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UNIVERSITY OF RIJEKA
FACULTY OF ECONOMICS AND BUSINESS
Ivana Filipovića 4, 51000 Rijeka
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telefon: +385 51 355 111

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Ekonomski fakultet u Rijeci – Zbornik radova, Ivana Filipovića 4, 51000 Rijeka, Hrvatska – Croatia
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O ČASOPISU

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Employment rate and economic growth: The case of transition countries*¹

Josip Tica², Viktor Viljevac³, Matija Matic⁴

Abstract

This paper investigates the effects of the employment rate on economic growth during the transition process. We start with the mainstream growth econometrics approach that controls for convergence and, in order to control for heterogeneity of countries in our sample, we control our estimates for transition-specific indicators such as initial conditions (pre-transition history), governance quality, privatisation methods as well as various indicators of institutional development. We use a wide range of model specifications using fixed effects as well as Bayesian averaging to address the problem of model uncertainty in 24 countries during the 1995-2019 period. Contrary to the neoclassical growth model assumptions, we find that the employment rate is one of the most important growth factors even after three decades. Results also indicate that convergence (initial level of development) robustly explains a part of cross-country growth rate differentials, while the effects of the initial conditions (pre-transition history) are robust, but fade out after the first decade. We do not find evidence that physical capital and population growth explain the growth in our sample.

Key words: transition, employment rate, convergence, Bayesian averaging, growth factors, initial conditions

JEL classification: P30, O43, E60

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² Full professor, University of Zagreb, Faculty of Economics and Business, Trg J.F. Kennedy 6, Zagreb 10000. Scientific affiliation: transition economics, macroeconomics, urban economics, real estate markets. Phone: +385 1 238 3162. E-mail: jtica@efzg.hr.

³ Teaching assistant, University of Zagreb, Faculty of Economics and Business, Trg J.F. Kennedy 6, Zagreb 10000. Scientific affiliation: macroeconomics, fiscal policy, economic history. Phone: +385 1 238 3229. E-mail: vviljevac@efzg.hr.

⁴ Project assistant, University of Zagreb, Faculty of Economics and Business, Trg J.F. Kennedy 6, Zagreb 10000. Scientific affiliation: transition economics, monetary policy, economic growth and development. Phone: +385 1 238 3144. E-mail: mmatic3@efzg.hr.

1. Introduction

Most growth economists assume mean-reverting properties of employment rate (ratio of employment to working age population) and ignore it in the analysis of determinants of economic growth in the long run (Durlauf et al., 2005). On the other hand, empirical trends as well as economic theories – the hysteresis hypothesis (Blanchard and Summers, 1987) and the structuralist hypothesis (Phelps, 1995) quite clearly indicate that economic shocks can have long-run and extremely persistent effects on the share of the population that is employed and actively contributes to the generation of added value.

When it comes to transition literature, there is a consensus about the importance of institutional development and labor market policies (Roland, 2002; Turley and Luke, 2011). Nevertheless, empirical estimates mostly overlook the effects of persistent changes in the structure of the working age population and initial level of development.

The research objective of this paper is to estimate the importance of employment rate (demographic changes) and convergence for economic growth in 24 transition countries⁵ during 1995-2019 using growth econometrics approach as defined by Durlauf et al. (2005).

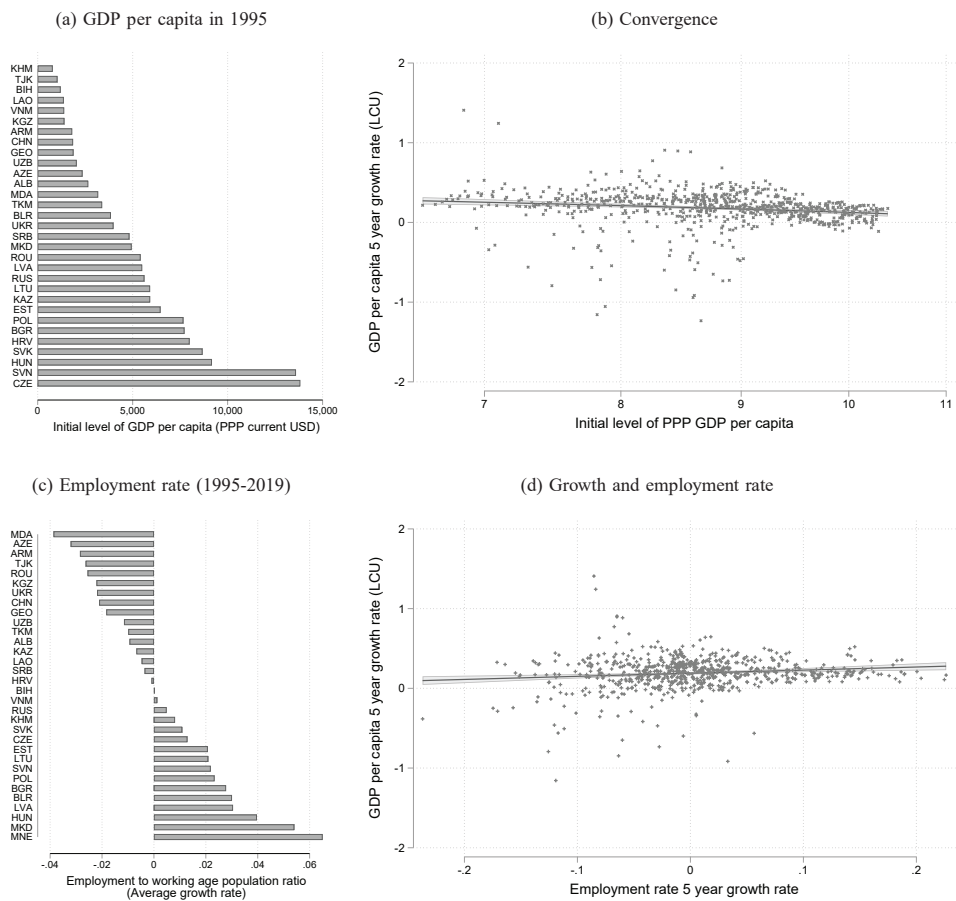
Following the view of the fundamental importance of labor market in the transition process (Turley and Luke, 2011) and empirical evidence on the persistence of employment rates and demographic changes (ageing and migrations) during the last 30 years (see Figure 1c), and contrary to classical assumptions of the Solow (1957) model, we estimate the effect of changes in employment rate and inverted age dependency ratio (ratio of working age population to population) on the long-run economic growth.⁶

⁵ We define transition countries as former centrally planned or non-market-based economies that have started the process of moving towards a market economy during or before the analysed period. This definition is used because there is no agreement on when transition ends, as indicated by various sources (Allsopp and Kierzkowski, 1997; Brown, 1999; Cieřlik and Wciřlik, 2020; Ganic, 2020; Lavigne, 2000). Additionally, it should be noted that different definitions may only consider a portion of the sample as post-transition: Albania (ALB), Armenia (ARM), Bulgaria (GBR), China (CHN), Czechia (CZE), Estonia (EST), Croatia (HRV), Hungary (HUN), Kazakhstan (KAZ), Kyrgyz Rep. (KGZ), Cambodia (KHM), Lao PDR (LAO), Lithuania (LTU), Latvia (LAT), Moldova (MDA), Poland (POL), Romania (ROU), Russian Fed. (RUS), Serbia (SRB), Slovakia (SVK), Slovenia (SVN), Tajikistan (TJK), Ukraine (UKR) and Vietnam (VNM). See Table A.4 for the list of countries and availability of data.

⁶ For example, China has only recently liberalised its *one-child policy*, while the EU *Lisbon strategy* focused on increasing the employment rate to 65%, and recently the target has been increased to 70%.

Transition countries were very heterogeneous in terms of GDP per capita at the beginning of the transition (Figure 1a). Therefore, it is reasonable to assume that a significant part of the growth rate differential between, for example, China as the fastest-growing country in our sample and Czechia as the most developed one at the beginning of the period can be attributed to the low starting point of China instead of only to divergent institutional development and/or shock vs. gradualism debate. Figure 1b for example shows that there is a negative correlation between the initial level of GDP per capita and GDP growth rate in subsequent periods.

Figure 1: Growth, employment and initial level of development



Source: Authors' elaboration

Up until now, a number of papers have addressed the determinants of economic growth in transition (see Turley and Luke (2011) for a survey), but empirical investigations of transition countries were limited in several dimensions. The early models were estimated in the mid-nineties or at the turn of the century (de Melo et al., 2001; Falcetti et al., 2002) with data covering a decade at best. Primarily due to data limitations, it was impossible to control the empirical estimates for neoclassical growth factors (Solow, 1956, 1957). As a result, most of the estimates were not controlled for the initial level of development (Falcetti et al., 2002; Turley and Luke, 2011). The dichotomy between the shock therapy view and the more gradual institutional approach to transition has directed most of the research toward the relative importance of history, initial conditions and quality of institutions (Dewatripont and Roland, 1992; Litwack and Qian, 1998; de Melo et al., 2001)⁷ while neglecting factors indicated by the neoclassical growth theory. Due to the widespread inefficient allocation of resources, in most of the early studies, it was assumed that growth in transition countries was not so much related to the changes in the standard growth determinants but had more to do with the improved allocation of resources (Turley and Luke, 2011).

Today, more than three decades since the start of the process, there is enough empirical evidence to estimate growth models for the group of transition countries. For example, the seminal paper by Mankiw et al. (1992) used 25 years of data spanning from 1960 to 1985 in order to empirically test the validity of the long-run growth model (Solow, 1957).

In order to close these methodological gaps in the growth literature, we devise an econometric strategy that encompasses growth factors as indicated by the mainstream growth econometrics literature (Mankiw et al., 1992; Durlauf et al., 2005) together with transition-specific factors of growth. Having in mind that it is very difficult to estimate the impact of convergence (for example, decreasing returns to capital) on the growth rate differentials unless we combine countries at different levels of development, we use data for Central and Eastern European (CEE) countries together with former Soviet Union (FSU) countries, China and Vietnam. Such a combination yields a very heterogeneous data sample in terms of initial conditions (economic history prior to transition), institutional development during the transition (shock vs. gradual structural reforms), macroeconomic policies as well as governance quality (accountability, rule of law, etc.).

This obviously raises the question of the consequences of including countries with such vast differences inside a single model. While this gives us the opportunity to test for the impact of the initial level of development on growth (convergence),

⁷ For example, how different were transition countries relative to their market economy counterparts, as well as how long were the countries under the planned economy system.

lumping largely different countries together risks that the differences in, for example, changes in the institutional settings in these countries will bias our results. Failure to control for these differences results in the omitted variable bias, therefore making it very important to (as much as it is possible and in line with the available data) control for them. In order to address the problem of heterogeneity of our sample we augment the standard growth econometrics approach by controlling our estimates for Worldwide Governance Indicators (The World Bank, 2020b) and transition indicators from EBRD (2020b). On top of that, we build on the previous body of literature on the relevance of initial conditions prior to the start of transition (de Melo et al., 2001) and introduce a methodological adjustment in order to investigate the effects of time-invariant pre-transition conditions through time. We estimate a battery of econometric models to identify the most important drivers of growth.

Following the traditional growth econometrics approach, we estimate a dynamic two-way fixed effects panel model (FE) in order to present our results in the most intuitive way, as well as to additionally control for the heterogeneity between these countries. In addition, we use a Bayesian model averaging (BMA) to address the problem of model uncertainty and estimate posterior inclusion probabilities for each regressor.

Thus, the paper formulates three research hypothesis:

H1 – The employment rate and dependency ratio are important and robust determinants of economic growth in transition countries even after controlling for all other growth factors.

H2 – The effect of time-invariant initial (pre-transition) conditions on the GDP growth rate fades away after the first decade of the transition process.

H3 – Initial level of development explains part of the growth rate differentials between developed and less-developed countries during the transition process even after controlling for transition-specific factors of growth.

Our results indicate that the ratio of employment to the working-age population and the initial level of development (convergence) are the most robust variables in explaining cross-country differences in GDP growth rates in transition countries and that the effects of initial pre-transition conditions fade away after a decade of the transition process.

The remainder of the paper is organized as follows. Section 2 summarizes the existent literature; Section 3 provides an overview of the methodology and discusses the data. In Section 4 we present the empirical results, and Section 5 concludes.

2. Survey of literature and conceptual framework

Although the list of variables used to explain economic growth is wide in the growth as well as in transition literature, the impact of the labor market via the employment to working-age population ratio and age dependency ratio, which includes both the functioning of the labor market and demographic changes in the population structure, has been neglected. The literature is mainly based on the analysis of the efficiency and productivity of the labor market in the early and later stages of transition, the efficiency of state policies, reactions of the labor market to changes in production, the decrease in real wages, the increase in both the rate and the duration of unemployment, the restructuring of employment from the state to the private sector etc. (Cámara, 1997; Svejnar, 1999; Boeri and Terrell, 2002; Rutkowski, 2006).

We focus on demographic and labor market indicators to highlight the impact of persistent labor market shocks and demographic changes on the divergence between GDP per capita and GDP per worker. The main reason for this augmentation stems from the fact that GDP per capita and GDP per worker can deviate from each other in the case of permanent trends in employment rate and/or age dependency ratio. Figure 1c shows the average growth rate of the employment to the working-age population ratio, and it is rather evident that trends in employment rate diverge across transition countries and that they are positively correlated with GDP per capita growth rate (Figure 1d).

