this ratio had different movements across countries in the region since 2010, depending on fiscal strategy, structural reforms, but also macroeconomic trends and

turbulences. Looking at the growth of this indicator, we see that until 2016 it was highest in Montenegro (158.1%) and lowest in Albania (approximately 50%). Afterwards we notice the stabilization and reduction of this relationship, until the last turbulences and crises on market. The debt increase is primarily an outcome of the deficit in the general government budget and the resulting need for its financing. The favorable conditions for borrowing on the international capital market before the Ukraine war also led to this trend.

The ratio of total external debt to exports

Another indicator, the ratio of total external debt to exports of goods, services and primary income, shows the possibility of debt repayment through the export of goods and services. Practically, there is no danger of a debt crisis if exports are greater than imports, i.e. there is no danger as long as the amount of debt does not exceed the limit of 220% of export earnings. It is an important indicator that shows the extent to which external debt weighs on economic flows with foreign countries in the current year.

According to the criteria of the World Bank, countries are classified according to the value of this ratio as follows (Topić-Pavković, 2015):

TED/E \leq 132% low indebted country,
 132% < TED/E \leq 220% medium indebted country and
 TED/E > 220% highly indebted country,
 where: TED - total external debt.

Table 2: External debt/exports of goods and services – countries of the Western Balkans (in %)

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Albania	146.8	159.0	194.5	212.4	203.7	240.0	218.8	212.8	183.9	175.2	272.4	182.3
Bosnia and Herzegovina	251.1	185.8	211.7	205.1	188.1	184.8	174.2	163.0	140.4	143.0	186.1	123.0
Montenegro	262.2	251.7	314.2	338.7	309.0	315.5	300.6	309.1	296.7	310.3	670.0	361.4
North Macedonia	135.7	122.2	143.1	137.0	128.5	133.4	134.1	133.4	111.2	112.9	143.2	116.6
Serbia	249.9	195.2	220.6	184.4	160.3	166.3	140.0	137.5	121.2	119.8	145.4	119.7
Croatia	302,8	282,5	274,0	274,7	263,4	234,8	202,7	178,4	164,2	144,0	197,0	162,2

Sources: World Bank, International Debt Statistic; HNB.

The observed countries have had a negative foreign trade balance for many years, which means even higher borrowing along with a budget deficit and a lower volume of foreign investment. Montenegro had the highest percentage in 2013 with 338.71%, which significantly exceeded the criterion of highly indebted countries. In 2010, Croatia had a maximum value of 302.8%, followed by Albania in 2015 (240%). Today we can say that these countries have a better ratio of the mentioned parameters and that in 2021 only Montenegro is considered as a highly indebted country. Croatia and Albania belong to the medium-indebted countries according to these indicators. B&H, Serbia and North Macedonia are among the low-indebted countries with a ratio below 132% of ratio TED/E.

In the further analysis of the external debt, we have looked at the currency structure of the Western Balkan countries' debt, and we note that according to the latest data, the total debt of Bosnia and Herzegovina in the euro currency is 63.82% of the TED of the country, in Serbia it is 58.1%, North Macedonia 89.8%, Croatia 71%, Montenegro 96.71% and Albania 60%. It is noticeable that the largest part of the debt is denominated in euros. Nevertheless, we cannot ignore the fact that the growth of the dollar relative to other world currencies will have some

impact on the growth of these countries' debt service costs. Total debt of Bosnia and Herzegovina in dollar currency amounts to 4.93% of the TED of the country, in Serbia it is 10.7%, Northern Macedonia 0.1%, Croatia 0.06% and Montenegro 1.01%. According to the latest data, the total debt in SDR currency, which includes dollar currency, is 24.93% of the TED of the country in Bosnia and Herzegovina, 1.9% in Serbia, Northern Macedonia 9.4%, Croatia (other currencies and SDR) 0.04%, Montenegro 2.28% (NOK, CHF and SDR). We could not find exact data for Albania.

One of the significant indicators of debt repayment risk is the structure of interest rates. Each country usually seeks a larger share of debt with a fixed interest rate. This is particularly pronounced under the conditions of today's crisis when the variable part of interest fluctuates and leads to higher debt service costs. Looking at the WB countries' structure of interest rates on external debt, we find that in Bosnia and Herzegovina, the variable interest rate accounts for 34.91% of the entire interest rate structure, and in Croatia about 11% is with variable interest rate. In Montenegro, the variable interest rate accounts for 25.33% of the whole interest rate structure, in Serbia, at the central government level the variable interest rate accounts for 13.4% and in Northern Macedonia for 20.4% of the interest rate structure.

Maastricht convergence fiscal criterion

The optimal currency area represents the theoretical basis of the monetary union, which implies the harmonization of the fiscal and monetary system as the key to achieving optimal functioning. As a special criterion, a high degree of fiscal policy integration is singled out. Due to the differences between the member countries, and with the aim of successful and stronger integration, the European Monetary System (EMS) was given the task to follow the convergence criteria of the countries as a condition for their membership. When introducing a common currency, it is necessary, according to the Maastricht Treaty, to fulfill the fiscal convergence criteria, which relate to the budget deficit and public debt.

The fiscal criteria of budget convergence stand out among the basic convergence criteria and imply the following:

1. Budget deficit of the states should not be higher than 3% of GDP; on the other hand, if the deviation from the benchmark is exceptional and temporary, the remaining thereby should be close to the benchmark
2. Public debt should not exceed 60% of GDP, and if this is the case, the debt should be significantly decreased and approximated to the benchmark.

In this section, we will analyze the public debt criteria for determining the level of indebtedness of the observed countries, since the majority of them are still in the process of EU and EMU accession.

Table 3: Public debt as % of GDP - Maastricht convergence fiscal criterion of 60%

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Albania	57,71	59,40	62,12	65,53	70,03	72,67	72,38	70,12	67,61	65,73	74,45	73,17
Bosnia and Herzegovina	40,81	39,55	42,21	42,50	45,86	45,53	44,08	37,95	34,27	32,53	36,53	35,43
Montenegro	40,66	45,44	53,42	57,49	56,19	62,30	60,77	61,13	67,62	74,91	103,47	82,54
North Macedonia	23,68	27,37	33,28	33,83	37,92	37,87	39,72	39,29	40,31	40,36	51,71	51,65
Serbia	40,32	42,67	53,21	56,30	66,43	70,02	67,87	57,91	53,73	52,04	57,39	56,52

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Croatia	55,99	62,36	68,16	78,77	82,23	81,79	78,42	75,38	71,81	69,60	85,31	77,74

Sources: International Monetary Fund.

The total debt-to-GDP ratio of the observed countries for the period up to 2015 had a tendency to increase, which was expected given the emergence of the financial and debt crisis after 2008. Bosnia and Herzegovina and North Macedonia had the lowest amounts of this ratio even then. The reference values were below the debt limit according to the Maastricht criteria (the reference value of this fiscal criterion is a maximum of 60% of GDP). After 2015, most countries, with the exception of Montenegro, experienced a decline in public debt-to-GDP ratios until the recent crises occurred. At the end of 2021, Montenegro, Croatia, and Albania had the highest ratios under the Maastricht fiscal criterion of debt, respectively. Bosnia and Herzegovina, Northern Macedonia and Serbia had the lowest debt ratios or were even below the required value, respectively.

This analysis of Maastricht criteria is significant because all the mentioned countries, with the exception of Croatia, which is already a member of the E(M)U, have a tendency to converge and join the European (Monetary) Union, and this is one of the nominal parameters and a condition for accession. It is suggested that the countries bring their debt-to-GDP ratio closer to the 60% reference value.

After the previous analysis of important factors for sustainability and debt servicing, the currency and interest rate structure, we can conclude that a high proportion of government debt is denominated in euros, and a smaller part in dollars. Interest rate risk is moderate. In the total debt structure, the largest part refers to loans with fixed interest rates. The analysis of the Maastricht debt indicators shows that the current sustainability of public debt in most countries of WB meets the fiscal convergence criteria. Considering that the trend of public debt and its servicing depends directly on the increase or decrease of GDP, exports and revenues available for debt servicing, decisions on further borrowing must be linked to productive projects, i.e. financing projects that contribute to the acceleration of reforms as a basis for further economic growth.

Conclusion

Rising inflation has led to a tightening of monetary policy in most countries. The U.S. Federal Reserve, the European Central Bank and the Bank of England have already raised their key interest rates. Higher interest rates raise concerns about the sustainability of public debt in countries with high levels of external debt. Global public and private debt has grown significantly in recent decades. This is a trend that is characteristic of the Western Balkans region, but also of the whole world. The COVID-19 pandemic further hit the sustainability of external debt in developing countries in the form of an outflow of non-resident portfolio capital and a decline in foreign direct investment, followed by a sharp decline in export earnings. The increase was stronger in countries with higher debt, and the war in Ukraine may add to concerns about debt sustainability. The cost of servicing public external debt remains a serious challenge. Many developing countries have substantial dollar debts and when the dollar appreciates, the cost of servicing debt in local currency increases, which can lead to debt crises.

The analysis of the Western Balkan countries shows that these countries follow the trend of constant growth of public debt. In relation to the total public debt, the external debt is growing

faster and stronger than the internal debt. Therefore, its monitoring and control are necessary. Since these countries are highly euro- and dollarized, under the conditions of increasingly frequent crises, the impact of changes in these two strongest currencies certainly has an impact on developing countries. Nevertheless, we can say that most of the debt of these countries is denominated in euros. Dollar-denominated debt is certainly an important source of government spending for these countries and, as such, should be monitored and structurally adjusted if necessary. The analysis has shown that the main risks that may affect debt sustainability stem from the debt profile in terms of external financing needs, changes in public debt maturity, currency and interest rate structure.

Restraining inflation by further tightening monetary policy measures may lead to an increase in government borrowing costs with greater sensitivity to debt, especially in developing economies. Due to market disruptions many countries and their governments face financial crises and political instability, and the cost of servicing public external debt remains a serious challenge. In the period ahead, governments will need to establish effective and timely policies related to investment and growing public needs while respecting fiscal sustainability. These include improving fiscal policy, high-quality public debt management and raising the quality of investment in physical and human capital.