Having that in mind, and following approach taken by Marattin and Salotti (2011); Maestas et al. (2023) we decompose GDP per capita into changes in GDP per worker, employment rate, and a quasi-inverted age dependency ratio:

$$\frac{GDP}{population} = \frac{GDP}{employment} \times \frac{employment}{work.age.pop.} \times \frac{work.age.pop.}{population} \quad (1)$$

where the right side of the equation collapses into the GDP per capita after all the fractions on the right side are cancelled. By decomposing GDP per capita into changes in GDP per worker, employment rate, and quasi-inverted age dependency ratio, we separate and empirically estimate the impact of different variables related to the labor market on economic growth. We aim to include the long-term impact of the labor market on economic growth. Accordingly, we formulate the first hypothesis:

H1 – The employment rate and dependency ratio are important and robust determinants of economic growth in transition countries even after controlling for all other growth factors.

From the beginning of the transition process research, a lot of attention was paid to initial conditions such as GDP per capita, the share of industry and agriculture in total GDP i.e. the structure of the economy, war conflicts, etc., which were generally considered to reflect an important determinant of the transition success. Different results in the literature can be found regarding the strength and duration of the influence of initial conditions on transition outcomes. One of the most influential papers on the role of initial conditions is the paper written by de Melo et al. (2001). The authors use principal component analysis to compress 11 initial conditions variables in two components which explain 70% of the variation in these 11 variables. We use their initial conditions variables in our own empirical analysis to control for the impact of time-invariant pre-transition initial conditions on the growth rates of transition countries.

In the early stages of transition, research emphasized the differences in success between the countries of Europe and the former Soviet Union due to different pre-transitional political arrangements such as the duration of the communist regime and the structure of the economy (Åslund et al., 1996; Selowsky and Martin, 1997). Although reforms and liberalization played an important role in the transition, especially in the early phase, liberalization can also be seen as an endogenous process strongly linked to initial conditions (Krueger and Ciolko, 1998). Depending on the particular initial conditions present in a specific country, it was more profitable for some countries to start the process of liberalization and reformation due to the favourable ratio of costs to benefits. On the other hand, it is also possible to assume that the role of the initial conditions is indirect, so instead of impacting growth directly, it influences growth through the policies of structural reforms, stabilization and liberalization (de Melo et al., 1996; Wolf, 1999; Fischer and Sahay, 2000).

Although not completely denying at least the partial importance of the initial conditions, some authors claim that initial conditions are less important than other determinants of growth and that they were not decisive for a successful transition process – or that only in combination with other factors and political decisions they resulted in vastly different outcomes in different countries (Havrylyshyn et al., 1998, 1999; Wolf, 1999). Since there are numerous papers which have included the initial conditions as a crucial determinant of a successful transition, we will single out only some of them – Brunetti et al. (1997); Hernández-Catá (1997); Sachs and Woo (1997); Heybey and Murrell (1999); Moers (1999); Abed and Davoodi (2000); Popov (2000); de Melo et al. (2001); Falcetti et al. (2002); Miller and Tenev (2007). The puzzle arises when we put the impact of initial conditions on a timeline – trying to separate their role in the initial transition shock and in all those processes that transition countries follow decades later. Numerous authors explain that the initial conditions have a limited influence, which is adverse only in the initial years of the transition, and which later loses its significance in explaining economic

performance (Berg et al., 1999; Havrylyshyn et al., 1999; Falcetti et al., 2006; Godoy and Stiglitz, 2006; Popov, 2007). Based on the existing research papers, we present the second hypothesis of this paper:

H2 – The effect of time-invariant initial (pre-transition) conditions on the GDP growth rate fades away after the first decade of the transition process.

After taking into account the negative but diminishing impact of initial conditions on economic growth, other factors become more important in explaining cross-country growth differences. In line with the assumptions of the neoclassical growth theory, we can expect a gradual convergence of transition countries, especially when the initial conditions specific to each country cease to play a major role in explaining subsequent economic growth.

Outside the growth literature, we find confirmation for the hypothesis of convergence between transition countries in a small number of papers. Kočenda (2001) finds evidence for the conditional convergence of similar transition countries when it comes to economic growth (approximated by industrial production). There are other papers that include the discussion of the convergence of countries or groups of countries and thus use the initial levels of development in empirical analysis (Campos and Coricelli, 2002; Polanec, 2004; Pipień and Roszkowska, 2019). However, the influence of the initial level of development is still much more widely covered in the growth econometrics literature (Mankiw et al., 1992; Barro and Sala-i Martin, 1997; Johnson and Papageorgiou, 2020). Thus we formulate our third hypothesis:

H3 – Initial level of development explains part of the growth rate differentials between developed and less-developed countries during the transition process even after controlling for transition-specific factors of growth.

3. Methodology

In line with Caselli et al. (1996) and Hoeffler (2002), the starting point of our analysis is the human capital augmented version of the Solow growth model. This version of the Solow model predicts that the output per capita growth rate is an increasing function of investments in physical and human capital and the state of technology from the previous period, and a decreasing function of population growth, technology growth, depreciation rate and initial level of income per capita at the beginning of the period (the convergence effect).

Following Durlauf et al. (2005) we estimate equation 2 and use a wide list of additional variables identified in the literature to capture additional growth factors that can either proxy for the state of technology (often used as a measure of the

level of total factor productivity) and/or explain the accumulation of other growth factors (for example, institutional factors).⁸ We use the FE estimator to estimate the following equation:

$$\Delta y_{i,t} = \alpha_i + \mu_t + \beta_1 y_{i,t=0} + \psi X_{i,t} + \pi Z_{i,t} + \theta_1 C_i + \theta_2 D_i + \epsilon_{i,t} \quad (2)$$

where $y_{i,t}$ is GDP per capita, parameters α_i and μ_t are country and time fixed effects, $y_{i,t=0}$ is the initial level of GDP per capita (a proxy for convergence), $X_{i,t}$ is the vector of growth factors implied by Caselli et al. (1996) and Hoeffler (2002) and $Z_{i,t}$ represents growth factors that aren't included in the human capital augmented Solow model (1956; 1957). The variable C_i represents a time-invariant principal component of the initial conditions for each transition country as defined by de Melo et al. (2001) and D_i represent a time-invariant dummy variable for the implemented privatisation model. Small letters denote logs of variables $x_t = \log(X_t)$. Following Bai (2009) we use interactive effects terms of initial conditions C_i and time fixed effects, and privatisation models D_i and time fixed effects in order to estimate the persistence of the effect of initial conditions and chosen privatisation models on the long-run growth.⁹

The choice of econometric methods in this paper is based on estimating fixed effects using the overlapping sample to increase the number of observations and on robustness control of fixed effects using Bayesian model averaging.

Keeping in mind the significant differences in the initial levels of development of transition countries (Figure 1a), we control our estimates for the initial level of GDP per capita in order to control for convergence. To avoid our panel from collapsing into a cross-section dataset, we divide our data into overlapping five-year periods and regress the five-year average growth rate on the initial level of GDP per capita in each five-year period. Therefore, the variable $y_{i,t=0}$ represents the initial level of GDP per capita in each five-year period.

Accordingly, we use five-year averages for all variables that appear as log-levels $x_{i,t} = 1/5 \times \sum_{n=0}^4 x_{i,t-n}$ in the estimation and we calculate five-year growth rates for all variables that are used as log-differences in the estimation $\Delta x_{i,t} = \log(X_{i,t}) - \log(X_{i,t-4})$. In the estimation, we use both the overlapping sample and non-overlapping five-year frequency.¹⁰ The difference between the five-year overlapping sample and the

⁸ All models are estimated using estimators that use variance-covariance matrix (VCE) in order to correct estimated errors for misspecification to obtain results robust to heteroskedasticity of the errors. Clustering on the panel variable produces a consistent VCE estimator when the disturbances are not identically distributed over the panels or there is serial correlation in errors.

⁹ Bai (2009) proposed large T and large N panel data models with observable multiple interactive effects.

¹⁰ Due to data limitations and a small number of countries in the sample, most of the results are presented for the overlapping sample.

non-overlapping sample is in the large number of observations. A five-year average (1995-2019 period) results in 4 periods for the non-overlapping sample and 23 periods for the overlapping sample. Therefore, the former converts the dataset into a panel with less than 100 observations, and the latter into a panel in which the number of observations is preserved at over 400 observations for the same model. Both overlapping samples (Islam, 1995; Caselli et al., 1996; Durlauf et al., 2005) and non-overlapping samples (Loayza and DEC, 1994; Égert, 2012; Woo and Kumar, 2015) are used in the growth econometrics panel data analysis in the literature. We proceed with the former to maximise the number of observations, but we control our estimates with the latter approach to control for autocorrelation in a more robust way. Non-overlapping sample is very wide ($N > T$) and by definitions controls for autocorrelation.

In order to check for the robustness of our model, we estimate a wide range of FE models with alternative combinations of variables in vector $X_{i,t}$ and interaction terms for initial conditions and privatisation models. To address the issue of model uncertainty, we employ the Bayesian averaging technique. Following (Fernandez et al., 2001) we use birth-death MCMC sampler with uniform model size prior and Zellner's g prior mechanism that posterior model probability (PMP) asymptotically behaves like Bayesian information criterion (g equal to the number of observations) or the risk inflation criterion (g equal to the number of regressors squared).¹¹ In total, we average over 2.2 billion estimated regressions in the model with 23 variables, 22 time and 19 cross-section fixed effects¹². We estimate a model without and with uncertainty in fixed effects. Keeping in mind that transition countries had quite different initial conditions and that there were significant differences in the privatisation models used in transition countries, we also investigate the effects of these initial reforms on the long-term growth trajectory.

In the FE estimate, we use two dummy variables (Pvoucher and Pdirsales) for three general types of privatisation models (voucher privatisation, direct sales, and management buyout). Both of the dummy variables are added into the model as interaction terms with time fixed effects to investigate the long-run consequences of privatisation model choices. A similar estimation strategy is employed for the initial conditions. We use de Melo et al. (2001) initial conditions dataset in order to estimate the principal component that is used as an interaction term with fixed effects in the model. The goal is to explore the strength that initial conditions had on the growth patterns of transition countries.

Following Mankiw et al. (1992) we use the share of gross fixed capital formation in GDP $mlgfcf$, population growth rate $dlpop$ and human capital $mlhc$ in the vector $X_{i,t}$.

¹¹ See Zeugner and Feldkircher (2015) for more information on BMA estimation and model selection.

¹² FE models were estimated in *Stata*, while the Bayesian averaging model was estimated in *R*.

Furthermore, in order to account for population ageing and quite persistent labor market disturbances during the transition process, we enlarge the vector $X_{i,t}$ with employment to working-age population ratio $dlemp$ and working-age population to total population ratio $dlrss$.

In the vector $Z_{i,t}$, we employ alternative combinations of a wide range of additional variables that are usually used in growth regressions. We use institutional factors proxied by EBRD's transition indicators and the World Bank's Worldwide Governance Indicators. We augment the growth factors with interest paid on public debt $mlintpaid$ following Reinhart and Rogoff (2010) and investigate the role that the surge in foreign direct investment $mFDI$ had on economic growth during the transition process. The estimates are controlled for openness $mlopen$ and financial development $mlfindev$ following Levine and Renelt (1992).

In order to investigate the long-term effects of the quite strong initial real exchange rate appreciation in the majority of transition countries (Dollar, 1992; Égert et al., 2004), we control our estimates for the appreciation of absolute real exchange rate and gross wages¹³, as well as for the changes in terms of trade $mltot$ in order to capture the change in the quality of exports and product complexity (Égert et al., 2004). To investigate structural differences between different transition growth models, we use the growth rate of manufacturing $dlmanuf5$, rents from natural resources $dlrent5$, and tourism receipts $dltourism5$. With these variables, we are trying to capture the effects of (de)industrialization and/or *resource curse* on growth trajectories of transition countries (Venables, 2016). We also use the share of government expenditure in GDP to proxy for the level of involvement of the public sector in the economy.

4. Empirical data and analysis

In this section we present data and the empirical analysis that we carried out.

4.1. Data

Table A.1¹⁴ lists all variables used in the empirical analysis, along with the description and the source for the variable. We use The World Bank (2020a) database to obtain the majority of data series. The human capital index $mlhc$ and terms of trade $mltot$ (price level of exports divided by the price level of imports) were obtained from Penn World Table 9.1 (Feenstra et al., 2015). The share of government expenditure in GDP $Gexp$ was obtained from EBRD (2020b). We use

¹³ We regress the price level and gross wages on PPP GDP per capita level and use the residuals as a proxy for the real exchange rate and unit labor cost appreciation respectively.

¹⁴ Tables A.1-A.6 are available in online Appendix: <https://www.efri.uniri.hr/upload/ZBORNİK%201%202023/Appendix.pdf>.

two different measures of institutional indicators, transition indicators published by EBRD (2020a) and Worldwide Governance Indicators (WGI) published by The World Bank (2020b). Both transition indicators and WGI consist of 6 different indicators, and the details are shown in Table A.1. A higher value of indicators denotes a better institutional score for both the WGI and transition indicators. Data on methods of privatisation of medium-sized and large enterprises are from the study published by The World Bank (2002) titled *Transition, The First Ten Years*. This study lists three different privatisation methods, direct sales, vouchers, and management-employee buyout. For a particular country, each method was labelled as *Primary*, *Secondary* or *n.a.* based on which of the three methods was a primary strategy for privatisation, which method was a secondary privatisation strategy, and which method was not used in a particular country.

We use de Melo et al. (2001) initial conditions data in order to capture the impact differing initial conditions, mostly different magnitudes of initial distortions, had on subsequent growth rates. For example, it makes sense to assume that countries with larger initial distortions such as higher repressed inflation, more years under central planning and larger trade dependence on other centrally planned economies before the fall of the Iron Curtain will go through a slower and more painful adjustment process, thereby resulting in lower growth rates. This is precisely the result de Melo et al. obtained back in 2001. Since we now have a much longer dataset than they had, we can also trace the impact of these initial conditions over time and see if their importance fades as the transition progresses. Since we use a total of 10 initial conditions variables to construct the principal components, the list of variables used along with variable definitions is provided in Table A.5. More information can also be found in the original paper by de Melo et al. (2001). Principal components and loadings related to each of the initial conditions variables are shown in Table A.6.

The result of combining all variables into one dataset is an unbalanced panel due to the large number of missing values that are differently distributed among the variables. To reduce the problem of the unavailability of certain variables for different countries, we form nine models with different variables. Table A.2 shows the descriptive statistics and availability of the variables used in the analysis. The largest sample is used in the first model, with a total of 431 observations, and the smallest sample in the ninth model with 286 observations. The correlation Table A.3 shows low correlation between the observed variables, with the exception being the correlation between *mlopen* (openness) and *mltot* (changes in terms of trade). The frequency of all the data is annual, and the data cover the 1995-2019 period for 24 countries.¹⁵ The complete list of countries in our sample and the

¹⁵ The dataset starts from 1989 and 32 countries, but due to data unavailability, we lose 8 cross-sections and the first six years in estimated models.

availability of all of the aforementioned variables for each particular country is shown in Table A.4.

4.2. Empirical analysis

We present the results in four different parts. First, we start with the results of the FE model for the overlapping and the non-overlapping sample in Tables 1 and 2. Second, we focus on the graphical analysis of estimated coefficients for interaction terms between time-fixed effects and initial conditions and interaction terms for privatisation models in Figure 2. After that, we focus on model uncertainty and BMA results presented in Figures 3 and Table 3. At the end of the result section we discuss the results of GMM estimators.

Table 1: Fixed effects estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	dly5	dly5	dly5	dly5	dly5	dly5	dly5	dly5	dly5
dipop5	-0.304 (0.547)	0.086 (0.865)	-0.014 (0.966)	0.185 (0.607)	-0.075 (0.874)	-1.193* (0.068)	0.208 (0.664)	-1.393 (0.178)	0.254 (0.632)
mlgfcf	0.045 (0.372)	0.018 (0.709)	-0.016 (0.698)	-0.020 (0.691)	0.030 (0.716)	-0.026 (0.832)	-0.075 (0.177)	-0.009 (0.924)	-0.028 (0.342)
mlhc	-0.195 (0.620)	0.003 (0.994)	0.489 (0.103)	0.302 (0.400)	0.476 (0.245)	0.292 (0.547)	0.898*** (0.001)	-2.646** (0.031)	0.581 (0.277)
dlemp5	0.501*** (0.000)	0.539*** (0.000)	0.372*** (0.002)	0.339** (0.012)	0.293** (0.040)	0.334* (0.068)	0.371*** (0.002)	0.088 (0.619)	0.370*** (0.006)
dlrss5	0.377 (0.668)	-0.405 (0.613)	-1.110* (0.069)	-0.844 (0.207)	-0.664 (0.516)	-0.771 (0.619)	-0.932 (0.119)	6.223*** (0.001)	-1.280 (0.219)
ylag5	-0.432*** (0.000)	-0.464*** (0.000)	-0.538*** (0.000)	-0.463*** (0.000)	-0.642*** (0.000)	-0.383*** (0.000)	-0.483*** (0.000)	-0.240* (0.095)	-0.646*** (0.000)
mlopen		-0.047 (0.536)	0.022 (0.593)	0.099 (0.106)	-0.028 (0.574)	0.029 (0.664)	0.148*** (0.004)	0.030 (0.822)	-0.003 (0.973)
mltot		0.581 (0.118)	0.384 (0.254)	0.234 (0.468)	0.256 (0.453)	0.249 (0.583)	0.309 (0.288)	0.874* (0.062)	0.341 (0.323)
mlrent		-0.010 (0.558)	-0.025 (0.144)	-0.025 (0.156)	-0.056 (0.169)	-0.015 (0.337)	-0.017 (0.239)	-0.159*** (0.002)	-0.022 (0.422)
mlFDI		0.029 (0.202)	0.026* (0.082)	0.014 (0.276)	0.032* (0.081)	0.013 (0.476)	0.015 (0.296)	-0.008 (0.609)	0.038 (0.145)
mCorruptionControl			-0.090 (0.348)	-0.052 (0.641)	-0.090 (0.421)	0.126 (0.294)	-0.045 (0.657)	0.154*** (0.009)	-0.037 (0.760)
mGovEffectiveness			-0.014 (0.850)	-0.053 (0.548)	-0.011 (0.884)	-0.108 (0.423)	-0.036 (0.620)	0.518* (0.050)	0.137 (0.199)
mPolStability			0.130*** (0.001)	0.086** (0.034)	0.151*** (0.001)	0.119** (0.022)	0.073** (0.030)	0.168* (0.094)	0.135** (0.014)
mRegQuality			0.180*** (0.010)	0.135** (0.034)	0.279*** (0.004)	0.133 (0.292)	0.146** (0.037)	-0.090 (0.452)	0.098 (0.228)
mRuleLaw			-0.008 (0.933)	0.038 (0.725)	-0.067 (0.590)	-0.106 (0.644)	0.041 (0.663)	-0.541*** (0.000)	-0.161 (0.274)
mVoiceAccountability			-0.150** (0.011)	-0.139** (0.022)	-0.162*** (0.001)	-0.118 (0.183)	-0.134*** (0.001)	0.159 (0.115)	-0.115 (0.113)
mlCompetition				0.014 (0.829)					
mlGovernance				0.245 (0.211)					
mlLprivatisation				-0.140 (0.259)					
mlPliberalisation				0.321* (0.054)					
mlSprivatisation				0.262 (0.116)					
mlTFsystem				-0.037 (0.805)					
mlmanuf					0.110 (0.346)				
mlhbs						-0.002 (0.881)			
mlintpaid							-0.048*** (0.009)		
mlfindev								-0.030 (0.277)	
mlGexp									-0.145* (0.099)
_cons	3.890*** (0.000)	4.113*** (0.000)	3.888*** (0.000)	2.279* (0.059)	4.886*** (0.000)	3.230*** (0.004)	2.805*** (0.000)	5.831*** (0.009)	5.258*** (0.000)
N	431	431	419	412	367	312	360	201	286
N_g	19	19	19	19	18	19	19	11	19
aic	-1260	-1293	-1427	-1442	-1314	-1181	-1414	-1136	-1012

Notes: *p*-values for estimated coefficients are in parentheses. *, ** and *** indicate statistical significance at 10%, 5% and 1% levels respectively. Prefixes *dl*, *ml* and *m* indicate five year log difference, log moving average and moving average of the variable respectively. Variables are: five year GDP growth rate *y5*, population *pop5*, gross fixed capital formation *gfcf*, human capital *hc*, ratio of employment to working age population *emp*, working age to total population ratio *rss*, initial level of GDP *ylag5*, openness *open*, terms of trade *tot*, ratio of rents to GDP *rent*, foreign direct investment *FDI*, share of manufacturing in GDP *manuf*, price level deviation from the fitted HBS trend *hbs*, interest paid on public debt *inpaid*, financial development *findev*, share of government expenditure in GDP *Gexp*, and institutional indicators: Control of Corruption *mCorruptionControl*, Government Effectiveness *mGovEffectiveness*, Political Stability and Absence of Violence/Terrorism *mStability*, Regulatory Quality *mRegQuality*, Rule of Law *mRuleLow*, Voice and Accountability *mVoiceAccountability*, competition policy *mlCompetition*, governance and enterprise restructuring *mlGovernance*, large scale privatisation *mlLPrivatisation*, price liberalisation *mlPliberalisation*, small scale privatisation *mlSprivatisation* and trade and foreign exchange system *mlTFsystem*. Institutional indicators variables with the prefix *m* represent six WGI indicators, and those with the prefix *ml* represent six transitional indicators. A higher value of an indicator denotes a better institutional score. This holds for all institutional indicators. Coefficients for the interaction terms are omitted from the table and presented in Figure 2.

Source: Authors' calculation

Table 2: Fixed effects estimates in the not-overlapping sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	dly5	dly5	dly5	dly5	dly5	dly5	dly5	dly5	dly5
dipop5	-0.548 (0.315)	-0.294 (0.588)	-0.421 (0.316)	-0.441 (0.476)	-0.629 (0.249)	-0.705 (0.469)	-0.443 (0.532)	-0.893*** (0.000)	-1.018 (0.160)
mlgfcf	0.034 (0.467)	0.022 (0.638)	-0.007 (0.892)	0.016 (0.837)	0.092 (0.425)	-0.069 (0.474)	-0.179*** (0.004)	0.234*** (0.000)	-0.071 (0.183)
mlhc	-0.088 (0.834)	0.239 (0.481)	0.368 (0.320)	0.413 (0.351)	0.313 (0.530)	0.706 (0.244)	0.827** (0.010)	3.339*** (0.000)	0.303 (0.413)
dlemp5	0.444*** (0.001)	0.557*** (0.000)	0.413** (0.012)	0.317* (0.059)	0.380 (0.121)	0.572** (0.018)	0.413** (0.040)	1.283*** (0.000)	0.530*** (0.000)
dldrss5	0.430 (0.576)	-0.168 (0.796)	-0.364 (0.567)	-0.018 (0.985)	0.240 (0.815)	-1.275 (0.462)	-1.219 (0.348)	-0.213*** (0.000)	-0.832 (0.255)
lylag5	-0.332*** (0.001)	-0.370*** (0.001)	-0.452*** (0.000)	-0.374*** (0.003)	-0.555*** (0.000)	-0.442** (0.039)	-0.448*** (0.008)	-0.387*** (0.000)	-0.360*** (0.013)
mlopen		-0.147* (0.081)	-0.068 (0.286)	0.109 (0.121)	-0.096 (0.262)	-0.047 (0.685)	0.112 (0.385)	-0.092*** (0.000)	-0.017 (0.782)
mltot		0.168 (0.569)	0.027 (0.938)	-0.220 (0.597)	-0.184 (0.703)	0.029 (0.946)	0.085 (0.812)	-0.782*** (0.000)	-0.383 (0.182)
mlrent		-0.013 (0.346)	-0.020 (0.207)	-0.008 (0.657)	-0.065 (0.275)	-0.014 (0.389)	-0.025 (0.146)	-0.190*** (0.000)	-0.055*** (0.006)
mlFDI		0.031 (0.157)	0.028 (0.122)	0.016 (0.381)	0.023 (0.398)	0.018 (0.363)	0.018 (0.270)	0.081*** (0.000)	0.012 (0.618)
mCorruptionControl			-0.018 (0.868)	0.070 (0.535)	-0.071 (0.663)	0.126 (0.234)	-0.013 (0.919)	0.402*** (0.000)	0.052 (0.659)
mGovEffectiveness			-0.070 (0.500)	-0.104 (0.380)	-0.036 (0.738)	-0.316*** (0.001)	-0.115 (0.396)	0.642*** (0.000)	0.191 (0.172)
mPolStability			0.099** (0.041)	0.037 (0.252)	0.126* (0.076)	0.032 (0.413)	0.048 (0.104)	0.237*** (0.000)	0.090 (0.232)
mRegQuality			0.081 (0.489)	0.040 (0.648)	0.127 (0.382)	0.062 (0.636)	0.148 (0.184)	-0.723*** (0.000)	0.201 (0.150)
mRuleLaw			0.052 (0.634)	0.105 (0.399)	0.012 (0.928)	0.235 (0.229)	0.053 (0.635)	-1.033*** (0.000)	-0.261 (0.120)
mVoiceAccountability			-0.098 (0.120)	-0.118 (0.122)	-0.068 (0.321)	-0.218 (0.194)	-0.188* (0.058)	0.642*** (0.000)	-0.076 (0.420)
mlCompetition				0.024 (0.894)					
mlGovernance				0.655*** (0.001)					
mlLprivatisation				-0.248 (0.194)					
mlPliberalisation				0.073 (0.843)					
mlSprivatisation				0.539** (0.040)					
mlTFsystem				-0.176 (0.197)					
mlmanuf					0.142 (0.427)				
mlhbs						0.000 (0.988)			
mlintpaid							-0.050* (0.054)		
mlfindev								0.010*** (0.000)	
mlGexp									0.189 (0.284)
_cons	3.148*** (0.003)	3.766*** (0.002)	4.040*** (0.000)	1.452 (0.300)	4.644*** (0.000)	3.774** (0.014)	3.358*** (0.001)	-0.441*** (0.000)	2.419 (0.111)
N	89	89	89	88	79	75	77	45	70
N_g	19	19	19	19	18	19	19	11	19
aic	-272	-281	-299	-342	-268	-295	-305	.	-264

Notes: *p*-values for estimated coefficients are in parentheses. *, ** and *** indicate statistical significance at 10%, 5% and 1% levels respectively. Variable abbreviations are explained in the notes of Table 1.

Source: Authors' calculation

Tables 1 and 2 present the estimates of 9 different models.¹⁶ In Model 1, we use only classical growth factors, employment rate and inverted dependency rate as regressors. In Model 2, we add openness, terms of trade, the share of rents from natural resources and the share of FDI in GDP to the list of regressors. In Model 3, the Worldwide Governance Indicators are added to the list of regressors, and finally, in Model 4, we add EBRD's transition progress indicators.

¹⁶ The results that include dummy variables for EU and EMU membership are available upon request. Both variables show statistically insignificant coefficients when added to the estimated equations.

Model 1 is nested within Model 2, Model 2 within Model 3 and Model 3 within Model 4. Expansion of the list of regressors between models 1 and 4 did not result in a significant loss in the sample size of the estimated models. The inclusion of the share of manufacturing and government expenditures in GDP, real exchange rate appreciation, interest paid on public debt and financial development significantly reduces the number of observations. Therefore, we add these variables to the list of regressors one by one in models 5 through 9. Contrary to the theoretical expectations of the growth model (Solow, 1957) and the results obtained in seminal empirical papers (Mankiw et al., 1992), we do not find evidence that investment rate or population growth played a significant role in the transition.