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EXAMINING THE POSSIBLE ECOSYSTEM OF ELECTRIC CAR USERS

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Abstract

Electric cars are a new and increasingly popular phenomenon today. Not only that technological solutions and infrastructural development of electric cars arise as a research question, but also getting to know the consumers who choose electric cars. There is no dispute among experts, economic and political decision-makers that sustainability is one of the defining megatrends alongside digitalization, and that they will fundamentally influence the life of societies for decades to come. Owners of electric cars are presumably at least partly driven by a commitment to sustainability. Of course, we cannot rule out the possibility that owners of electric cars are driven by a love of innovation, the search for new things, trendsetters, and self-expression, yet we think that a greater proportion of buyers are motivated by environmental responsibility. Our research results show that for the surveyed owners of electric cars, environmental aspects were of particular importance in making their choice. Therefore, we assume that the owners of electric cars chose this form of drive primarily out of sustainability considerations, so it can also be examined whether their decisions are made according to a similar principle in other areas as well. We have outlined the ecosystem elements which may be affected by similar decision criteria. It is therefore possible to draw the network where these areas show a closer or less close connection with the choice of an electric car, because the representation of sustainability as a value drives the decisions made in various areas. With choosing the electric car users, we examined the areas that, on the one hand, are fundamental elements of a more sustainable lifestyle, and on the other hand, the most frequently occurring actions that can be easily adapted in everyday life. We did all this by grouping the product categories that can be characterized as alternatives, and then created categories that are as follows: energy consumption (including the use of smart devices, limiting water consumption), the purchase and use of household cleaning products (bio, natural materials), ideas about food (organic products, flexitarianism, even veganism), the choice of clothing products (basic materials, frequency of purchase), financial awareness (e.g. investments in green funds, savings), mobility (sharing, tourism, public transport), housing (when building, materials used for furnishing, garden construction), waste management (selective collection, avoidance of waste). The task of the already targeted research will be to show in which areas there is a closer relationship, and in which areas the strength of value enforcement is weakened. The final goal is to be able to define segments and typical groups among the owners of electric cars according to the representation of this system of criteria.

Keywords: consumer behaviour, electric car, sustainability

JEL classification: D11, L94, M31, Q56

Introduction

Since the number of owners of electric cars is limited compared to owners of cars equipped with traditional methods, they are often cannot even be examined with the well-proven quantitative methodology. Looking at the example of Hungary, in 2021 the proportion of newly registered cars equipped with any kind of electric technology was only 8 percent (Bello, 2023), so the basic number of stakeholders is small, and it is hardly possible to reach them through traditional research channels. In the case of an online survey representative of the adult Hungarian population (Vereckei-Poór & Törőcsik, 2022), there were only 19 people who owned some kind of electric car, of which only 13 people used – the most relevant from the point of view of our research – a purely electric car. The situation is similar in Croatia, the proportion of newly sold electric cars of any kind in 2021 was 4 percent (Bello, 2023). Yet the researcher's curiosity works, which, for example, covers what motivates the decisions of these consumers, what is their characteristic. We naturally find segments that can be described with different characteristics. If we go beyond finding the simpler demographic background, the ethnographic approach seems more relevant. In this way, a research question arises as to whether the group of electric car owners who chose the less burdensome solution due to the consideration of sustainability, what kind of consumer environment and milieu do they display. We assume that this value can also be seen in other consumer areas, therefore, the relationships can be described as an ecosystem.

The term ecosystem comes up most often primarily in ecological topics, however, the use of the expression is also very common in the case of environmental economics. At the same time, the economic ecosystem is also a relevant concept in various technical articles. In this case, we approach the consumption network in this way, which stems from the commitment to sustainability as a value. In order to somehow grasp this interconnected system and interdependence, it is enough to highlight one element, namely the provision of an electric car. However, as we assume that awareness appears in the world of electric car users and in other areas of their consumption, it is important to identify who is the decision-maker of the e-car purchase. After all, it does not matter whether we are examining the respondent who bought the car under the auspices of conscious consumption and environmental protection, or whether it is someone who just uses the vehicle. There are presumably several people in the car buyer's environment – family members, for example – who also use the vehicle during their daily commute, but at the same time do not show any conscious consumption. In the case of the latter, the electric car appears only as a means of transportation, with visually no importance attached to whether it drives an electric or a polluting one. Because of these factors, it is important to distinguish between those who use electric cars and those who use electric cars, which draws attention to the importance of choosing the participants in the research. In our future research, which tries to go around the ecosystem of electric car users, we will research the consumption of those who have purchased such a vehicle as a decision maker. The primary goal of this study is to present the areas of consciousness in which electric car users – if only on a micro level – can create sustainability in their own lives and in their environment. In later chapters, we will define the categories where alternatives are available that complement the multitude of everyday objects with a smaller impact on our environment.

Sustainability as a value in consumers' choices

Today, sustainability means more than a buzzword. As a result of large-scale urbanization, the sustainability solutions seen in cities highlight the fact that we should turn not only our living

environment, but the entire planet towards sustainability (Elmqvist et al., 2019). The need to develop sustainability is present in the everyday lives of both individuals and companies. Less conscious individuals typically find it difficult to accept means and forms of behaviour to move towards a sustainable life, while conscious individuals (LOHAS consumers) look for and incorporate such products into their lives, or in some cases prefer not to consume a product that does not fit the concept (Sandikici & Ekici, 2009). Companies are under pressure from the government or even the EU (Glass & Newig, 2019). Consumers are looking for opportunities that bring alternative solutions closer to their daily lives, and companies are thus forced to satisfy these emerging needs (Sodiq et al., 2019). Today, it is difficult to find an area or product category where sustainable solutions have not appeared on some level. A long-lasting "battle" started between the companies, in which everyone participates, even if somewhat under pressure, and everyone wants to end up as a winner. And the best will be the one who does the most to satisfy the requests of conscious consumers. We have known for a long time that in the case of a product, value creation is one of the most important aspects that the manufacturer must consider (Reketye, 2018). Today, this value also appears in how much the company does for the environment and how green the products it offers are. An interesting contrast can be observed when discussing the product and its value perceived by the consumer. While previously the value was given by the product's simplicity or ease of use, or perhaps its unusual appearance, environmentally friendly products typically require compromises (Avram, 2014). In addition to the fact that the feeling of conscious shopping is raging in the consumer, it still makes their everyday life a little more difficult when using these products, since they typically require more attention or care than usual. Although several large companies – such as Nestlé or LEGO – have undertaken the development of sustainable packaging techniques (Meier, 2018; Murphy, 2018), we are primarily thinking of packaging-free products. The packaging protects the product from the outside world, and the outside world from the product, which we did not have to deal with before, as the manufacturer thought of this. If we purchase consciously and choose products without packaging, then in this case we have to solve the protection of the product ourselves. The situation is similar with the electric car (Graham-Rowe et al., 2012). We are already used to the fact that after refuelling our car in a few minutes at a gas station, we will have to find a place to refuel after covering hundreds of kilometres, but in the case of an electric car, which is considered sustainable, although we spend more time with charging, we cannot cover even close to that distance as we can drive with a tank of conventional fuel (Philipsen, 2018). However, the ability and desire to develop this ability in the consumer is subject to certain conditions. The development of an individual's consumer behaviour is a long process, during which he learns about consumer goods and services, learns what their needs are, and acquires the knowledge of how to make decisions in certain market situations and how to assert their will. It is not a negligible aspect that you should be aware of what natural resources our Earth provides. During these steps, the demand for sustainable consumption may develop, the depth of which depends on the knowledge of environmental values and attitudes, the willingness to act, and the actual action (Zsóka, 2007). If the consumer recognizes and treats the sustainably produced or functioning product as a value, then the adaptation is successful, and the consumer, in addition to getting used to possible limitations, uses these products with a good conscience.

The model of the ecosystem of electric car owners

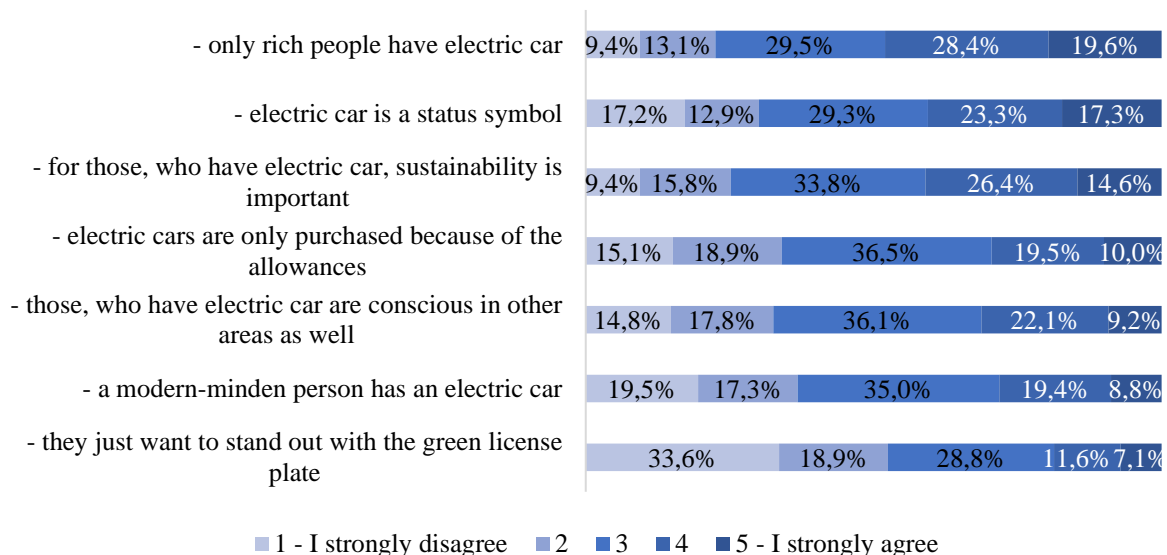
The demand for sustainability and sustainable development is increasingly present in humanity's everyday life. If we think about megatrends in such a way that they fundamentally influence the life of societies for several decades, it is easy to see that they are unavoidable

phenomena (Hauser, 2016). These are the components of long-term waves and cycles (Wilenius, 2017), of which digitalisation points in the direction of speeding up life, while sustainability points in the direction of slowing it down (Töröcsik, 2016). In this mean, it makes sense that electric car owners were at least partially guided by their commitment to sustainability.

Undoubtedly, it is difficult to make clear statements about a car category of which the price is significantly higher than the ones that have traditional drive. In addition to a positive attitude, the right income situation is also necessary for actual purchases. It is typical that there are quite a lot of used cars on the Hungarian market.

It is no coincidence that in 2021, the results of a sample of 1 000 people, representative of the Hungarian adult population, show (Vereckei-Poór & Töröcsik, 2022) that the respondents primarily see the electric car as a sign of their financial situation, and only think of the electric car in third place to represent sustainability (Figure 1).

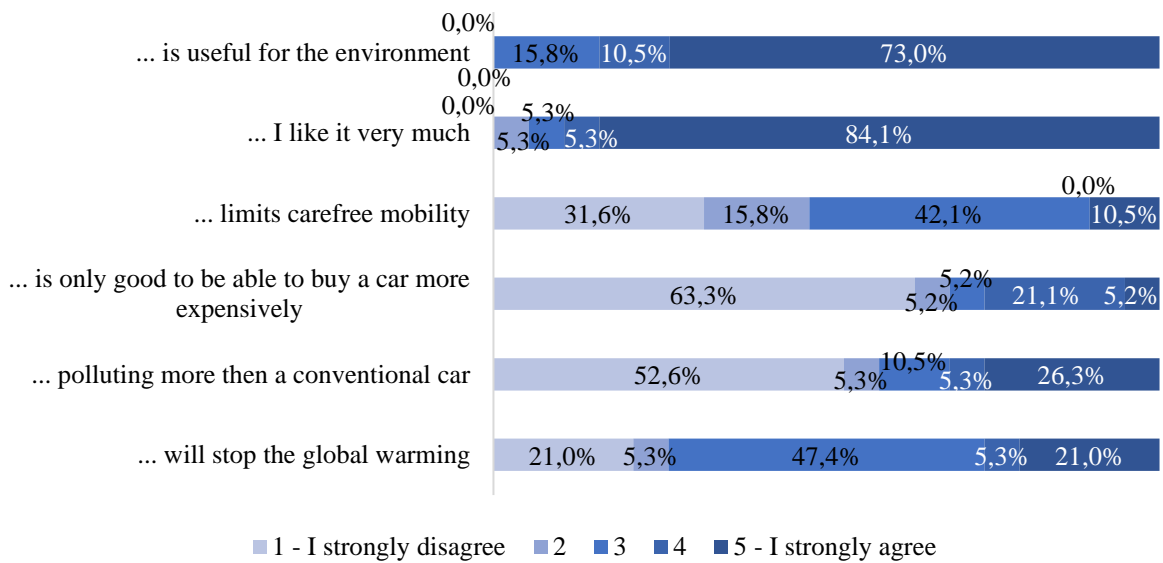
Figure 1: Attitudes toward electric car users (n=1000) – „What do you think about electric car users?”



Source: own construction based on (Vereckei-Poór & Töröcsik, 2022).

Until now, we have only approached the research of the topic with quantitative methods, so there was a very low number of respondents who owned a purely electric car. 75% of the referred sample has a car. Only 2.5% (19 people) of car owners use purely electric (EV), Plug-in Hybrid (PHEV), or Mild-Hybrid (MHEV) equipped cars. Out of the 19 people, 13 use EVs, 4 use PHEVs, and 2 use MHEVs. 12 people bought their purely or partly electric vehicle used, and 7 bought it new. The problem with that is that we cannot meaningfully compare public opinion with the opinion of the owners involved. If we do make an attempt, then the attitudes towards electric cars must be examined separately in the case of those who own an electric car (Figure 2). It can be concluded that the users of such a car show great conviction that this means of transport is useful for the environment, but they are not sure at all that it will stop global warming, since almost half of the respondents indicated the middle value when we asked them about this matter. In line with the previous statements, more than half of the respondents do not agree at all that the e-car is more polluting than the conventional car, and even more think that it is not only good for buying a car more expensively.

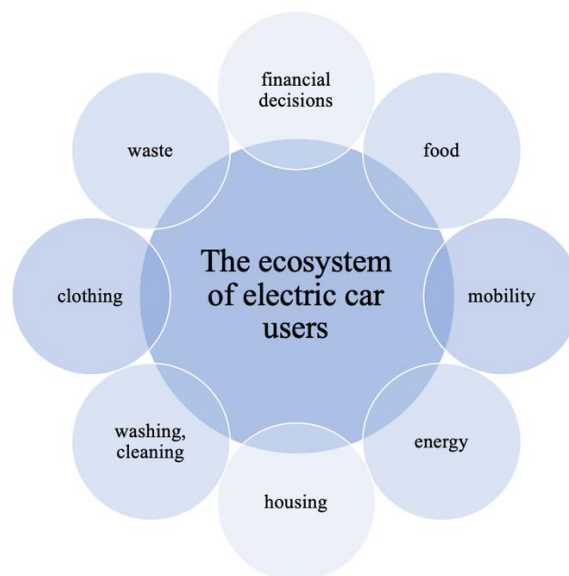
Figure 2: Attitudes towards electric cars (n=19) – „What do you think about electric cars? The electric car...”



Source: own construction based on (Vereckei-Poór & Töröcsik, 2022).

Therefore, we assume that the owners of electric cars chose a form of drive primarily out of sustainability considerations, so it can also be examined whether their decisions are made according to a similar principle in other areas. Accordingly, we highlighted energy consumption (including the use of smart devices, limiting water consumption), the purchase and use of household cleaning products (organic, natural materials), ideas about food (organic products, flexitarianism, even veganism), the choice of clothing products (basic materials, shopping frequency), consciousness in financial decisions (e.g. investments in green funds, saving), mobility (sharing, tourism, public transport), housing (materials used in construction, furnishing, gardening), waste management (selective collection, avoiding waste) as the areas of investigation. We have outlined the ecosystem where elements have similar decision criterias (Figure 3).

Figure 3: The possible ecosystem of electric car users



Source: own construction.

It is therefore possible to draw the network where elements show a closer or less close connection with the choice of an electric car, because sustainability, awareness, or even a certain degree of renouncing comfort as a representation of value drives the decisions made in various areas. Before creating the model, we took alternative product categories into account that promote sustainability. We categorized these solutions and then sorted them into 8 different groups. These groups make up the ecosystem with the electric car users in the center, which defines the areas where the individual can choose solutions that promote sustainability. The task of the already targeted research is to show in which areas there is a closer relationship, and in which areas the strength of value enforcement is weakened. In the future, therefore, qualitative research and targeted social media surveys can provide more accurate results. The final goal is to be able to define segments and typical groups according to the representation of this system of criteria.

In the following, we are showing the elements of the ecosystem and their interpretation ranges, of which close relationships we consider important to subject to further investigation.

Waste management, avoiding wastage

Today's wide range of products and the constant pressure from advertisements make us want to always buy something newer, better, bigger. As a result of this trend, the amount of waste generated in our homes is also constantly increasing, although the difficult economic situation results in a decrease due to missed purchases. In Hungary, according to the data of the Hungarian Central Statistical Office (KSH, 2019), compared to the data of 2004, the amount of waste generated fell by a little more than forty percent by 2013, but a continuous increase was observed between 2013 and 2019. Although it does not reach the level of 2004, in 2019 we produced only 25 percent less waste since 2004, in the starting year of the measurement. Waste management has always been a problem for mankind. It can be seen that the amount of waste is constantly increasing, which cannot be stopped. Based on this, it can be concluded that the previous strategy of reducing waste increase does not work. It has become expedient to think about the recycling of waste. Reuse can be extremely versatile, for example, it also appears in the case of electric cars, where several brands make seat covers made from recycled PET bottles (Boleslav, 2022; Carney, 2021). In terms of waste management, 67 percent of all waste is household waste, which includes garden and food waste (38%), paper (23%), plastic (8%), metal (4%) and other textile and electronic products, furniture (Hofmeister-Tóth, Kelemen & Piskóti, 2011). As a result of the pandemic and new opportunities for package delivery companies, such as parcel machines, packaging waste is increasingly present and accounts for an ever-increasing amount of household waste. Wasting also contributes greatly to the growing amount of household waste. Waste, especially food waste, creates huge problems worldwide. As we may all know, in some parts of the Earth there is a huge starvation, while in other places there is a balanced economic situation and enough food. The product range of edible food is constantly growing, and since consumers are constantly receiving impulses that lead them to both curiosity and excessive (bigger) purchases, they buy more and more food that is not consumed in the household and ends up as waste. Another cause of food waste is, for example, the lack of planning, improper storage of food, and the increasing number of conspicuous products (Aschemann-Witzel, Hooge, Amani, Bech-Larsen & Oostindjer, 2015), which consumers mostly buy just for and because they like the appearance of the product, so impulse buying comes to the fore, during which emotional involvement dominates the customer (Törőcsik & Szűcs, 2022). Conscious shopping is rarely compatible with impulse buying, the purchase of an electric car itself also shows a kind of conscious decision-making.