Results of the FE estimates in the Table 1 indicate that the ratio of employment to working-age population, together with the initial level of development and political stability, explain economic growth in transition countries in the most robust way. Coefficients for the employment rate and political stability are positive and significant, and coefficients for the initial level of GDP are negative and significant, indicating that the effects of political stability, labor market reforms and convergence dominate other determinants of long-run economic growth. The results for two institutional indicators, Regulatory Quality and Voice and Accountability, are slightly less robust. In models 4 through 9, the estimated coefficients for price liberalisation, interest paid on public debt and share of government expenditures in GDP are statistically different from zero and have the theoretically expected sign. The FE estimates for the non-overlapping sample (Table 2) confirm the results for the employment rate and the initial level of GDP, while the results for institutional indicators are less robust due to a smaller number of observations.

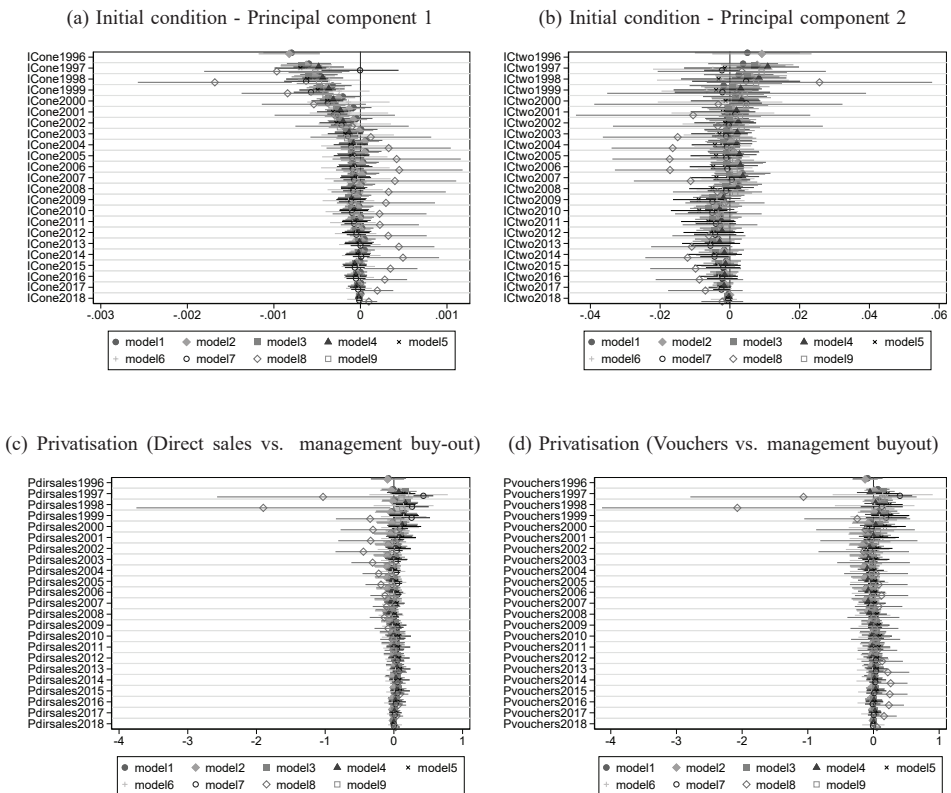
Vectors of estimated coefficients for the interaction terms between initial conditions and time dummies θ_1 and privatisation models and time dummies θ_2 are presented in Figure 2. Figures show point estimates and confidence intervals through time for each estimated FE model presented in Table 1.

Figure 2a presents estimated coefficients for the interaction term between fixed effects and the first principal component. The results imply that initial conditions had a statistically significant impact on the growth rate until the end of the first decade of transition. After 2000 the effect of interaction terms is not statistically different from zero. Interaction terms for the second principal component in Figure 2b are not different from zero throughout the entire period. When it comes to interaction terms for privatisation model dummies in Figures 2c and 2d, we do not find evidence that the choice of either the direct sales model or the voucher privatisation model had a statistically different long-run impact on growth vis á vis the management buyout privatisation model.

Keeping in mind the problems related to the model uncertainty in growth econometrics, we proceed with the Bayesian averaging approach to estimation.

We use a birth-death MCMC sampler to estimate 2.2 billion models with different combinations of covariates in order to endogenously choose proper regressors and simultaneously estimate their average estimated sign as well as statistical significance. Table 3 presents estimated posterior inclusion (PIP) probabilities of used regressors, averaged coefficients over all models (Post mean), posterior standard deviation (Post SD) and posterior probability of a positive coefficient (Cond.Pos.Sign).

Figure 2: Impact of initial conditions and inflation through time



Source: Authors' calculation

We have forced all estimates to include country and time fixed dummies, and therefore all fixed effects have PIP at 1 (maximum level).¹⁷ Employment rate, initial level of development, small-scale privatisation and Voice and Accountability indicator are the variables with maximum levels of PIP in the model. A posterior inclusion probability higher than .9 is also estimated for human capital, Political Stability, Control of Corruption, Rule of Law, and price liberalisation indicators. The initial level of development has zero posterior probability of having a positive estimated sign, while the employment rate, small-scale privatisation, human capital and price liberalisation have maximal probabilities of having a positive estimated sign. Probabilities of estimated signs for the Rule of Law and Voice and Accountability are counter-intuitive in our estimates.

Figure 3 presents the data from Table 3 together with the cumulative probability of estimated models (horizontal axis). Results indicate that the models with the biggest weights are based on the employment rate, human capital, the initial level of development (convergence) and a set of institutional indicators such as small-scale privatisation, Political Stability, and Control of Corruption in the huge majority of the best models. Gross fixed capital formation and population growth are excluded from the best models, as well as auxiliary growth regressors such as openness, terms of trade, the share of rents from natural resources and FDI. In addition, there are also institutional transition progress indicators that do not seem to have a statistically significant effect on long-run growth. These are competition policy, Regulatory Quality, large-scale privatisation and Government Effectiveness.

¹⁷ The results for BMA estimates with uncertainty in fixed effects are available upon request.

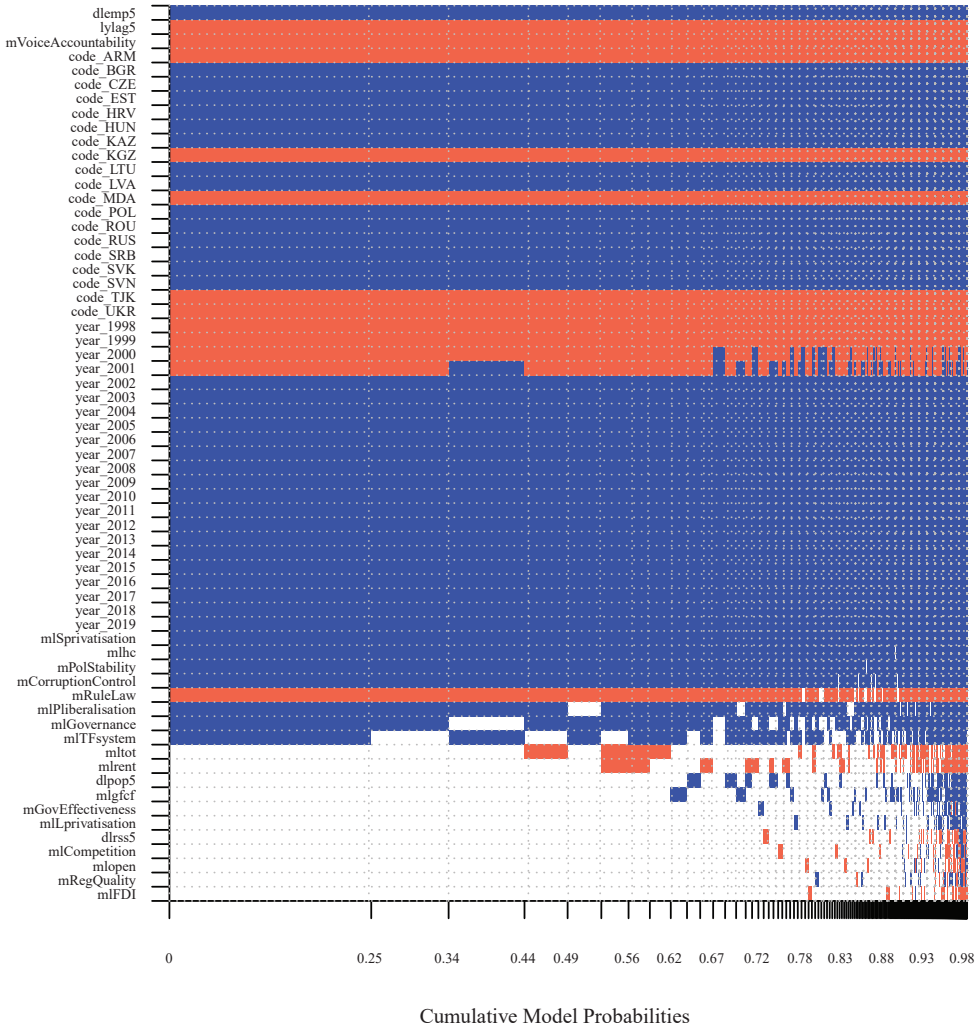
Table 3: Bayesian averaging least squares dummy variables model

	PIP	Post Mean	Post SD	Cond.Pos.Sign	Idx
lylag5	1	-0.456	0.029	0	6
code_ARM	1	-0.137	0.031	0.00000	23
code_BGR	1	0.179	0.036	1	24
code_CZE	1	0.278	0.083	1	25
code_EST	1	0.170	0.074	1.000	26
code_HRV	1	0.152	0.054	1	27
code_HUN	1	0.216	0.065	1	28
code_KAZ	1	0.167	0.050	1	29
code_KGZ	1	-0.617	0.034	0	30
code_LTU	1	0.335	0.049	1	31
code_LVA	1	0.308	0.049	1	32
code_MDA	1	-0.082	0.029	0	33
code_POL	1	0.227	0.066	1	34
code_ROU	1	0.237	0.032	1	35
code_RUS	1	0.132	0.059	0.998	36
code_SRB	1	0.136	0.032	1	37
code_SVK	1	0.189	0.074	1	38
code_SVN	1	0.320	0.068	1	39
code_TJK	1	-0.685	0.055	0	40
code_UKR	1	-0.077	0.032	0.001	41
year_1998	1	-0.036	0.024	0.00000	42
year_1999	1	-0.045	0.028	0.001	43
year_2000	1	-0.025	0.031	0.081	44
year_2001	1	-0.002	0.034	0.251	45
year_2002	1	0.034	0.036	0.997	46
year_2003	1	0.070	0.038	1.000	47
year_2004	1	0.111	0.040	1	48
year_2005	1	0.139	0.042	1	49
year_2006	1	0.171	0.045	1	50
year_2007	1	0.207	0.048	1	51
year_2008	1	0.214	0.050	1	52
year_2009	1	0.129	0.053	1	53
year_2010	1	0.127	0.056	1	54
year_2011	1	0.147	0.059	1	55
year_2012	1	0.143	0.062	1	56
year_2013	1	0.170	0.065	1	57
year_2014	1	0.220	0.065	1	58
year_2015	1	0.226	0.067	1	59
year_2016	1	0.243	0.069	1	60
year_2017	1	0.282	0.070	1	61
year_2018	1	0.320	0.072	1	62
year_2019	1	0.348	0.073	1	63
mVoiceAccountability	1.000	-0.154	0.023	0	16
dlemp5	1.000	0.316	0.062	1	4
mlSprivatisation	0.999	0.354	0.078	1	21
mlhc	0.996	0.803	0.191	1	3
mPolStability	0.988	0.066	0.017	1	13
mCorruptionControl	0.979	0.167	0.046	1	11
mRuleLaw	0.940	-0.139	0.051	0.00003	15
mlPliberalisation	0.906	0.305	0.135	1	20
mlGovernance	0.787	0.186	0.116	1	18
mlTFsystem	0.686	0.121	0.095	1	22
mltot	0.215	-0.057	0.121	0.00000	8
mlrent	0.158	-0.003	0.009	0.0004	9
dlpop5	0.085	0.033	0.125	0.999	1
mlgfcf	0.084	0.003	0.013	1.000	2
mGovEffectiveness	0.028	0.001	0.010	0.955	12
mlLprivatisation	0.026	0.001	0.012	0.999	19
dlrss5	0.021	-0.004	0.054	0.121	5
mlCompetition	0.021	-0.0003	0.006	0.237	17
mlopen	0.020	-0.0001	0.004	0.281	7
mRegQuality	0.019	0.0001	0.005	0.751	14
mlFDI	0.017	-0.00004	0.001	0.101	10

Notes: p -values for estimated coefficients are in parentheses. *, ** and *** indicate statistical significance at 10%, 5% and 1% levels respectively. Variable abbreviations are explained in the notes of Table 1.

Source: Authors' calculation

Figure 3: Cumulative model probabilities and estimated coefficient signs



Note: The blue colour represents the positive, and the red colour the negative estimated coefficients. The white colour indicates that the variable in not included in the model.

Source: Authors' calculation

In the end, the robustness of the results for nine models estimated by FE was additionally checked with the first difference GMM and system GMM estimators. We use first difference GMM and system GMM to control for endogeneity issues and feedback effects in our estimates. These results confirm FE results in terms of the expected signs as well as the statistical significance.¹⁸

5. Results and discussion

Our results confirm the prevailing consensus about the importance of institutions and transition-specific reforms for long-run growth. Contrary to the standard assumptions of the growth model, we allow the changes in population structure to affect growth. We control our estimates for changes in employment to working-age population ratio as well as for changes in dependency rate. Results indicate that the employment rate is crucial for understanding economic growth in transition countries, even in the long run, contradicting the long-run labor market neutrality assumption usually employed. This result can be explained by a combination of the hysteresis hypothesis (Blanchard and Summers, 1987) and the structuralist hypothesis (Phelps, 1995). Large negative developments in the early years of the transition resulted in sharp GDP decreases, coupled with decreases in employment and soaring unemployment. According to the hysteresis hypothesis, and in the context of transition, it is likely that these negative developments were not simply temporary and therefore negligible deviations from a fixed long-run employment rate. Our results support this view – some countries managed to recover from these strong initial negative shocks, while others did not. Failure to increase the employment rate after the negative shocks during the transition had dire consequences on future economic growth. Hysteresis effects resulting in permanently lower employment rates also resulted in lower future growth rates since production (both aggregate and per capita) is a function of employment. A typical explanation of hysteresis effects is that long periods of unemployment can result in a deterioration of worker's skills, which makes them less employable in the future when the economy recovers and more job opportunities arise. Workers unemployed for longer periods of time also might face stigma, which makes them less desirable compared to workers who did not spend extended periods of time in unemployment. On the other hand, countries that did manage to successfully recover from the negative labour market shocks were rewarded by higher growth, which is a natural consequence of employment growth.

Phelp's structuralist theory of employment can provide us with a similar explanation – employment rates in some countries didn't decrease only temporarily, but rather

¹⁸ Results are available upon request.

witnessed a structural (permanent) decrease without a subsequent recovery. In other words, macroeconomic disturbances lead to a structural and long-lasting decrease in the equilibrium employment rate. Notice that, while our sample starts from 1995 and doesn't include the earlier years of transition in which the majority of negative labour market shocks occurred, the years in which most of the recovery phase (depending on the country) took place are included in our sample and we therefore still capture this effect of increasing employment rate on growth. Our results imply that labour market shocks are not transitory in the long run. Policies, reforms, and institutional settings that encourage the activation of the working age population appear to be one of the most important characteristics that set apart success from failure in transition countries. Our findings support the view of the fundamental importance of labour markets in the transition process (Turley and Luke, 2011). Furthermore, these results may be important in the realm of growth econometrics in general since the majority of growth papers explore the effects of demographic changes only sporadically (Bloom et al., 1998) and assume the neutrality of the labour market in the long run.

The impact and significance of initial economic conditions was a very important theoretical issue during the early stages of transition (de Melo et al., 2001; Godoy and Stiglitz, 2006). Our results suggest that history and initial conditions mattered for growth during the first decade, while institutional reforms, labour market policies and convergence were more important in the long run. This result fits very well into the existing literature. It confirms the results of de Melo et al. (2001) and The World Bank (2002), as well as the results of numerous older empirical studies done in the 90s such as Fischer et al. (1996), Havrylyshyn et al. (1998), Havrylyshyn et al. (1999), Heybey and Murrell (1999), Fischer and Sahay (2000), Abed and Davoodi (2000), Katchanovski (2000) and Popov (2000).

Fading of the impact of initial conditions also provides an explanation why studies such as Godoy and Stiglitz (2006), which use a longer time span of data, conclude that the impact of initial conditions is not significant. Since the impact of initial conditions gradually decreases as the transition progresses and fades after 2000 (in our estimates), it is likely that using longer data sets (as well as different models and estimation methods) results in the overall impact being insignificant. Since we use a much longer data set compared to the existing literature, our results support the conclusion that the impact of initial conditions was important in the first decade of the transition, but also that this impact is not long-lasting. Fading impact of initial conditions is in line with the results of Falcetti et al. (2002) and Falcetti et al. (2006).

When it comes to the classical growth factors, we do not find evidence that gross fixed capital formation and population growth have an important role in explaining long-run growth. This result implies that the effect of improved resource allocation dominates over the effect of the expansion in physical capital and population size

even in the long run. Furthermore, the central role that labour market reforms had during the transition process, as well as demographic changes, might have created a setting in which the effect of population composition dominates over the effect of population growth. The effect of human capital is mostly insignificant in our FE models, but results change once we control for model uncertainty in BMA estimates. These findings suggest that even after three decades, improvements in the allocation of resources dominate over the effects of resource accumulation. This is both expected but also somewhat surprising. Turley and Luke (2011) point this out as well, stating that growth in transition economies is unlikely to be associated with the standard determinants of growth and has more to do with improved resource allocation instead of resource expansion. They say that investment (gross fixed capital formation) was not a significant variable in explaining growth in the early years of transition, and logically conclude that this is likely to change over time. It is interesting that this empirical result still holds using a much longer time span of data.

Out of the institutional indicators, we find that Political Stability, Control of Corruption and small-scale privatisation have the expected signs, and the results are the most robust. The result for Political Stability is in line with the findings of one of the early studies done by Brunetti et al. (1997), who find that political stability was an important determinant of growth in the 1993-1995 period. Our result for small-scale privatisation is also supported by Staehr (2005), whose results show that small-scale privatisation done after the implementation of liberalisation policies is good for growth. In addition, the impact of price liberalisation, governance quality and trade and foreign exchange systems on growth is slightly less robust but also positive. With the exception of the employment rate and initial conditions, the impact of institutional elements dominates the impact of all the other growth factors.

Divergent results between small-scale and large-scale privatisation indicators partly fit the counter-intuitive (negative) results obtained by Godoy and Stiglitz (2006), but they can also be connected with the fact that most of the large-scale privatisations were often associated with corruption scandals and certain controversial aspects of FDI (Mencinger, 2003). Staehr (2005) for example finds that small-scale privatisation is beneficial for growth, while large-scale privatisation not accompanied by other reforms has a negative impact on growth.

The most important limitation of our research is the lack of available data. In most of the estimates, we used an overlapping sample to maximize the number of observations per country while controlling for diminishing returns to physical capital. As a result of our methodological choice, we have ignored autocorrelation issues in most of our estimates using overlapping samples. In terms of the model, the major limitation is that we partially control the informal institutions. Furthermore, we do not have good enough data for the early nineties, and therefore we do not control our estimates for the pre-nadir part of the transition process.

Therefore, our results should be interpreted in terms of the long-run growth. Furthermore, our study focuses on initial economic conditions while omitting political and sociological variables. We do not estimate the effects of non-economic initial conditions on the initial choice of institutions and policies as Roland (2002) suggested. Also, we do not endogenise the development of institutions as suggested by de Melo et al. (2001).

6. Conclusion

This paper focuses on the effects of employment rate, initial conditions, and convergence on economic growth in transition countries. We frame our analysis within the classical growth regression approach but control our estimates for a wide range of transition-specific indicators that quantify initial conditions, institutional quality, and economic reforms. We relax the long-run growth model's assumptions and allow labor market and demographic changes to have non-transitory effects in the long run, which was not done previously within the growth literature concerning transition countries.

One of our most robust findings is that the employment rate, an overlooked variable in the literature on transition, had a statistically significant impact on growth. The employment rate result is important for policymaking in transition countries, but it also has implications for economic theory. A significant divergence between transition countries in terms of the employment rate and its relevance for long-run growth suggests the relative importance of hysteresis and structuralist hypotheses in transition economies.

We find strong evidence of conditional convergence within the analysed group of transition countries. The initial level of GDP per capita is one of the most robust indicators in our analysis, and fixed effects for cross-country heterogeneity imply the existence of conditional convergence within our sample. The most important implication of that result is that a part of the disappointing/impressive results of transition countries can be attributed to these countries' initial level of development, and not to the specific economic policies pursued during and after the transition. Most of the early studies do not analyse this issue due to technical reasons (short time horizons).

Finally, we investigate the importance of initial conditions for long-run economic growth. We assume that the effects of initial conditions should fade away in the long run. Therefore, we use interaction terms of the initial conditions and time fixed effects to analyse their importance as the transition progresses. Our results suggest that initial conditions affected growth during the first decade of transition, but their impact faded afterwards. In the period after 2000, the coefficients are

not statistically different from zero in our estimates. When it comes to different privatisation models, we do not find differences in the impact on growth between the three analysed privatisation models.

In terms of future avenues of research, it might be interesting to investigate the relevancy of the structure of physical capital for economic growth as well as the potential of endogenous theories to explain club convergence of transition countries. Product complexity, product quality, R&D expenditure and backward/forward position in global value chains might be interesting avenues of future research as well. Furthermore, it might be interesting to explore the interaction terms between FDI, large-scale privatisation and/or corruption control indicators to explore further divergence in the importance of small-scale privatisation relative to large-scale privatisation in transition countries.

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Stopa zaposlenosti i ekonomski rast: slučaj zemalja u tranziciji¹

Josip Tica², Viktor Viljevac³, Matija Matic⁴

Sažetak

U ovom radu istražuju se učinci promjena stope zaposlenosti na ekonomski rast u procesu tranzicije. U radu se kreće od ortodoksnog ekonometrijskog pristupa ekonomskom rastu koji kontrolira za konvergenciju. Da bi se kontrolirala heterogenost zemalja u uzorku, koriste se indikatori specifični za proces tranzicije, kao što su početni uvjeti (pred-tranzicijska povijest), kvaliteta upravljanja, privatizacijske metode, kao i razni indikatori institucionalne razvijenosti. U radu se razvijaju i procjenjuju razne specifikacije modela koristeći fiksne učinke kao i Bayesevo uprosječivanje, a s ciljem adresiranja problema modelske nesigurnosti za 24 zemlje u razdoblju od 1995. do 2019. godine. Suprotno pretpostavkama neoklasičnog modela rasta, rezultati pokazuju da je stopa zaposlenosti jedan od najvažnijih faktora ekonomskog rasta, čak i nakon tri desetljeća. Rezultati također pokazuju da konvergencija (početna razina razvijenosti) robustno objašnjava jedan dio razlika u stopama rasta između zemalja, dok su učinci početnih uvjeta (predtranzicijski period) robusni, ali nestaju nakon prvog desetljeća. Za korišteni uzorak analize, rezultati ne ukazuju da fizički kapital i rast populacije imaju utjecaj na ekonomski rast.

Glavne riječi: tranzicija, stopa zaposlenosti, konvergencija, Bayesevo uprosječivanje, faktori rasta, početni uvjeti

JEL klasifikacija: P30, O43, E60

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² Profesor, Sveučilište u Zagrebu, Ekonomski fakultet, Trg J. F. Kennedy 6, Zagreb 10000. Znanstveni interes: tranzicijska ekonomija, makroekonomija, urbana ekonomija, tržišta nekretnina. Tel.: +385 1 238 3162. E-mail: jtica@efzg.hr.

³ Asistent u nastavi, Sveučilište u Zagrebu, Ekonomski fakultet, Trg J. F. Kennedy 6, Zagreb 10000. Znanstveni interes: makroekonomija, fiskalna politika, ekonomska povijest. Tel.: +385 1 238 3229. E-mail: vviljevac@efzg.hr.

⁴ Asistent na projektu, Sveučilište u Zagrebu, Ekonomski fakultet, Trg J. F. Kennedy 6, Zagreb 10000. Znanstveni interes: tranzicijska ekonomija, monetarna politika, gospodarski rast i razvoj. Tel.: +385 1 238 3144. E-mail: mmatic3@efzg.hr.

Gender diversity in the boardroom and earnings management during the period of the COVID-19 crisis*

Toni Šušak¹, Tomislava Pavić Kramarić², Marijana Bartulović³

Abstract

This paper investigates the effect of the COVID-19 crisis on the relationship between gender diversity in management and supervisory boards and the level of earnings management. The research sample comprised companies listed on the Croatian national stock exchange, and the panel data was obtained for the 2015-2020 period to estimate regression models. Findings indicated that the presence and higher share of female directors on management boards were beneficial for curtailing earnings management but only for the financial statements disclosed during the first year of the COVID-19 pandemic. At that time, such effort was vital due to the escalation of earnings management caused by extremely pessimistic economic expectations. In the financial statements disclosed during the second year of the pandemic, the level of earnings management considerably declined, and female directors were not as effective in restraining these activities as in the first year. It could imply greater prudence of female directors when anticipating the intensity of public scrutiny regarding financial statements in a period of crisis. Gender diversity in supervisory boards proved to be an insignificant determinant of earnings management during the COVID-19 crisis.

Keywords: COVID-19 crisis, boardroom, earnings management, gender, diversity

JEL classification: G01, M41, G32, J16, M14

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¹ Assistant Professor, University Department of Forensic Sciences, University of Split, Ruđera Boškovića 33, 21000, Split, Croatia. Scientific affiliation: forensic accounting, audit, corporate governance and corporate law. E-mail: toni.susak@forenzika.unist.hr.

² Associate Professor, University Department of Forensic Sciences, University of Split, Ruđera Boškovića 33, 21000, Split, Croatia. Scientific affiliation: corporate finances, insurance, financial institutions and financial analysis. E-mail: tpkramaric@forenzika.unist.hr.

³ Associate Professor, University Department of Forensic Sciences, University of Split, Ruđera Boškovića 33, 21000, Split, Croatia. Scientific affiliation: forensic accounting, corporate reporting, internal auditing. E-mail: marijana.bartulovic@forenzika.unist.hr.

1. Introduction

Numerous research papers argued that gender diversity or female representation in the boardroom per se positively influences corporate performance.. It is widely held view that women possess superior monitoring capabilities and strong motivation to limit opportunistic activities (Zalata et al., 2021), they are more cautious and risk-averse (Li et al., 2021), they enhance the board's advisory efficiency (Kim and Starks, 2016), their presence increases transparency reducing information asymmetry (Srinidhi et al., 2011), it is less likely for women to have attendance problems (Adams and Ferreira, 2009). Furthermore, women are associated with more creative companies' strategies (Campbell and Mínguez-Vera, 2008), and they are more sensitive to ethics (Ghaleb et al., 2021) which are the attributes that should consequently lead to enhanced performance.