Mobility

From the point of view of the load on the environment, the travel habits of households play a strong role. In today's world, everyone travels wherever they want, and because of this, the wealth of transportation methods becomes visible to us. Of course, it is important to distinguish between daily routine transport and tourism. In the case of the latter, companies specializing in tourism are increasingly seeing destinations that try to satisfy the demand for sustainable development (Krajinović, 2022). While flying was previously only available to the privileged few, flights by several low-cost airlines are now we can also choose from, which will fly us thousands of kilometers for a relatively small fee. The nature of the trip itself has also become completely different, since thanks to these airlines, the quality of the traveling is no longer such a pleasure for the eager traveller, their goal is to get from point A to point B as quickly as possible. Just as first or business class has disappeared on low-cost airline planes, in the case of other travel options, the standard created by large companies for the sake of accessibility for everyone is becoming more and more typical (Baker, 2013). While previously popular modes of transportation such as the train are increasingly relegated to the background, the popularity – and availability – of sea and ocean cruises is increasing (Dowling & Weeden, 2017). In the case of floating hotels, the amount of waste generated is also huge, which is also accompanied by the operation of huge resources for moving them – typically with high carbon dioxide emissions – which places a great burden on the environment as well. If we move away from tourism and focus on people's daily transport routine, we have many options to carry out our location changing, including solutions that use more and less use for the environment. When discussing the burden of daily urban transport, it is important to emphasize that the environmental pollution should not only be examined from the side of air pollution, as aspects such as sound pollution, noise pollution, or simply the amount vehicles surrounding us in our living environment is also important. Various alternatives have emerged to mitigate these harmful effects. Public transport is inherently the "least bad" mode of transport, since one vehicle can move many people at the same time. In this sector – in the case of buses – modern, electrically operated buses have appeared in recent years, which are able to serve urban traffic extremely quietly and economically. There are also countless types of personal transport, for example we can go on foot or by bicycle, which mean a lot of exposure to weather conditions, but at the same time we do the best for our health and the environment. Imagine, Hungary's population of 9.7 million (KSH, 2022) is accompanied by a fleet of more than 4 million passenger vehicles (KSH, 2022), a significant part of which is assumed to be involved in daily traffic. The hybrid system cars that first appeared in traffic – which cause less air pollution in the urban environment – were followed by the smoke-free, purely electric cars that are now available to the masses. Of course, these raise new problems, since although it is true that they do not pollute the air in our cities, but the energy used to charge the e-car must be produced somewhere. The number of 4 million passenger vehicles presented above is an astonishing number, especially if we consider that our passenger cars spend most of their time stationary, which also costs money (Ujj, 2020). The use based on sharing, which is now present not only in the mobility sector, but also in several other areas, can provide a solution to this problem (Jani & Mwakyusa, 2022). In the larger cities of Hungary – but mainly in the capital – shared based transport methods have appeared. In Budapest, in the beginning only bicycles (Bubi, Donkey Republic) and electric scooters (Blinkee.city), and later passenger cars (GreenGo, Mol limo, Drivenow) – most of which are electric – could be used with a per-minute service. It is extremely easy to use them, we can use the services of these companies simply using a mobile phone.

Energy

The increase in consumption, as a global trend, can be observed not only in the case of material goods, such as a bigger apartment, a bigger car, but also in parallel with energy consumption. After all, every smart and non-smart electronic devices that we use in our daily lives, without which in some cases we could not even imagine our lives, or even charging electric cars, require a lot of energy. Larger sites and apartment floor areas, which bring the increasing cooling and heating needs, create a continuous demand for energy. In the average household, the largest amount of energy is consumed by the heating technology of the apartment, followed by the heating of water, and then the consumption of equipment for lighting and cooking. While the energy class labels of our electronic devices show an ever-lower consumption demand, observing the curves of energy consumption, the amount of electricity used has been continuously increasing in the last couple of years. In Hungary, consumption increased by 4 percent in 2021 compared to the previous year, and by 3 percent compared to 2019 (Major, 2022). Energy production requires crude oil, the processing of which involves a large environmental burden. This is one of the most powerful reasons typically used to argue against electric cars (Ortar & Ryghaug, 2019). At the same time, there are more and more technical innovations capable of gaining energy from the opportunities provided by nature, from renewable energy sources. Whether it is alternative energy sources such as the sun, wind, water or geothermal energy (Mbungu, Naidoo, Bansal, Siti & Tungadio, 2020), they all provide opportunities that do not pollute the environment during their energy production. These techniques are available and we can adapt them depending on our environment. Although it would be difficult to gain the energy provided by the wind in a traditional living environment, for example, with the help of solar panels installed on the roofs, we can obtain energy for our apartment in an environmentally and budget-friendly way.

In an already built apartment/house, we can use smart devices that save energy, such as a timed boiler system, but we can think of, for example, a solar panel that transmits the energy obtained from the sun to different points of the house (Adeh, Good, Calaf & Higgins, 2019), a solar collector, which can heat water, or even for watering plants from the collected rainwater container. People who own an electric car often install solar panels in their living environment in order to be able to charge their car from a renewable energy source, rather than from the electricity produced by a power plant with a high environmental pollution.

Clothing

Nowadays, clothing and fashion are the second most polluting industry. It is responsible for 10 percent of the total CO₂ emissions, which, according to estimates, will continue to grow (Tamás-Krivácsy & Bárdos, 2022). The production of clothes also requires a large amount of water, and they are typically made from materials that are difficult to decompose. Microfibers that are released from textiles are already present in the air, soil, lakes, and oceans, which is a concern for the sustainability of the clothing industry (Liu et al., 2021). It is an essential element of conscious consumption that the consumer buys clothes that have less impact on the environment, and this demand has also been recognized by large companies (Phau & Ong, 2007). For example, we can find many chain stores that sell used clothes at favourable prices. These unique pieces of clothing are in good condition, and their buyers are already protecting the environment from another, hard-to-degrade waste (Wang, Fu & Li, 2022). Other companies in the clothing industry change the material composition of the clothes in order to, on the one hand, use old clothes that have already been taken off, and on the other hand, to make the

decomposition or recyclability of the clothes faster and easier. Materials are appearing in the industry, such as seaweed, for which complete algae farms have been established (Duarte, Bruhn & Krause-Jensen, 2021) and which we previously did not think could be used to make clothes of (Ayyanar et al., 2023). The use of sustainable and organic materials and the development of sustainable processes are still in their infancy in the clothing industry, however, the process has begun, and in the future, we will be able to see clothing made in the spirit of awareness on the shelves of more and more stores. According to our presumption, those who use an electric car also try to find solutions in their clothing that support conscious sustainability.

Washing, cleaning

The year 2020 was all about hand sanitizer production worldwide, and companies that had not even produced a similar product before (see MOL) took it into their portfolios (Trademagazin, 2020). Washing and cleaning products made with environmentally friendly technology and containing natural, degradable materials are gaining ground. The products that show the way to become greener appear on the shelves of the stores one after the other. These eco-products do not contain, or contain only small amounts of petroleum or natural gas derivatives or synthetic materials. The term eco can also be used for these products, since they are ecological, as they are made from materials that come from nature and are fully reusable by the nature, and participate in the natural cycle. This kind of cycle of the product is ensured by completely degradable plant-based materials. In most cases, these washing and cleaning agents do not contain preservatives or colourants. Today, many companies try to present a product line that can receive the logos and signs that stand for the packaging of sustainable products. Although, due to their complex production, these environmentally friendly products are much more expensive (Sztrunga, 2020), there are already practical home solutions that you don't even have to leave your home to find and use. We can make alternative detergents from household baking soda, citric acid, vinegar and washing soda, or from a combination of these. These materials are a natural solution for keeping different parts of our home clean. In addition to the conscious use of materials, we must also note that, for example, in the process of cleaning clothes, we can also protect the environment by using household appliances responsibly. By taking small precautions, such as reducing the washing temperature (Visser & Schoormans, 2023), adding the necessary amount of detergent to the wash, and only starting the washing machine when it is full (Laitala, 2012), we can show additional awareness of our environment. In terms of achieving sustainability, this is perhaps one of the most difficult areas to achieve change, but at the same time, we assume that there are electric car users who try to do everything in this area to reduce their ecological footprint.

Housing

The flat, the house, the living space in which we live in have a great influence on our everyday life. Of course, as in all other areas, we strive for growth here as well, but at the same time, we may need to use different solutions to not only make the "operation" more cost-effective, but also to be more sustainable. The energy supply and heating of residential buildings contributes greatly to the production of greenhouse gases (EPA, 2018), so it is very important to build with materials that are suitable for energy saving. Whether it is an earlier built, newly built or semi-finished flat/house, we can find the techniques and materials in every phase, which can be used to achieve long-term cost efficiency and greener operation. In the case of a house with a garden,

the existence of it and the chemical-free fruits and vegetables are also among the possibilities to relieve the environment. Of course, these solutions can sometimes give rise to compromises, which not everyone may accept just to live more sustainably, but a wide range of innovations is open to us if we want to make our home less burdensome on the environment. We make it likely that e-car drivers, during house construction or planning, will collect information and get to know the options with which they can achieve a lower environmental load, and that these materials will actually be used during construction.

Awareness in financial areas – financial decisions

It is very problematic to maintain financial awareness, the buying of unnecessary things, the accumulation of unnecessary products and the making of rational decisions in a business, political and market environment in which today's generation lives (Nyikos, 2022). We are constantly encouraged to grow, to develop, to buy bigger, better and newer, which causes us to buy products that we don't really need, and get rid of those that don't have any damages. The handling and simplicity of online shopping appeals to us even more, since we don't even have to leave the house to spend. Thrift is pushed into the background; the number of conscious purchases is decreasing. We don't think we need to emphasize how bad this kind of behaviour is for the environment. If we are not thinking strictly about everyday shopping products, but rather about investing money, for example, investors today have almost no choice between profit and saving the planet. Sustainable financing prioritizes businesses that pay attention to environmental aspects (Broom, 2022). There is a reason why the ESG framework appeared, it is also an effort that forces large companies to carry out their activities in a way that is sustainable and leaves as small ecological footprint as possible.

Food

Today, the conscious customer tries to buy fresh food instead of choosing the frozen ones, of which the production and storage requires ten times more energy. Buying local products also turns out to be a conscious decision, since the products did not travel hundreds or even thousands of kilometres to be able to buy them (FEBESZ, 2013). Awareness can therefore appear in many areas during shopping, we could even detail the purchase of products made from recycled materials or packaged-free ones. A divisive topic is the issue of alternative diets. A versatile (limited to boundaries) diet is good for human health and makes the environment more sustainable (Stenson & Buttriss, 2020). The food system and how food gets from the producer to the consumer's refrigerator goes through an extremely complex process. We do not wish to present the parts of the process, but we would like to draw attention to how complex the food system is. It includes all those areas, such as the environment, people, infrastructure, processing, transportation, and through all these it becomes a part of the economy as well (HLPE, 2014). Food systems try to ensure the variety of foods that make up diets (GloPan, 2016). As can be read in the Brundtland report, the goal of creating sustainability is that the generations that come after us have the same natural resources and the same opportunities to use available raw materials that are given to today's generations. For example, alternative diets have appeared under the auspices of sustainability, the number of followers of which are growing worldwide either for health or environmental reasons. Whether they are vegetarians (those who do not eat meat), vegans (those who do not eat food of animal origin) or flexitarians (who eat mostly plant-based food), more and more raw materials are appearing that can be consumed and can be well built-in to their diet. Hereby, raw materials become part of the food

system presented above. We find it important to highlight the relationship between environmental impact and a healthy diet, as there are diets that are less healthy but more environmentally burdensome, and there are also those that, although healthy for the consumer, have a high environmental cost (Garnett, 2016). In special diets, they try to find and maintain a balance in which both health awareness and environmental awareness appear. In one of our previous studies, which has already been mentioned before, based on a sample of 1,000 people, representative of the Hungarian population (Vereckei-Poór & Törőcsik, 2022), only 15 percent of the respondents followed a special diet, and 65 percent do not sympathize with the idea of veganism at all. According to our presumption, with regard to those who own an electric car, it will be confirmed in our further research that they sympathize more with diets that show an attitude towards sustainability.

Research limitations, future research directions

During our research on electric car users, we find that since the number of vehicles equipped with electric technology in traffic is extremely small in Hungary, we also encounter problems in reaching their users. This is true primarily for quantitative surveys, which encourages us to focus on qualitative methods in our further researches. During our previous research on social media, we found the group where a large number of people who have experience with e-cars represent themselves in bigger numbers. According to our plans, we will conduct focus group interviews, during which we will try to get answers to which are the sustainability areas in which electric car users are actively participating, and whether there are any additional actions that will appear. We also plan to conduct in-depth interviews in the case of those who show awareness in multiple areas of sustainability.

Conclusion

Protecting our Earth and reducing the burden on our environment plays an increasingly important role in everyday life. It has become necessary to transform previously polluting products or to create new ones in order to keep the planet a place to live. The data and frightening numbers that threaten future generations also prompt global decision-makers to create a world in which consumers have the opportunity to choose products that promote sustainable development, along with various regulations. The demand for sustainability must play an increasingly important role not only at the level of companies, but also at the level of individuals. The electric car, which is considered to be a technology that promotes sustainability, is widely available, and the number of such vehicles is slowly, but increasing in Hungary. According to Hungarians, sustainability is important to those who own an electric car, and according to those who own an EV, this alternative is beneficial for the environment. Since their use indicates conscious consumption, we have taken the typical areas into account in which further responsible consumption can be demonstrated. We make it likely that awareness can also be observed in these areas when examining electric car users. Whether it is energy consumption, cleaning products, food, clothing, financial awareness, housing, or waste management, in each case there may be a solution or an alternative replacement that can be used to reduce the size of the ecological footprint. Our study shows the possible alternative products in the case of each of the listed areas in order to show what are the actions and solutions can be adapted in the favour of a more sustainable way of life. We believe that those, who use electric car as a more conscious means of transportation are likely to choose solutions that have

a smaller impact on our environment in the areas included in our model and detailed by category.

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K-MEANS CLUSTERING OF COUNTRIES ACCORDING TO WAR ACTIVITIES: COMMON CHARACTERISTICS AND DIFFERENCES

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Abstract

There are detrimental effects of war that transcend battle deaths. The war has a great impact on other areas of human endeavour such as economic development and social well-being. The question that arises is what are the characteristics of countries involved in conflict and war. In the paper, k-means cluster analysis was conducted in the period from 1991 to 2017 on a noticeable sample of countries and 8 macroeconomic indicators, in order to investigate common characteristics and differences between countries in peace and war. Three clusters were formed, differentiating between countries in peace and war. The results of the analysis are mainly according to economic theory; countries in a war in most cases are geographically located in Africa and Asia, had lower levels of GDP, HDI and absolute military expenditures, and higher refugee flows while there were no significant differences between countries in peace and countries at war related to self-harm deaths and inflation. This paper can be relevant to economic policymakers in times of uncertainty regarding the impact of war and conflict on economics.

Keywords: war, countries, macroeconomic indicators, k-means clustering.

JEL classification: C38, H56.

Introduction

The detrimental effect of war transcends far beyond the battle deaths. It leads to more volatile migration trends increasing refugee population, higher unemployment and inflation as well as bigger military expenditures. Furthermore, the conflict destroys infrastructure and ruins human capital, destabilizing institutions and causing political instability by impeding investment and economic growth. The question that arises is what are the characteristics of countries involved in conflict and war. The research question of the paper is to better understand the consequences of higher war activities on a country's development and its society. War activities do not have only an impact on the number of casualties but the war has a great impact on other areas like economic development or social well-being. With regard to the effects of main macroeconomic variables that are closely tied to military activities, there is a gap in the literature that this paper aims to fill. Therefore, a total of eight variables were carefully selected to take into account all those areas impacted by war activities. Those are the number of deaths from conflict (civil conflict and war between states) and terrorism per 100,000 people, unemployment, real gross domestic product per capita, military expenditure per capita, refugee population, the annual

population growth rate, annual number of deaths from suicide per 100,000 people, inflation and Human Development Index. After that, k-means clustering of countries will be conducted by taking into account the values of the observed variables for each observed year separately. Before conducting the k-means clustering all variables will be standardized. Afterwards, a two-step cluster analysis will be applied to determine the optimal number of clusters in the k-means clustering. Countries will be divided into countries in war and countries in peace. It is expected that there will be differences between the aforementioned clusters of countries regarding the observed variables as well as changes throughout the observed period, 1991 to 2018. It will be fascinating to examine if there are any notable distinctions between the cluster of countries in conflict and those in peace in relation to their shared economic traits. As a result, this paper's contribution is to distinguish between the effects of war activities on groups of countries, those at war and those at peace. The obtained results should shed new light on the common features of countries in war and countries in peace.

The paper is structured into five sections. After the introduction, in the second section literature review on the impact of conflict on the economic growth of a country and its main macroeconomic variables was presented and elaborated. In the third section of the paper data and methodology of the paper are introduced while results and discussion of the main findings are presented in section five. The final section concludes.

Literature review

Žmuk and Jošić (2022) examined world-at-war data providing statistics across continents. They evaluate the effects of selected war variables (deaths, number of countries in war, military expenditure and refugee population) across continents. Hierarchical cluster analysis revealed that Europe and South America can be considered as continents with medium war activities whereas North America and Oceania were grouped into clusters with the lowest war activities. On the other side, it was found that war activities are the highest in Africa and Asia. In his study, Gül Altın (2021) provided clustering of military powers of 138 countries using a critic-based k-means algorithm in 2019. Countries were divided into four clusters while clustering was made using 21 criteria with weighted values calculated by the Critic method. Cornia and Scognamillo (2016) clustered least developed countries and investigate policies to expand their productive capacity between 1993 and 2013. Countries at war generally experience a disruption of production, trade, social infrastructure and growth. Wars are a major cause of poverty, underdevelopment, and ill health in poor countries (Stewart, 2002). The major root causes of wars include political, economic, and social inequalities in addition to extreme poverty, poor government services, high unemployment, environmental degradation and others. Conflicts impose large economic costs. It was found that the average annual growth in countries in war is about 2.5 percentage points lower than countries in peace. Armed conflicts pose significant strains on countries' public finances lowering revenue, raising military spending and shifting resources away from development and social spending (Fange et al., 2020). There are direct and indirect costs of war. The most important direct costs include military costs borne by the government, costs of damage to physical and social infrastructure, and damage to capital assets and land. On the other side, indirect costs include lost income due to the loss of human capital and foreign investments as well as the income loss from reduced tourism (Howell, 2011). The long-term effects of the Yugoslav war were unprecedented growth and development losses, (Keseļjević & Spruk, 2020). Lamotte (2012) found that the wars and sanctions in Former Yugoslavia caused a reduction in trade not only between the countries involved but also with other countries. Civil war negatively affects the growth rate of income through reduced

investment in physical capital (Gyimah-Brempong & Corley, 2005). Serneels and Verpoorten (2015) analyzed the impact of armed conflict on economic performance in Rwanda in the early 90s and found that households and localities that experienced more intense conflict were lagging in terms of consumption six years after the conflict. According to Institute for Economics and Peace (2011), government policies associated with funding United States war activities resulted in increased public debt, levels of taxation and inflation while consumption and investment decreased. A similar conclusion was provided by Thies and Baum (2020). Countries in war underperform in terms of production and consumption while GDP per capita falls because of lower labour and total factor productivity. Imai and Weinstein (2000) identified the channels through which civil war strips a country of its growth potential. It negatively impacts private investment through the process of portfolio substitution. According to low per capita incomes and slow economic growth of countries are both robustly linked to civil war (Blattman & Miguel, 2010). According to Ganegodage and Rambaldi (2014), the war in Sri Lanka had negative effects both in the short and long-run while high returns from investment in physical capital did not translate into sizable positive externalities. The conflict has detrimental effects on the reduction of poverty, primary education, child mortality and access to potable water, Gates et al. (2016). There is evidence that global war does not seem to pay off in terms of augmenting net national wealth both for the winners and losers (Rasler & Thompson, 1985).

Data and methods

In this section, the data and methodology of the paper will be elaborated. To better understand the consequences of war activities on a country's development and its society, in the paper nine variables will be taken into cluster analysis and observed in detail. The main variable under the study is the number of deaths from conflicts. This variable is related to the description of the war activities of a country. The remaining eight variables were carefully selected to take into account all those areas impacted by war activities. However, according to the literature review, war activities do not have only an impact on the number of casualties but the war has a great impact on other areas like economic development or social well-being. In Table 1 a list of observed variables along with brief descriptions is provided.

Table 1: List of observed variables

Variable	Variable description	Source
Deaths	Total combined number of deaths from conflict (civil conflict and war between states) and terrorism per 100,000 people	Our World in Data (2022b)
Unemp	Total unemployment as % of total labor force	Our World in Data (2022h)
GDPpc	Real gross domestic product per capita, in US\$ in 2011 prices	Our World in Data (2022c)
MilitExp	Military expenditure per capita, in constant 2019 US\$	Our World in Data (2022e)
Refugee	Refugee population by country or territory of origin per 100,000 people	Our World in Data (2022g)
PopGrow	Annual population growth rate, includes births, deaths and migration	Our World in Data (2022f)

Variable	Variable description	Source
HDInd	Human Development Index, summary measure of key dimensions of human development	Our World in Data (2022d)
DeathsS	Annual number of deaths from suicide per 100,000 people	Our World in Data (2022a)
Inflat	Inflation, GDP deflator (annual %)	World Bank (2022)

Source: authors.