However, the findings of the relevant literature on this issue are ambiguous. Specifically, papers by Carter et al. (2003), Campbell and Mínguez-Vera (2008), Miller and del Carmen Triana (2009), Low et al. (2015) find board diversity to have a positive influence on corporate performance. Adams and Ferreira (2009) find the negative impact of diverse boards on company performance, whereas Rose (2007) finds gender diversity in the boardroom to be an insignificant determinant of company performance. Findings by Ho et al. (2015) support the view that gender diversity increases the integrity of financial reporting, while Cumming et al. (2015) add that females have a lower propensity to commit fraud. In this context, and having in mind all the unique features of female executives stated above, it is considered important to investigate their potential impact on earnings management, which is deemed as a "legal and very effective method of accounting techniques and may be used to obtain specific objectives of the enterprises involving the manipulation of accruals" (Kliestik et al., 2020: 372).

In terms of scarce literature relating to the impact of gender diversity in the boardroom on earnings management practices, Srinidhi et al. (2011) find a positive impact of board gender diversity on earnings quality in the sample of US companies. Moreover, Li et al. (2021) find support for the thesis that female presence on supervisory boards and executives in Chinese companies constrain real earnings management during both bear and bull periods which was not the case with management boards although women acting as executives (without chief executive officers and chief financial officers) limit earnings manipulation. However, Arioglu (2020) shows that the presence of women on companies' boards does not impact their earnings management. Zalata et al. (2021) find that the presence of women directors with financial education in auditing committees enhances earnings quality and that in the crisis period, the presence of women per se constrains earnings management. While studying the corporate social responsibility reporting practices on the sample of Jordanian-listed companies, Ghaleb et al. (2021) find that board gender significantly mitigates, either directly or indirectly, earnings manipulation activities.

After taking previous research into consideration and including the COVID-19 crisis in the primary relationship, research hypotheses were established as follows:

- H1a. *There is a statistically significant negative effect of the first year of the COVID-19 crisis on the relationship between the gender diversity of management boards and earnings management.*
- H1b. *There is a statistically significant negative effect of the first year of the COVID-19 crisis on the relationship between the gender diversity of supervisory boards and earnings management.*
- H2a. *There is a statistically significant negative effect of the second year of the COVID-19 crisis on the relationship between the gender diversity of management boards and earnings management.*
- H2b. *There is a statistically significant negative effect of the second year of the COVID-19 crisis on the relationship between the gender diversity of supervisory boards and earnings management.*

Due to the specific characteristics and skills inherent in women, but primarily due to their superior monitoring capabilities, it is believed that the presence of women in the boardroom mitigates earnings management. Therefore, the aim of this study is to explore the influence of gender diversity in the boardroom of Croatian listed companies on their earnings management during the COVID-19 crisis, including both the management board and the supervisory board. The COVID-19 pandemic represents a major global health threat in recent decades causing unfavourable social as well as economic consequences. Suspension of activities has hit many companies and their existence, having significant financial reporting effects emphasizing the significance of complete and quality disclosure of financial information (Lassoued and Khanchel, 2021).

This research adds to the scientific thought firstly due to the fact that gender diversity in the boardroom and its role in the context of earnings management is a rather under-investigated area. It holds true particularly for an emerging economy such as the Croatian one, due to the fact that earnings management practices are more prevalent in companies in emerging markets (Zweig, 2019, Ghaleb et al., 2021). In addition, the appointment of women directors in the boardroom of Croatian companies is on a voluntary basis. Besides filling the gap with a kind of research that has not been conducted on a sample of Croatian companies so far, it sheds new evidence on the presence of female directors on the both management and supervisory board and corporate earnings quality, enriching existing literature in this way. Moreover, as the timeframe covered with the analysis encompasses the financial crisis period caused by the coronavirus pandemic when companies' financial reporting practices were under intensified scrutiny by investors, regulators as well as the general public, the analysis provided a useful insight into whether female representation in the boardroom

constrains companies' opportunistic practices in such environment. The comparative analysis between the first year and the second year of the pandemic proved to be insightful in terms of the divergence of the attitudes adopted by the female directors. Furthermore, since earnings management can be determined by a number of factors these were also controlled for in our research.

The rest of the manuscript is structured as follows. After the introductory section, which discusses the theoretical framework focusing on the importance of female representation in the boardroom and companies' earnings management practices, the literature review follows. The third and fourth sections provide methodology, empirical data, statistical analysis, and robustness analysis. The fifth section deals with the discussion of research results and analysis. The conclusion follows in the sixth section.

2. Literature review

The literature relating the impact of gender diversity in the boardroom on earnings management practices is scarce, and research results are inconclusive. Some authors (for example, Srinidhi et al. 2011, Li et al., 2021, Zalata et al., 2021, Ghaleb et al., 2021...) confirm that female presence positively impacts earnings quality and constraints of real earnings management, while others like Arioglu (2020) and Hili and Affes (2012) argue that gender diversity in companies' boards does not impact their earnings management practices. This section presents the most relevant studies for research design and establishment of the hypotheses.

Peni and Vähämaa (2010) focused on the impact of chief executive officers' and chief financial officers' gender on reporting quality. The research carried out on a sample of S&P 500 companies indicates the presence of income-decreasing activities in companies with female chief financial officers, supporting the thesis that women in positions of the chief financial officer are more conservative when choosing financial reporting strategies. On the contrary, the chief executive officers' gender was not significantly related to earnings management practices. Srinidhi et al. (2011) have found a positive relation between the board's gender diversity and earnings quality using a sample of US companies. Research on this issue in the emerging market of Kazakhstan was performed by Orazalin (2020). The research sample included public companies in the period from 2010 to 2016. According to the results, board gender diversity is an effective constraint of earnings management activities (Orazalin, 2020). Li et al. (2021) analyzed the influence of gender diversity in supervisory boards and executives on real earnings management in the period from 2000 to 2017 in a sample of Chinese companies which was divided into bull and bear period sub-samples. Research results confirmed the thesis that female presence in supervisory boards and

executives of Chinese companies limits real earnings management during both analyzed periods. Moreover, no relation was found in the case of management boards. Additionally, results suggest that women acting as executives (without chief executive officers and chief financial officers) are more likely to limit earnings manipulation. Research performed by Ghaleb et al. (2021) found, on a sample of Jordanian-listed companies in the period from 2011 to 2016, that board gender diversity negatively impacted real earnings management practices. These results have emphasized the added value of having female directors in a boardroom in terms of monitoring capacities and ethical behaviour regarding disclosed financial statements (Ghaleb et al., 2021), which results in improved earnings quality. Zalata et al. (2021) focused on the financial background of female directors in audit committees and analyzed its impact on earnings quality and earnings management practices in a sample of US companies in the period from 2007 to 2013. Authors have concluded that enhanced earnings quality is not the result of gender differences, but female directors' financial background.

Some authors, such as Arioglu (2020) or Hili and Affes (2012) showed opposite results and did not prove a connection between female board members and earnings management activities. Arioglu (2020), who used a sample of Turkish listed companies in the 2009-2017 period, suggested that female directors' inclusion on boards does not impact earnings management practices. Similar results were obtained by Hili and Affes (2012) on a sample of French-listed companies, indicating insignificant differences regarding earnings persistence or earnings management practices regarding gender diversity in corporate boards. Due to inconsistent research conclusions in this area, the question of the impact of board gender diversity on earnings management practices is still under debate, especially in the case of an emerging economy such as Croatian.

3. Methodology

In this section, the models applied to estimate the level of earnings management and to show gender structure in a boardroom are presented. Discretionary accruals were measured using the Modified Jones Model, while the share of women on boards, the Blau index, the Shannon index, and binary variable showing if there was at least one woman in the boardroom are used as measures for the gender structure of a boardroom.

3.1. Measurement of Earnings Management

There are various methods of estimating earnings management, but among those that are the most commonly used are the Jones Model (Jones, 1991) and the Modified Jones Model (Dechow et al., 1995). Thus, the research model's dependent

variable was estimated using the later version, which, if compared to its preceding model, is modified to alleviate measurement error related to revenues (Dechow et al., 1995).

Discretionary accruals were estimated by subtracting non-discretionary accruals from total accruals to measure earnings management (Bzeouich et al., 2019). Non-discretionary accruals of the Modified Jones Model can be expressed with the following equation (Orazalin, 2020):

$$\frac{TA_t}{A_{t-1}} = \alpha_1 \left(\frac{1}{A_{t-1}} \right) + \alpha_2 \left(\frac{\Delta REV_t - \Delta REC_t}{A_{t-1}} \right) + \alpha_3 \frac{PPE_t}{A_{t-1}} + e_{i,t} \quad (1)$$

where 'TA_t – total accruals, measured as the difference between net profit and operating cash flows from activities; A_{t-1} – total assets at the end of year t-1; ΔREV_t – the difference in operating revenues in year t and year t-1; ΔREC_t – the difference in net receivables in year t and year t-1; PPE_t – property plant and equipment at the end of year t' (Orazalin, 2020: 45).

Absolute discretionary accruals are applied in this research based on the approach applied in previous research (Warfield et al., 1995; Gabrielsen et al., 2002; Barth et al., 2008, in Orazalin, 2020), in order to take into account both downward and upward earnings management (Orazalin, 2020). The lower value of this indicator is more desirable given that it signifies higher financial reporting quality (Kim and Jeong, 2018).

3.2. Measures for the Gender Structure of a Boardroom

Board composition has gained substantial attention from researchers in recent decades, which is true, particularly for the gender composition of the board. To analyse how this demographic characteristic affects earnings management, the authors employed a set of gender-oriented variables in the analysis as used in previous relevant studies, including the share of women on boards, Blau index, Shannon index, and binary variable if there is at least one woman in the boardroom. The share of women is calculated as the proportion of female board members in the total number of board directors following Saona et al. (2019), Ghaleb et al. (2021), Li et al. (2021) and Zalata et al. (2021).

Furthermore, in order to account for gender diversity in the board room the Blau index was included following Saona et al. (2019) and Fan et al. (2019) as well as studies dealing with company performance such as Campbell and Mínguez-Vera (2008), Miller and del Carmen Triana (2009), Joecks et al. (2013), Kılıç and Kuzey (2016) and Li and Chen (2018). Based on previously mentioned studies, the Blau index is computed using the following formula:

$$\text{Blau index} = 1 - \sum_{i=1}^n p_i^2 \quad (2)$$

where p_i stands for the share of male and female directors and n represents the total number of board members. The Blau index ranges between zero, if there are no women in the boardroom, and 0.5 in case there is an equal number of male and female board members.

Furthermore, the Shannon index is used in the analysis to reflect gender diversity based on the papers by Campbell and Mínguez-Vera (2008), Saona et al. (2019), Dobija et al. (2021). Based on these studies, the Shannon index is calculated as follows:

$$\text{Shannon} = - \sum_{i=1}^n p_i * \ln(p_i) \quad (3)$$

where, once again, p_i represents the proportion of board directors in each category, i.e. proportion of male and female directors and n stands for the total number of board members. The Shannon index reaches its minimum value of zero when there is no diversity in the boardroom and a value of 0.693 when both categories, i.e. genders are equally represented in the boardroom. Since the value of the natural logarithm of zero is not defined, in the case when the share of women equals zero, the authors have followed an approach suggested by Campbell and Mínguez-Vera (2008) who applied the convention that in that case the expression $p_i \ln(p_i)$ equals 0.

Since all these gender-specific variables mentioned above are measured as continuous variables, as suggested by Zalata et al. (2021) high percentages might suggest a higher number of female directors, but also a smaller number of total board directors with the number of female board members remaining the same. Thus, to consider the mere presence of women on board, the binary or dummy variable, which equals one in case there is at least one female board member and zero otherwise, is employed in the analysis.

4. Empirical data and analysis

The research data was collected from secondary sources related to the large listed Croatian companies legally organised as public limited companies (PLCs) available at the Zagreb Stock Exchange official website. Two categories of data were used – financial data required for measuring earnings management construct, as well as for the financial ratios included in the research model as control variables and non-financial data on the gender structure of management and supervisory boards. The entire population of 103 Croatian PLCs listed on the Zagreb Stock Exchange on the 1st of October 2020 was considered for the sample. Companies that have

operated in sector K – Financial and insurance activities according to the National Classification of Activities (Official Gazette, 2007) were eliminated from the sample due to the accounting differences (Bzeouich et al., 2019), as well as the companies with unavailable financial data in the research period. All companies that operated in an activity that had not met the conventional minimum requirement of at least six companies were also excluded (DeFond and Jiambalvo, 1994; Subramanyam, 1996, in Yang and Krishnan, 2005). Therefore, the final research sample comprised data for 53 companies over the six-year period from 2015 to 2020. Similar to research conducted by Kim and Jeong (2018) and Du et al. (2016), the winsorisation procedure at 1 percent and 99 percent was applied for all the continuous variables to decrease the impact of outliers.

According to the hypotheses, the following research models were constructed:

$$aDACC_{i,t} = \beta_0 + \beta_1 * M_{i,t} + \beta_2 * M * C_{i,t} + \beta_3 * BF_{i,t} + \beta_4 * CS_{i,t} + \beta_5 * PF_{i,t} + \beta_6 * LV_{i,t} + e_{i,t} \quad (4)$$

$$aDACC_{i,t} = \beta_0 + \beta_1 * S_{i,t} + \beta_2 * S * C_{i,t} + \beta_3 * BF_{i,t} + \beta_4 * CS_{i,t} + \beta_5 * PF_{i,t} + \beta_6 * LV_{i,t} + e_{i,t} \quad (5)$$

where aDACC stands for absolute discretionary accruals which were used for measuring the level of earnings management in financial statements, M represents four measures of management boards' gender diversity, S represents four measures of supervisory boards' gender diversity, C represents two dichotomous variables indicating in which year after the declaration of the COVID-19 pandemic financial statements were disclosed – the first year starts after 11th March 2020 when global COVID-19 pandemic was declared (Cucinotta and Vanelli, 2020) and ends on 31st December 2020, while the second year starts on 1st January 2021 and ends on 31st December 2021, CS is the size of a company, PF represents profitability measured by return on assets, LV is leverage, and BF is the dichotomous variable indicating if a company was audited by a Big Four auditor.

Table 1: Variable measurement

Abbreviation	Variable	Definition
aDACC	Absolute discretionary accruals	Discretionary accruals are calculated using the Modified Jones model elaborated in section 3.2.
C1	The first year of the COVID-19 pandemic	1 denotes companies that disclosed their annual financial statements during the first year of the COVID-19 pandemic (from 11 th March 2020 to 31 st December 2020), 0 denotes other periods included in the sample
C2	The second year of the COVID-19 pandemic	1 denotes companies that disclosed their annual financial statements during the second year of the COVID-19 pandemic (from 1 st January 2021 to 31 st December 2021), 0 denotes other periods included in the sample
M1	Presence of women in management board	1 denotes at least one female director in a management board, 0 denotes a management board without female directors
M2	Share of women in management board	% of female directors in a management board
M3	Blau index for management board	Computed for management boards using the formula presented in section 3.3.
M4	Shannon index for management board	Computed for management boards using the formula presented in section 3.3.
S1	Presence of women in supervisory board	1 denotes at least one female director in a supervisory board, 0 denotes a supervisory board without female directors
S2	Share of women in supervisory board	% of female directors in a supervisory board
S3	Blau index for supervisory board	Computed for supervisory boards using the formula presented in section 3.3.
S4	Shannon index for supervisory board	Computed for supervisory boards using the formula presented in section 3.3.
BF	Big Four audit firm	1 denotes that a company was audited by a Big Four audit firm, 0 denotes that a company was audited by a non-Big Four audit firm
CS	Company size	Natural logarithm of total assets
PF	Profitability	Return on assets (net profit/total assets)
LV	Leverage	Total liabilities/total assets

Source: Authors' creation

Having in mind the fact that earnings management can be affected by other factors and following the previous research (Lakhal et al., 2015; Du et al., 2016; Damak, 2018; Orazalin, 2020; Mnif and Cherif, 2021), the authors have employed a set of control variables – the size of a company (CS), profitability measured as return on assets (ROA), leverage (LV), and a variable indicating the size of an audit firm (BF).

Sixteen regression models were estimated. Models 1-8 were focused on the financial statements disclosed during the first year of the COVID-19 pandemic, while Models 9-16 were focused on the financial statements disclosed during the second year of the pandemic. Models 1-4 and 9-12 were estimated using measures for gender diversity of management boards, while Models 5-8 and 13-16 were estimated using identical measures for supervisory boards. Panel analysis was applied to estimate regression models and the Hausman test was utilised to decide on which type of panel regression model was more suitable – the fixed effects model or the random effects model (Khan et al., 2019; Orazalin, 2020). For the purpose of statistical analysis and generating regression models, R statistical software (R Core Team, 2022) was applied, as well as three packages that are the prerequisite for its functionality in the context of this research – the stargazer (Hlavac, 2022), The plm Package (Croissant and Millo, 2008) and the car package (Fox and Weisberg, 2019). PAST 3.16 (Hammer et al., 2001) was used for the estimation of correlation coefficients.

Measures of descriptive statistics are displayed in Table 2, correlation coefficients are included in Table 3 and results of the panel models are presented in Table 4 and 5.

Table 2: Descriptive statistics

Variable	Minimum	First quartile	Median	Mean	Third quartile	Maximum
aDACC	0.0008	0.0136	0.027	0.0441	0.054	0.2243
M1	0	0	0	0.2633	1	1
M2	0	0	0	0.1209	0.2	1
M3	0	0	0	0.0922	0	0.5
M4	0	0	0	0.0825	0	0.6931
S1	0	0	1	0.6267	1	1
S2	0	0	0.1429	0.1556	0.2857	0.7143
S3	0	0	0.2449	0.2092	0.4082	0.4898
S4	0	0	0.4101	0.3179	0.5983	0.6829
BF	0	0	1	0.5651	1	1
CS	17.80	19.20	20.27	20.22	21.03	23.73
PF	-0.6339	-0.0146	0.0177	0.0043	0.0485	0.1744
LV	0.0512	0.2798	0.3976	0.4447	0.5651	1.6226

Source: Authors' calculation

Table 3: Correlation coefficients

	C1	C2	M1	M2	M3	M4	S1	S2	S3	S4	BF	CS	PROF	LVG
C1	1.00													
C2	-0.19*	1.00												
M1	0.01	0.06	1.00											
M2	0.02	0.04	0.81*	1.00										
M3	-0.01	0.08	0.84*	0.50*	1.00									
M4	-0.03	0.24*	0.63*	0.33*	0.74*	1.00								
S1	0.03	0.08	-0.02	-0.15*	0.04	0.06	1.00							
S2	0.04	0.09	-0.04	-0.13*	-0.01	0.01	0.73*	1.00						
S3	0.05	0.09	-0.01	-0.12*	0.04	0.04	0.88*	0.92*	1.00					
S4	0.04	0.08	-0.02	-0.13*	0.03	0.04	0.92*	0.89*	0.99*	1.00				
BF	-0.06	-0.03	0.28*	0.15*	0.23*	0.14*	0.02	-0.04	-0.004	-0.01	1.00			
CS	-0.03	-0.01	0.16*	0.05	0.17*	0.06	0.12*	0.17*	0.17*	0.17*	0.46*	1.00		
PROF	-0.03	-0.02	0.17*	0.16*	0.11	0.06	-0.01	0.07	0.04	0.02	0.04	0.10	1.00	
LVG	0.06	0.04	-0.18*	-0.14*	-0.13*	-0.13*	-0.11*	-0.16*	-0.12*	-0.12*	-0.11	-0.02	-0.37*	1.00

Source: Authors' calculation

Correlation coefficients in Table 3 indicate an absence of the multicollinearity problem given that all correlation coefficients for independent variables which were simultaneously included in a certain model were lower than 0,7 (Pallant, 2007, in Orazalin, 2020). Exceptions are the variables measuring related concepts (e.g. correlation coefficient between the presence and the share of women on the management board).

Table 4: Panel estimations for models 1-8

Dependent variable: aDACC									
Var	(1)	(2)	(3)	(4)	Var	(5)	(6)	(7)	(8)
C1	0.027*** (0.008)	0.023*** (0.007)	0.024*** (0.007)	0.020*** (0.007)	C1	0.004 (0.011)	0.012 (0.010)	0.006 (0.011)	0.005 (0.011)
M1	0.014* (0.007)				S1	-0.010 (0.006)			
C1M1	-0.038*** (0.015)				C1S1	0.021 (0.014)			
M2		0.026** (0.013)			S2		-0.025 (0.021)		
C1M2		-0.048* (0.025)			C1S2		0.033 (0.042)		
M3			0.017 (0.018)		S3			-0.024 (0.018)	
C1M3			-0.072* (0.038)		C1S3			0.052 (0.037)	
M4				0.004 (0.015)	S4				-0.015 (0.012)
C1M4				-0.037 (0.038)	C1S4				0.038 (0.025)
BF	0.004 (0.007)	0.005 (0.006)	0.006 (0.007)	0.006 (0.006)	BF	0.005 (0.007)	0.005 (0.007)	0.005 (0.006)	0.005 (0.006)
CS	0.002 (0.003)	0.002 (0.003)	0.002 (0.003)	0.002 (0.003)	CS	0.002 (0.003)	0.003 (0.003)	0.002 (0.003)	0.002 (0.003)
PF	-0.115*** (0.027)	-0.117*** (0.027)	-0.112*** (0.027)	-0.111*** (0.027)	PF	-0.112*** (0.027)	-0.110*** (0.027)	-0.110*** (0.027)	-0.110*** (0.027)
LV	0.030** (0.012)	0.030** (0.012)	0.030** (0.012)	0.030** (0.023)	LV	0.027** (0.012)	0.028** (0.012)	0.028** (0.012)	0.028** (0.012)
Cons.	-0.022 (0.054)	-0.023 (0.052)	-0.017 (0.054)	-0.016 (0.054)	Cons.	-0.016 (0.054)	-0.021 (0.054)	-0.018 (0.054)	-0.016 (0.054)
Obs.	279	280	280	280	Obs.	279	280	280	280
R ²	0.157	0.154	0.145	0.137	R ²	0.145	0.140	0.143	0.144

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; Obs. = Observations; Cons. = Constant. Standard errors are included in parentheses

Source: Authors' calculation

The results in Table 4 indicate that the interaction between the presence of women on management boards and the first year of the COVID-19 crisis is statistically significant indicating that companies which had at least one female director on their management boards were more likely to have lower discretionary accruals during the first year of the COVID-19 crisis. The value of absolute discretionary accruals was on average -0.038 lower in companies whose management board was composed of at least one female director during the first year of the COVID-19 crisis.

Similarly, the interaction variable between the share of women on management boards and the variable that indicates the first year of the COVID-19 crisis is statistically significant indicating that companies with a higher proportion of female directors on their management boards were more likely to have lower discretionary accruals during the first year of the COVID-19 crisis. In other words, for every additional percentage point in favour of women's participation in a management board, the value of absolute discretionary accruals has decreased by -0.00048 on average during the first year of the COVID-19 crisis.

When analysing years other than the first year of the COVID-19 crisis, results indicate that the presence and higher share of female directors in management and supervisory boards contribute to earnings management, which could be attributed to their more prudential opportunism in comparison to their male colleagues. In other words, they are more cautious in carrying out earnings management activities during periods of crisis when public scrutiny of financial statements is more pronounced.

Regarding the Blau and the Shannon indices, the interaction variable between the gender diversity in a management board and the variable that indicates the first year of the COVID-19 crisis is significant in the case of the Blau index – companies with higher gender diversity in management boards were more probably to have lower discretionary accruals during the first year of the COVID-19 crisis.

It is noteworthy that the relationship between gender diversity in supervisory boards and the level of earnings management was not statistically significant during the first year of the COVID-19 crisis.

On the other side, the results presented in Table 5 show that all relations analysed in the previous table were not statistically significant in the context of the second year of the COVID-19 crisis.

Table 5: Panel estimations for models 9-16

Dependent variable: aDACC									
Model	(9)	(10)	(11)	(12)	Model	(13)	(14)	(15)	(16)
C2	-0.020*** (0.008)	-0.016** (0.008)	-0.016** (0.008)	-0.017** (0.008)	C2	-0.024** (0.012)	-0.022** (0.009)	-0.023** (0.010)	-0.024** (0.010)
M1	0.005 (0.008)				S1	-0.007 (0.007)			
C2M1	0.020 (0.014)				C2S1	0.016 (0.014)			
M2		-0.014 (0.022)			S2		-0.020 (0.022)		
C2M2		0.018 (0.028)			C2S2		0.049 (0.039)		
M3			0.004 (0.019)		S3			-0.015 (0.019)	
C2M3			0.022 (0.035)		C2S3			0.043 (0.034)	
M4				0.0002 (0.018)	S4				-0.010 (0.013)
C2M4				0.018 (0.027)	C2S4				0.031 (0.024)
BF	0.003 (0.007)	-0.006 (0.009)	0.004 (0.007)	0.005 (0.007)	BF	0.004 (0.007)	0.004 (0.007)	0.005 (0.006)	0.005 (0.006)
CS	0.002 (0.003)	0.002 (0.014)	0.002 (0.003)	0.002 (0.003)	CS	0.002 (0.003)	0.002 (0.003)	0.002 (0.003)	0.002 (0.003)
PF	-0.115*** (0.027)	-0.118*** (0.030)	-0.112*** (0.027)	-0.111*** (0.027)	PF	-0.113*** (0.027)	-0.112*** (0.027)	-0.112*** (0.027)	-0.113*** (0.027)
LV	0.033*** (0.012)	0.021 (0.022)	0.032*** (0.012)	0.032*** (0.012)	LV	0.031** (0.012)	0.031*** (0.012)	0.032*** (0.012)	0.032*** (0.012)
Cons.	-0.004 (0.053)		-0.008 (0.055)	-0.006 (0.054)	Cons.	-0.013 (0.054)	-0.012 (0.055)	-0.010 (0.054)	-0.010 (0.054)
Obs.	279	280	280	280	Obs.	279	280	280	280
R ²	0.136	0.107	0.128	0.129	R ²	0.132	0.132	0.132	0.132

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; Obs. = Observations; Cons. = Constant. Standard errors are included in parentheses

Source: Authors' calculation

A plausible explanation could be that the intensity of earnings management was reduced in the second year of the COVID-19 crisis, rendering the deterrence of earnings management by management board or supervisory board unnecessary. This conclusion is based on the results indicating a negative relationship between earnings management and the second year of the COVID-19 crisis in Table 5, while the relationship between earnings management and the first year of the COVID-19 crisis was positive (Table 4).

Two additional robustness analyses were conducted following the approach applied by Orazalin (2020). More specifically, the original Jones model (1991) was applied to verify the primary results (Orazalin, 2020) in Tables 4 and 5. Also, VIF coefficients were calculated as a part of the multicollinearity problem testing.