The data is collected for countries worldwide for the period from 1991 to 2017. A country was omitted from observing in a certain year if there was no certain data for any of the observed variables in that year. Therefore, the number of observed countries varies throughout the observed period. The lowest number of included countries in the analysis was 61 in 1991. On the other hand, the highest number of included countries in the analysis was 141 in 2008, 2013 and 2014. The analysis will be conducted in several steps. In the first step, descriptive statistics methods will be applied to explore observed variables. It has to be emphasized that because overall 3,334 cases related to countries are observed in the paper in the period from 1991 to 2017, some limitations had to be applied in the presentation of the results and findings. Therefore, some outputs and results had to be omitted from the paper. So, the descriptive statistics results will be provided only for the starting (1991) and ending (2017) years. In the second step k-means clustering of countries by taking into account the values of the observed variables will be conducted for each observed year separately. Clustering was introduced by Driver and Kroeber in their 1932 paper (Driver & Kroeber, 1932). The term "k-means" was first used by James MacQueen in 1967 (MacQueen, 1967), although the originator of the idea was Hugo Steinhaus in 1956 (Steinhaus, 1957). K-means cluster analysis work in 5 steps: (1) define the number of clusters, (2) set cluster centres randomly, (3) assign points to clusters, (4) calculate the centre of each cluster and (5) assign points to the new clusters. The k-means clustering algorithm is as follows. Given a set of observations (x_1, x_2, \dots, x_n) , where each observation is a d-dimensional real vector, k-means clustering aims to partition the n observations into $k \leq n$ sets where $S = \{S_1, S_2, \dots, S_k\}$ minimizing the within-cluster sum of squares (Kriegel et al., 2016). Before conducting the k-means clustering all variables were standardized. Afterwards, a two-step cluster analysis was applied to determine the optimal number of clusters in the k-means clustering. In the two-step cluster analysis, all nine standardized variables were included whereas as a distance measure log-likelihood was applied and Schwarz's Bayesian Criterion (BIC) was used as a clustering criterion. The optimal cluster number for each of the observed years is shown in Table 2.

Table 2: Optimal number of clusters according to the two-step cluster analysis results

Optimal number of clusters	Years	Number of years
2	1991, 1992, 1993, 2007, 2008, 2010, 2011, 2013	8
3	1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2003, 2004, 2005, 2006, 2009, 2012, 2014, 2015, 2016, 2017	18
4	2002	1

Source: authors.

Since the optimal cluster number, according to the results given in Table 2, is different in the observed years, it is decided that only k-means clustering solutions with three clusters will be taken into account because those solutions turned out to be optimal in 75% observed years. Also, in that way, the results for different years can be directly compared. The resulting three

clusters will be entitled according to the average value of the variable total combined number of deaths from conflict and terrorism per 100,000 people (variable Deaths) which is considered as a main war variable.

The resulting cluster with countries with the highest average Deaths value will be considered as a cluster of countries at war. The resulting cluster with countries with the lowest average Deaths value will be recognized as a cluster of countries in the peace. The remaining cluster, the third one, will be observed as a cluster of countries in war danger. In the final analysis step, the characteristics of the clusters with countries in war and the characteristics of the clusters with countries in peace will be inspected and compared in all observed periods. The comparison will be conducted for all observed variables except the variable Deaths because it is obvious that clusters with countries in war are going to have a higher value of the total combined number of deaths from conflict and terrorism per 100,000 people than clusters with countries in peace.

Analysis and discussion

In the Appendix in Tables A1 and A2 the main descriptive statistics results related to the observed variables in 1991 and 2017 are provided. In that way, the levels of the observed variables at the beginning of the observed period can be compared with the levels at the end of the observed period. The descriptive statistics results provided in Table A1 are based on values collected from 61 countries whereas the descriptive statistics results given in Table A2 are provided by taking into account 137 countries. Even though more countries were observed in 2017, the total combined number of deaths from conflict and terrorism per 100,000 people in 2017 was lower than in 1991. By comparing mean values between 1991 and 2017 it can be concluded that the means remained roughly at the same level at the most observed variables. However, the most emphasized differences in means are at variables Inflat, MilitExp and GDPpc. Whereas the mean inflation rate in 2017 is considerably lower than the mean inflation rate in 1991, military expenditure per capita and real gross domestic product per capita means are considerably higher in 2017 than in 1991.

Table 3: Variable means, k-means clustering, 3 cluster solution, the period from 1991 to 2017

Year	Cluster	Count	Variable								
			Deaths	DeathsS	HDInd	Inflat	MilitExp	GDPpc	PopGrow	Refugee	Unemp
1991	1	50	1	11	0.522	184	43	4034	2.26	95	7.78
	2*	6	20	18	0.390	35	15	1825	0.58	3172	6.22
	3**	5	0	10	0.785	7	544	21303	1.24	2	4.61
1992	1*	3	31	18	0.618	517	17	4248	1.51	604	7.58
	2**	4	0	11	0.796	3	639	23114	1.30	3	4.30
	3	62	1	11	0.505	27	40	3836	2.02	601	7.48
1993	1*	1	284	7	0.579	1207	4	2719	1.58	1253	6.20
	2	75	1	12	0.523	146	35	4436	1.79	841	7.94
	3**	5	0	8	0.774	-1	957	26988	-0.09	3	4.58
1994	1*	1	8482	20	0.199	17	7	503	-3.53	38030	0.46
	2**	22	0	12	0.797	4	538	24437	0.65	5	7.19
	3	80	5	12	0.535	92	33	4706	1.82	410	7.69
1995	1*	3	122	17	0.268	34	8	1021	0.67	15282	1.94
	2**	23	0	12	0.806	4	614	26354	0.84	4	6.66
	3	78	1	12	0.555	50	35	5041	1.70	318	8.46
1996	1*	3	86	17	0.275	18	8	969	2.08	7858	1.96
	2	2	65	10	0.436	534	2	1043	2.06	1104	8.16
	3**	106	1	13	0.624	15	167	10125	1.38	270	8.42
1997	1*	2	127	15	0.282	17	6	934	0.91	8038	2.65
	2**	1	0	21	0.704	913	30	6236	-0.94	37	13.70
	3	106	3	13	0.623	14	158	10177	1.41	301	7.94

Year	Cluster	Count	Variable								
			Deaths	DeathsS	HDInd	Inflat	MilitExp	GDPpc	PopGrow	Refugee	Unemp
1998	1*	1	212	20	0.300	11	10	722	1.17	8125	1.87
	2**	25	0	12	0.827	0	597	30057	1.27	3	6.99
	3	86	3	13	0.581	14	41	5717	1.39	360	8.50
1999	1	68	2	10	0.532	26	28	4058	1.89	308	7.97
	2*	2	155	20	0.502	21	43	3513	0.25	5108	7.80
	3**	45	0	17	0.789	14	351	22174	0.63	203	8.68
2000	1*	2	124	14	0.294	21	6	814	2.59	8846	2.66
	2	1	6	13	0.333	2630	3	496	2.66	789	2.91
	3**	125	2	13	0.639	15	154	11911	1.35	209	8.26
2001	1*	1	210	17	0.302	14	8	672	2.49	8490	1.86
	2	97	1	13	0.581	11	35	5434	1.40	299	8.92
	3**	28	0	12	0.836	2	554	32036	1.12	4	5.33
2002	1**	7	1	21	0.587	57	52	5912	0.56	3303	15.80
	2*	1	198	17	0.310	1	7	685	2.86	8570	1.89
	3	127	1	12	0.652	5	171	12783	1.37	151	8.10
2003	1	106	1	13	0.585	8	40	5551	1.41	353	8.91
	2*	1	194	16	0.316	12	6	699	3.09	7695	1.89
	3**	33	0	11	0.851	3	624	34990	1.45	5	5.87
2004	1*	1	179	16	0.324	13	6	713	3.19	6811	1.85
	2	108	1	13	0.590	10	47	5819	1.42	405	8.83
	3**	30	0	11	0.857	4	709	37755	1.86	3	5.80
2005	1*	1	175	16	0.330	19	7	680	3.23	5957	1.81
	2	136	1	12	0.658	9	182	13403	1.37	264	7.75
	3**	4	0	6	0.808	21	1147	73652	9.87	6	1.61
2006	1*	1	145	6	0.636	23	45	5097	1.80	5286	8.78
	2	105	1	12	0.614	9	56	7269	1.42	335	8.32
	3**	33	0	11	0.864	4	695	41503	2.28	6	5.48
2007	1*	1	135	6	0.638	14	71	5833	1.68	8274	8.65
	2	103	0	12	0.623	8	71	8053	1.42	281	7.78
	3**	33	0	11	0.868	4	768	43009	2.32	3	5.02
2008	1*	2	49	15	0.691	23	93	6912	1.29	3698	6.81
	2**	130	1	12	0.668	10	169	13613	1.36	214	7.08
	3	9	1	6	0.834	14	1554	65180	6.07	8	3.64
2009	1	104	0	11	0.636	5	81	8458	1.44	185	8.26
	2*	4	28	15	0.550	-1	51	4418	1.74	2971	4.93
	3**	32	0	10	0.873	-2	826	40706	2.00	3	6.64

Note: * countries at war cluster, ** countries in the peace cluster.

Source: authors.

Table 3: Variable means, k-means clustering, 3 cluster solution, the period from 1991 to 2017 - continued

Year	Cluster	Count	Variable								
			Deaths	DeathsS	HDInd	Inflat	MilitExp	GDPpc	PopGrow	Refugee	Unemp
2010	1	125	0	12	0.684	7	157	13522	1.27	143	8.48
	2*	3	24	16	0.582	15	71	6200	1.51	3372	5.83
	3**	11	0	7	0.856	8	1407	55183	4.00	7	4.30
2011	1*	1	61	2	0.642	12	118	5740	-2.21	95	8.60
	2	2	11	8	0.537	18	71	6152	3.27	3155	5.20
	3**	133	0	11	0.707	9	285	17623	1.38	121	8.00
2012	1**	25	0	20	0.697	12	133	12911	0.74	61	9.16
	2*	2	20	6	0.582	10	98	8151	3.27	1175	10.61
	3	113	0	9	0.705	4	311	18402	1.53	153	7.58
2013	1*	1	57	6	0.666	0	235	15171	3.81	1211	9.27
	2	82	0	10	0.605	6	64	6880	1.96	134	6.30
	3**	58	0	12	0.847	2	589	32159	0.56	67	10.06
2014	1**	68	1	12	0.829	4	516	29183	0.60	65	10.38
	2*	1	108	6	0.666	-3	201	14807	3.52	1075	10.59
	3	72	1	10	0.594	4	59	6471	2.13	143	5.25
2015	1*	1	84	6	0.668	-30	270	14663	3.10	742	10.72
	2**	67	0	10	0.836	1	442	27989	0.64	54	9.01
	3	68	1	11	0.589	5	46	5489	2.03	236	6.29

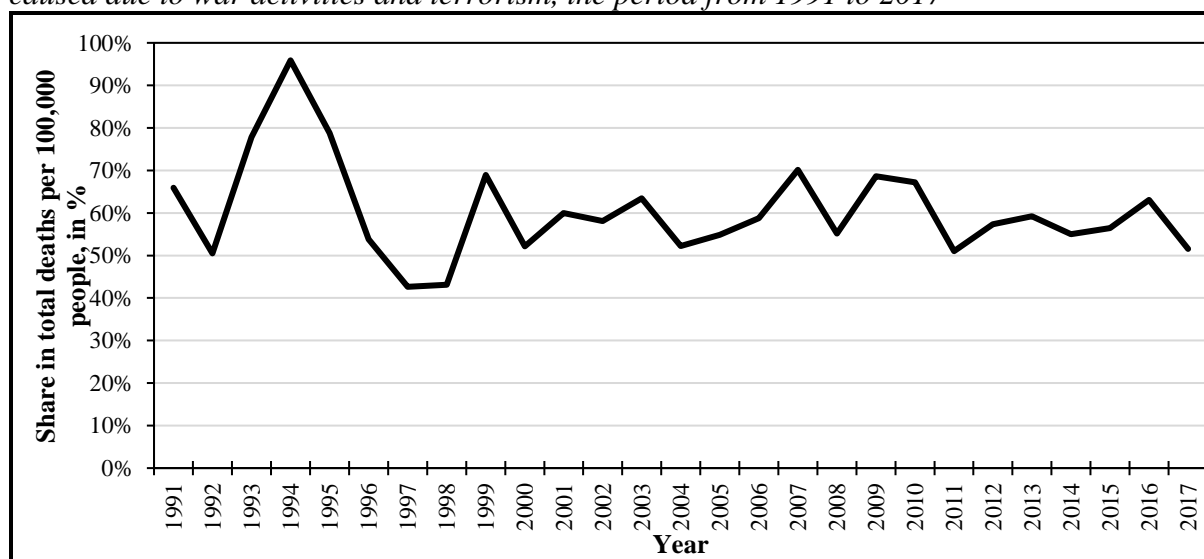
Year	Cluster	Count	Variable								
			Deaths	DeathsS	HDInd	Inflat	MilitExp	GDPpc	PopGrow	Refugee	Unemp
2016	1*	1	87	6	0.672	-11	163	16267	2.71	863	10.82
	2	6	2	9	0.471	7	24	2167	2.88	1733	7.02
	3**	126	0	11	0.722	4	251	16863	1.27	75	7.48
2017	1	1	27	20	0.367	6	6	727	1.40	11869	4.17
	2**	135	0	10	0.714	6	246	16879	1.31	156	7.08
	3*	1	75	6	0.685	15	197	15301	2.43	965	13.02

Note: * countries at war cluster, ** countries in the peace cluster.

Source: authors.

According to the results given in Table 3, k-means clustering was very strict to include countries in the cluster with countries at war. Therefore, clusters with countries with the highest average Deaths value consist only of a few countries. The highest number of countries in the war cluster was six in 1991 and four in 2009. In all other observed years, the number of countries in the war cluster was three or less. Next to the number of countries in each cluster, in Table 3 variables means of the included countries in each cluster are provided as well. Generally speaking, war clusters characterize, in addition to the highest average total combined number of deaths from conflict (civil conflict and war between states) and terrorism per 100,000 people, the highest average annual population growth rate, including births, deaths and migration, and total unemployment as % of total labor force. However, the countries in the war cluster on average tend to have the lowest annual number of deaths from suicide per 100,000 people. On the other side, in comparison to the other clusters, countries in the peace cluster, in general, have the lowest average total combined number of deaths from conflict (civil conflict and war between states) and terrorism per 100,000 people (in most cases the average value is zero), annual population growth rate, includes births, deaths and migration, refugee population by country or territory of origin per 100,000 people. However, countries in the peace cluster tend to have on average the highest development index, military expenditure per capita, and real gross domestic product per capita.

Graph 1: Share in total deaths per 100,000 people of countries in clusters with the most deaths caused due to war activities and terrorism, the period from 1991 to 2017



Source: authors.

Graph 1 reveals that in 93% of cases or observed years, the k-means clustering resulted in such clustering results that countries at war cluster had more than 50% of total deaths per 100,000

people in countries observed that year. The share in total deaths per 100,000 people of countries in clusters with the most deaths caused due to war activities and terrorism of the countries at war cluster was lower than 50% only in 1997 and in 1998. In both years the share was 43%. All in all, those results are going in favour that clustering was successful.

In Table 4 the share of countries in the countries at war cluster according to the continent is given. The results are showing that in most cases countries at war are from Africa or Asia. However, since 2011 all countries in the countries at war are from Asia. In that sense, it has to be emphasized that k-means clustering recognized Iraq as a country at war from 2012 to 2017. Similarly, Burundi was included in the countries at war cluster from 1995 to 2005. Countries from Oceania never had been included in the countries at war cluster. Countries from Europe (Serbia in 1999), North America (El Salvador in 1991) and South America (Brazil in 1992) appeared just once in the countries at war cluster. The full list of countries in the countries at war clusters is provided in Table 5 whereas in Graph 2 the mean values of the observed variables of countries in clusters with the most deaths per 100,000 people caused due to war activities and terrorism are shown.

Table 4: Share of countries in clusters with the most deaths per 100,000 people caused due to war activities and terrorism according to the continents, the period from 1991 to 2017

Year	Continent					
	Africa	Asia	Europe	North America	Oceania	South America
1991	67%	17%	0%	17%	0%	0%
1992	0%	67%	0%	0%	0%	33%
1993	0%	100%	0%	0%	0%	0%
1994	100%	0%	0%	0%	0%	0%
1995	100%	0%	0%	0%	0%	0%
1996	100%	0%	0%	0%	0%	0%
1997	100%	0%	0%	0%	0%	0%
1998	100%	0%	0%	0%	0%	0%
1999	50%	0%	50%	0%	0%	0%
2000	100%	0%	0%	0%	0%	0%
2001	100%	0%	0%	0%	0%	0%
2002	100%	0%	0%	0%	0%	0%
2003	100%	0%	0%	0%	0%	0%
2004	100%	0%	0%	0%	0%	0%
2005	100%	0%	0%	0%	0%	0%
2006	0%	100%	0%	0%	0%	0%
2007	0%	100%	0%	0%	0%	0%
2008	0%	100%	0%	0%	0%	0%
2009	50%	50%	0%	0%	0%	0%
2010	33%	67%	0%	0%	0%	0%
2011	0%	100%	0%	0%	0%	0%
2012	0%	100%	0%	0%	0%	0%
2013	0%	100%	0%	0%	0%	0%
2014	0%	100%	0%	0%	0%	0%
2015	0%	100%	0%	0%	0%	0%
2016	0%	100%	0%	0%	0%	0%
2017	0%	100%	0%	0%	0%	0%

Source: authors.

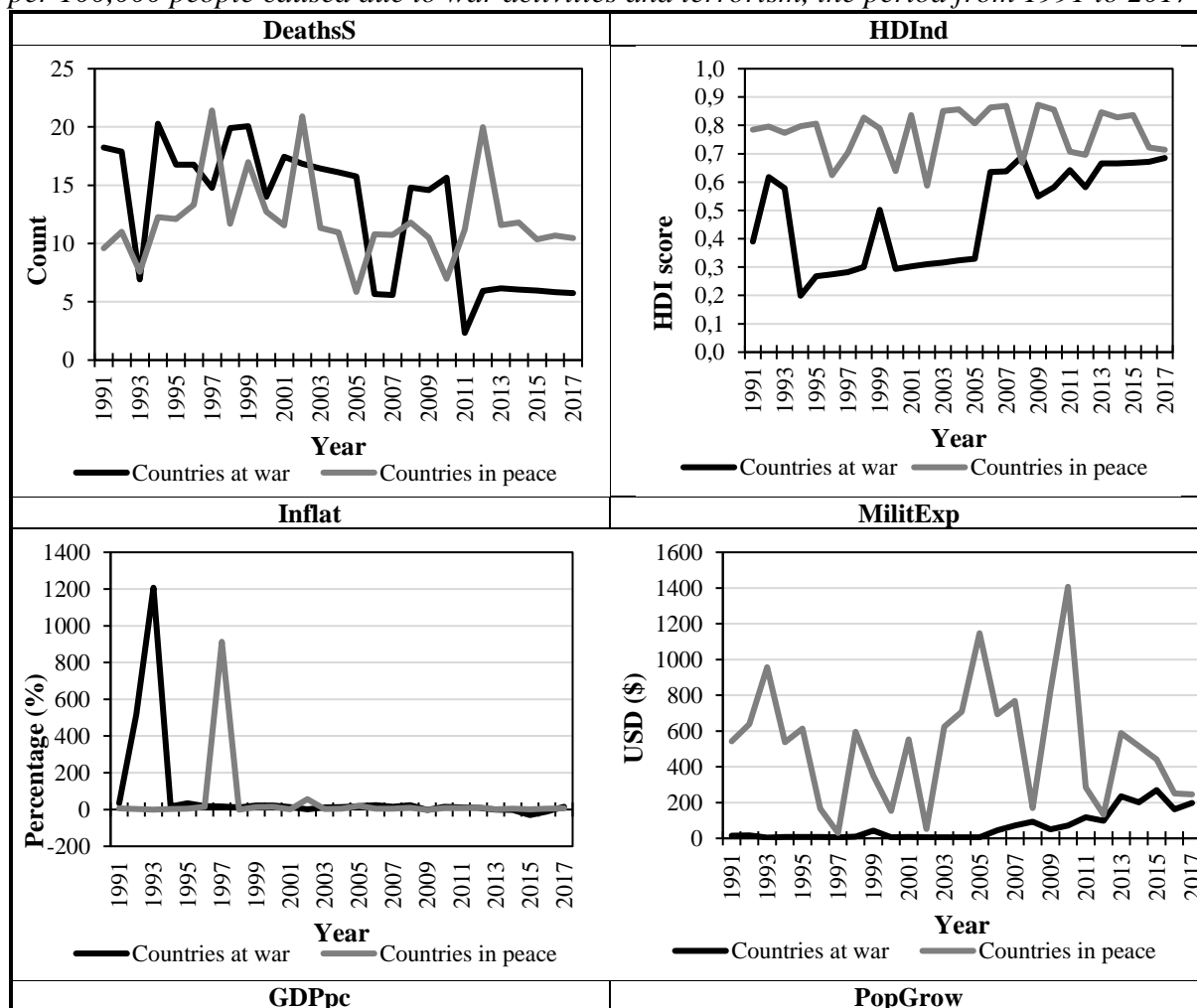
Table 5: List of countries in the countries at war cluster, the period from 1991 to 2017

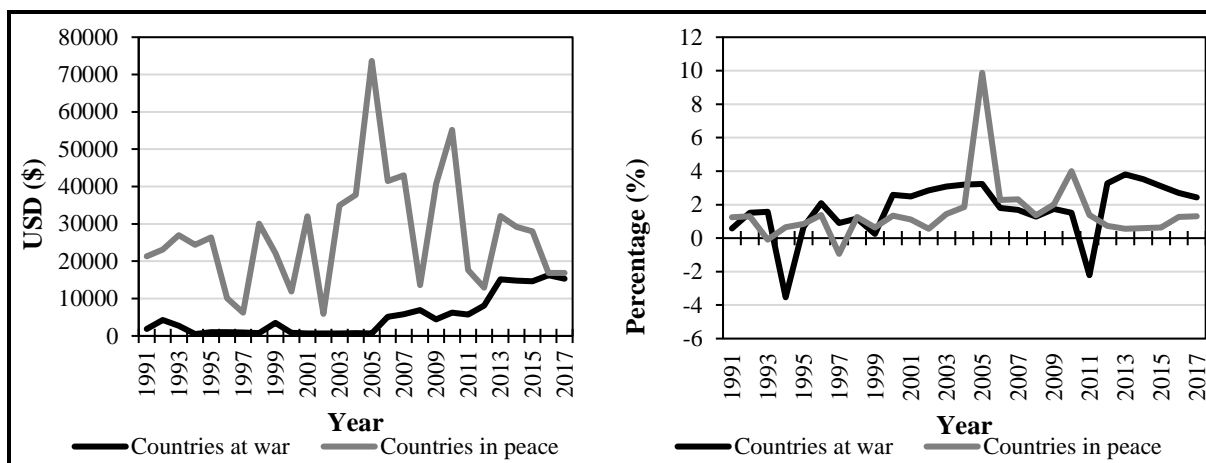
Year	Countries
1991	Burundi, El Salvador, Mauritania, Rwanda, Sierra Leone, Sri Lanka

Year	Countries
1992	Brazil, Sri Lanka, Tajikistan
1993	Tajikistan
1994	Rwanda
1995-1996	Burundi, Rwanda, Sierra Leone
1997	Burundi, Sierra Leone
1998	Burundi
1999	Burundi, Serbia
2000	Burundi, Sierra Leone
2001-2005	Burundi
2006-2007	Iraq
2008	Iraq, Sri Lanka
2009	Central African Republic, Iraq, Rwanda, Sri Lanka
2010	Central African Republic, Iraq, Sri Lanka
2011	Syrian Arab Republic
2012	Iraq, Yemen
2013-2017	Iraq

Source: authors.

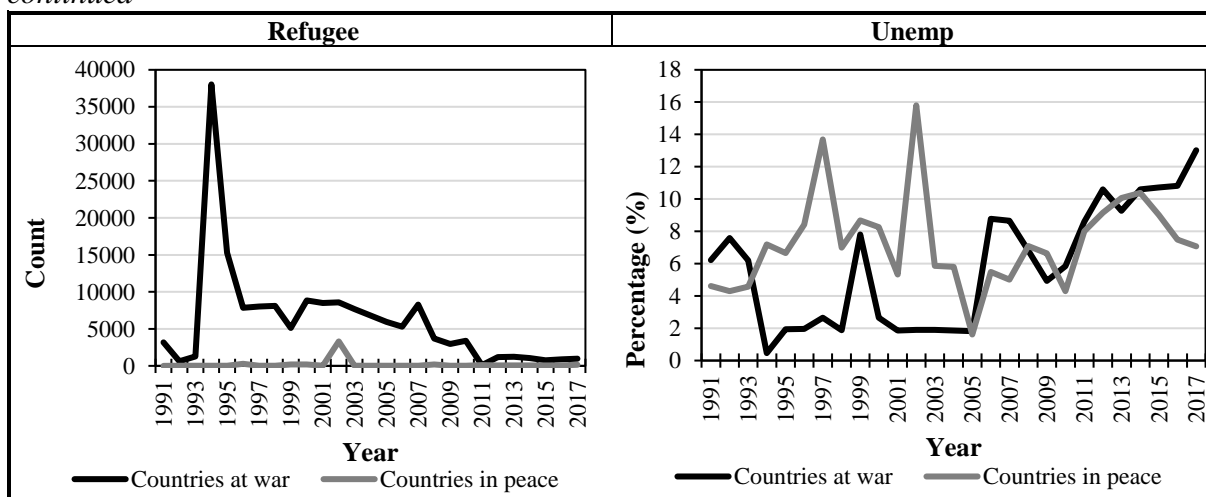
Graph 2: Mean values of the observed variables of countries in clusters with the most deaths per 100,000 people caused due to war activities and terrorism, the period from 1991 to 2017





Source: authors.

Graph 2: Mean values of the observed variables of countries in clusters with the most deaths per 100,000 people caused due to war activities and terrorism, the period from 1991 to 2017 - continued



Source: authors.

There were no significant differences between countries in peace and countries at war related to self-harm deaths. Durkheim (1897) placed importance on social integration as a determinant of suicide, even for civil conflicts. Many subsequent studies have also revealed a decline in suicide rates during wartime. Countries in peace initially had higher HDI than countries in a war in the observed period but the differences in HDI between clusters of countries were slowly disappearing. There was almost no difference in the level of HDI for the year 2017 due to the steady increase in HDI of mainly poor countries in the countries at war cluster. Furthermore, there were found no larger differences between inflation in clusters of countries in peace and war. However, there are spikes of hyperinflation on the graph for some countries in the observed period, namely the years 1993 and 1997. War is a global phenomenon, aftermaths of major wars have often been associated with rising inflation, high bond yields and financial disruption. Chankova and Daly (2021) stated that the median inflation rises by nearly 8% one year after the war. Countries in peace had much higher absolute military expenditures than developing countries. It can be sad that is the cost of peace. However, if we wanted to express relative military expenditures, then per capita military expenditures or as a percentage of GDP, should be observed (Tian et al., 2022). Another characteristic of countries in peace is higher GDP per capita than countries in war, which was explained before. Population growth exhibits some

negative spikes for countries at war. Countries in the war had higher refugee populations, which was a highly expected result. The interesting finding is that countries in peace had higher unemployment levels because wars often lead to increases in production, tighter labour markets, and higher wages (H. D. H., 1915). On the other hand, the conventional wisdom is that conflicts destroy jobs because unemployment can spur more conflict (Human Development Reports, 2016). The main finding of this paper is that countries in peace initially had higher levels of development in terms of their GDP per capita and HDI values, as well as larger military expenditures, which helped to maintain their peace. On the other hand, as predicted by earlier studies in this area, refugee flows were higher in nations experiencing war.

Conclusions

The goal of this paper is to investigate and better understand the common characteristics and differences between countries in war and peace related to development and major macroeconomic indicators. For that purpose, a k-means cluster analysis was conducted. The main findings of the paper can be summed up as: (1) in most cases countries at war are from Africa or Asia, (2) there were no significant differences between countries in peace and countries at war related to self-harm deaths and inflation, (3) countries in peace had higher military expenditures, GDP and initial level of HDI than countries in a war which had higher refugee flows. Limitations of the paper are related to the uneven number of countries in clusters depending on data (un)availability. Therefore, the number of observed countries varied throughout the observed period. Recommendations for future research are to further investigate the impact of war activities on economics by employing other statistical and econometric methods such as panel regression analysis.

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Appendix

Table A1: Descriptive statistics of the observed variables, 1991, n=61 countries

Variable	Statistics					
	Mean	Std. dev.	Minimum	Maximum	Sum	Skewness
Deaths	3.01	7.89	0.00	43.80	183.39	3.60
DeathsS	11.23	6.66	3.15	40.61	685.13	1.67
HDIInd	0.53	0.15	0.23	0.86	32.37	0.00
Inflat	155.03	645.10	-6.78	4523.63	9457.11	6.01
MilitExp	80.94	176.91	0.37	1176.14	4937.17	4.58
GDPpc	5232.14	5971.92	805.86	35723.08	319160.72	3.20
PopGrow	2.01	1.32	-4.20	5.46	122.89	-1.67
Refugee	390.00	1113.17	0.00	6087.57	23790.05	3.70
Unemp	7.37	6.24	0.30	37.44	449.53	2.29

Source: authors.

Table A2: Descriptive statistics of the observed variables, 2017, n=137 countries

Variable	Statistics					
	Mean	Std. dev.	Minimum	Maximum	Sum	Skewness
Deaths	1.06	6.80	0.00	74.68	144.76	9.90
DeathsS	10.49	5.92	2.44	43.64	1436.90	1.85
HDIInd	0.71	0.16	0.35	0.95	97.50	-0.41
Inflat	5.80	8.02	-2.65	60.99	794.38	3.83
MilitExp	244.20	427.38	0.00	2357.41	33454.92	3.06
GDPpc	16749.63	15317.71	727.29	67138.12	2294699.47	1.15
PopGrow	1.32	1.19	-1.55	4.80	180.24	0.21
Refugee	247.04	1106.67	0.03	11869.24	33844.57	9.04
Unemp	7.10	5.23	0.14	24.13	972.68	1.40

Source: authors.