Table 6: Panel estimations for models 17-24

Dependent variable: aDACC									
Var	(17)	(18)	(19)	(20)	Var	(21)	(22)	(23)	(24)
C1	0.021*** (0.008)	0.018** (0.007)	0.017** (0.007)	0.013* (0.007)	C1	-0.001 (0.011)	0.005 (0.009)	-0.0004 (0.010)	-0.001 (0.010)
M1	0.015** (0.007)				S1	-0.010 (0.006)			
C1M1	-0.034** (0.014)				C1S1	0.020 (0.014)			
M2		0.026** (0.013)			S2		-0.026 (0.021)		
C1M2		-0.047* (0.024)			C1S2		0.042 (0.041)		
M3			0.021 (0.018)		S3			-0.025 (0.018)	
C1M3			-0.060 (0.037)		C1S3			0.056 (0.036)	
M4				0.006 (0.015)	S4				-0.016 (0.012)
C1M4				-0.019 (0.037)	C1S4				0.040 (0.024)
BF	0.003 (0.007)	0.003 (0.006)	0.004 (0.007)	0.004 (0.006)	BF	0.003 (0.006)	0.003 (0.007)	0.003 (0.006)	0.003 (0.006)
CS	0.003 (0.003)	0.003 (0.003)	0.002 (0.003)	0.002 (0.003)	CS	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)
PF	-0.114*** (0.026)	-0.115*** (0.026)	-0.111*** (0.026)	-0.110*** (0.026)	PF	-0.110*** (0.026)	-0.109*** (0.026)	-0.109*** (0.026)	-0.109*** (0.026)
LV	0.029** (0.012)	0.029** (0.012)	0.029** (0.012)	0.028** (0.012)	LV	0.026** (0.012)	0.027** (0.012)	0.027** (0.012)	0.027** (0.012)
Cons.	-0.029	-0.031	-0.025	-0.024	Cons.	-0.023 (0.054)	-0.029 (0.055)	-0.026 (0.055)	-0.025 (0.054)
Obs.	279	280	280	280	Obs.	279	280	280	280
R ²	0.143	0.141	0.130	0.121	R ²	0.132	0.127	0.131	0.131

Note: * p < 0.1; ** p < 0.05; *** p < 0.01; Obs. = Observations; Cons. = Constant. Standard errors are included in parentheses

Source: Authors' calculation

The results in Table 6 represent the models estimated using the Jones model for analysis of the relationship between gender diversity in management boards and

earnings management during the first year of the COVID-19 crisis. Since the results resemble the ones obtained using the Modified Jones model, the conclusions remain the same and provide additional validation. The only significant difference is the interaction variable between the gender diversity in management boards and the variable that indicates the first year of the COVID-19 crisis which is not statistically significant for the Blau index.

Table 7: Panel estimations for models 25-32

Dependent variable: aDACC									
Model	(25)	(26)	(27)	(28)	Model	(29)	(30)	(31)	(32)
C2	-0.019** (0.008)	-0.014* (0.008)	-0.014* (0.007)	-0.015** (0.008)	C2	-0.023** (0.012)	-0.020** (0.009)	-0.022** (0.010)	-0.023** (0.010)
M1	0.006 (0.008)				S1	-0.008 (0.007)			
C2M1	0.018 (0.014)				C2S1	0.017 (0.014)			
M2		-0.015 (0.021)			S2		-0.022 (0.021)		
C2M2		0.016 (0.028)			C2S2		0.048 (0.038)		
M3			0.012 (0.019)		S3			-0.017 (0.019)	
C2M3			0.013 (0.034)		C2S3			0.043 (0.033)	
M4				0.008 (0.018)	S4				-0.012 (0.013)
C2M4				0.010 (0.026)	C2S4				0.031 (0.023)
BF	0.002 (0.007)	-0.005 (0.009)	0.003 (0.007)	0.003 (0.006)	BF	0.003 (0.006)	0.003 (0.006)	0.003 (0.006)	0.003 (0.006)
CS	0.002 (0.003)	-0.003 (0.014)	0.002 (0.003)	0.002 (0.003)	CS	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)
PF	-0.114*** (0.026)	-0.120*** (0.030)	-0.111*** (0.026)	-0.110*** (0.026)	PF	-0.112*** (0.026)	-0.111*** (0.026)	-0.111*** (0.026)	-0.111*** (0.026)
LV	0.031*** (0.012)	0.012 (0.021)	0.030** (0.021)	0.031*** (0.021)	LV	0.029** (0.012)	0.030** (0.012)	0.030** (0.012)	0.030** (0.012)
Cons.	-0.014 (0.055)		-0.017 (0.055)	-0.018 (0.054)	Cons.	-0.022 (0.054)	-0.022 (0.055)	-0.020 (0.054)	-0.020 (0.054)
Obs.	279	280	280	280	Obs.	279	280	280	280
R ²	0.134	0.105	0.125	0.125	R ²	0.130	0.129	0.129	0.129

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; Obs. = Observations; Cons. = Constant. Standard errors are included in parentheses

Source: Authors' calculation

The results for the relationship between gender diversity in supervisory boards during the second year of the COVID-19 crisis presented in Table 7 are in line with the conclusions drawn for the models with the Modified Jones model.

Table 8: Variance inflation factors for models 1-16

Var	Model 1	Model 2	Model 3	Model 4	Var	Model 5	Model 6	Model 7	Model 8
C1	1.38	1.25	1.27	1.16	C1	2.92	2.10	2.58	2.64
M	1.35	1.32	1.27	1.19	S	1.22	1.29	1.27	1.26
C1*M	1.59	1.51	1.46	1.30	C1*S	3.16	2.37	2.87	2.92
BF	1.38	1.31	1.33	1.30	BF	1.32	1.33	1.31	1.30
CS	1.29	1.28	1.28	1.28	CS	1.31	1.34	1.32	1.32
PF	1.18	1.19	1.17	1.17	PROF	1.17	1.17	1.17	1.17
LV	1.19	1.18	1.18	1.20	LVG	1.19	1.20	1.19	1.19
Var	Model 9	Model 10	Model 11	Model 12	Var	Model 13	Model 14	Model 15	Model 16
C2	1.47	1.32	1.39	1.41	C1	3.34	2.13	2.51	2.64
M1	1.39	1.27	1.39	1.75	S	1.23	1.35	1.34	1.32
C2*M	1.76	1.55	1.73	2.22	C2*S	3.66	2.51	2.92	3.02
BF	1.38	1.31	1.33	1.32	BF	1.32	1.31	1.30	1.30
CS	1.30	1.29	1.28	1.30	CS	1.32	1.34	1.32	1.32
PF	1.18	1.19	1.17	1.17	PROF	1.18	1.17	1.17	1.17
LV	1.19	1.18	1.18	1.19	LVG	1.19	1.20	1.19	1.19

Source: Authors' calculation

To provide additional validation for conclusions drawn on the basis of correlation coefficients presented in Table 3, variance inflation factors for all variables included in models 1-16 were calculated and they did not exceed the conventional threshold of 10 (Chatterjee et al., 2000, in Orazalin, 2020), what denoted that there was no multicollinearity problem.

5. Results and discussion

Most important scientific result of the research implies that the COVID-19 crisis resulted in increased earnings management, but only regarding financial statements disclosed in the first year after the pandemic was declared. This could be attributed to the initial shock caused by gloomy predictions about the future course of the pandemic, as well as to the scarce and often contradictory information which led to further aggravation. In the second year of the pandemic, the effect was contrastive – companies were more focused on reducing the level of their earnings management.

In the time when financial statements were prepared and disclosed in the following year, the situation was significantly different because the consequences of the pandemic were not as far-reaching as predicted and the optimism was high due to the start of the vaccination against the virus.

The presence and representation of women in management boards were found to have a positive impact on curbing earnings management, exclusively in the first year of the pandemic, when the need for such action was necessary. However, in the second year, the threat to the reliability of financial statements decreased, and the efforts of female directors in reducing earnings management were less pronounced. The positive relationship between the presence and share of female directors in management boards and earnings management in years other than the first year of the pandemic, in which financial statements were disclosed indicates that women on management boards are generally oriented toward corporate interests, but in times of fiercest crisis, they reason wisely because every corporate action is scrutinised by the public concerned.

These findings are consistent with previous research by Zalata et al. (2021), which also highlighted the positive role of women in constraining earnings management during periods of crisis. Results also indicate that gender diversity in supervisory boards is not so useful in decreasing earnings management. Above mentioned scientific findings also have practical implications in terms of assessing the behaviour of (potential) members of management board, as well as for forensic accountants' investigations.

6. Conclusion

The research findings strongly support hypothesis H1a, as they reveal a negative relationship between the level of earnings management in financial statements during the first year of the COVID-19 pandemic and various measures of gender diversity in management boards, with the exception of the Shannon index. However, when considering other business years, the relationship between the presence and higher share of female directors in management boards and earnings management becomes either positive or insignificant. These contrasting findings highlight the key scientific contribution of this research, which suggests that women on boards can serve as an additional monitoring mechanism during severe economic crises and periods of high uncertainty, which often drive companies to resort to earnings management techniques in order to mitigate economic difficulties. However, it is important to acknowledge the limitations of this research. The study sample was confined to large listed public limited companies operating in the Republic of Croatia, which limits the generalizability of the results. Future research should aim to validate these conclusions in other countries and consider non-listed companies,

although data availability may pose challenges in that regard. Additionally, further investigation is needed to clarify the role of the supervisory board, as this research has left questions unanswered regarding its effectiveness.

Given the findings that the presence of female directors in management boards helps restrain earnings management during crises, regulatory measures could be considered to promote their inclusion in board compositions. This would contribute to maintaining a more objective overview of a company's financial position and practices.

Overall, this research provides valuable insights into the relationship between gender diversity in management boards, earnings management, and crisis situations. It highlights the need for continued exploration in this area to inform policy decisions and foster a more inclusive and transparent corporate environment.

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Spolna raznolikost u upravljačkoj strukturi i upravljanje financijskim rezultatom tijekom razdoblja COVID-19 krize

Toni Šušak¹, Tomislava Pavić Kramarić², Marijana Bartulović³

Sažetak

U ovom radu istražuje se učinak COVID-19 krize na povezanost spolne raznolikosti u upravama i nadzornim odborima s razinom upravljanja financijskim rezultatom. Uzorak istraživanja čine trgovačka društva uvrštena na hrvatsko nacionalno tržište kapitala, a za potrebe procjene regresijskih modela prikupljeni su panel podaci u razdoblju od 2015. do 2020. Rezultati su pokazali da su prisutnost i veći udio ženskih članova u upravama bili korisni za smanjivanje upravljanja financijskim rezultatom, ali samo za financijska izvješća objavljena tijekom prve godine pandemije COVID-19. U to vrijeme takav napor bio je ključan zbog eskalacije upravljanja financijskim rezultatom izazvane krajnje pesimističnim gospodarskim očekivanjima. U financijskim izvješćima objavljenima tijekom druge godine pandemije razina upravljanja financijskim rezultatom znatno je opala, a članice uprava nisu bile tako učinkovite u obuzdavanju ovih aktivnosti kao u prvoj godini. To bi moglo upućivati na veću opreznost ženskih članova uprave prilikom predviđanja intenziteta javnog nadzora financijskih izvještaja u razdoblju krize. Spolna raznolikost u nadzornim odborima nije se pokazala značajnom odrednicom upravljanja financijskim rezultatom tijekom COVID-19 krize.

Ključne riječi: COVID-19 kriza, upravljačka struktura, upravljanje financijskim rezultatom, spol, raznolikost

JEL klasifikacija: G01, M41, G32, J16, M14

¹ Docent, Sveučilišni odjel za forenzične znanosti, Sveučilište u Splitu, Ruđera Boškovića 33, 21000, Split, Hrvatska. Znanstveni interes: forenzičko računovodstvo, revizija, korporativno upravljanje i korporativno pravo. E-mail: toni.susak@forenzika.unist.hr.

² Izvanredni profesor, Sveučilišni odjel za forenzične znanosti, Sveučilište u Splitu, Ruđera Boškovića 33, 21000, Split, Hrvatska. Znanstveni interes: korporativne financije, osiguranje, financijske institucije i financijska analiza. E-mail: tpkramaric@forenzika.unist.hr.

³ Izvanredni profesor, Sveučilišni odjel za forenzične znanosti, Sveučilište u Splitu, Ruđera Boškovića 33, 21000, Split, Hrvatska. Znanstveni interes: forenzičko računovodstvo, korporativno izvještavanje, interna revizija. E-mail: marijana.bartulovic@forenzika.unist.hr.

Factors influencing the purchase of fashion products before and during the COVID-19 pandemic: the example of Serbia*

Karolina Perčić¹, Milica Slijepčević², Pedja Ašanin Gole³

Abstract

The aim of this paper is to analyze the factors that most influenced consumers in purchasing fashion products and the factors the most important to consumers during the COVID-19 pandemic, as well as whether there are any differences between the period prior to the pandemic and the period after it. The available research on the correlation between the pandemic and consumer buying habits and the factors influencing the purchase of products mainly dealt with consumer goods stimulated by the initial stockpiling of hygiene materials and food, books, recreational equipment, etc. On a purposive sample of 1,002 adult respondents in the territory of Serbia, the quantitative empirical research applying an online survey was conducted within the March-June 2021 period. The SPSS was used for data processing and analysis and for the interpretation of research results. In addition to descriptive statistics (frequency distribution, mean, standard deviation), comparative statistics (χ^2 -test, ANOVA, t-test) was used as well. The change in the attitude to consumption has led to the introduction of a new value system for consumers when purchasing fashion products. Understanding these factors will help the fashion industry find new approaches to satisfy the changed buying habits of consumers.

Keywords: fashion industry; fashion products; consumer behavior; purchase factors; COVID-19 pandemic

JEL classification: D9, L67, M31, M37

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¹ Assistant Professor, Modern Business School, Terazije 27, Belgrade, Serbia. Scientific affiliation: marketing and education. Phone: + 381 63 361 319. E-mail: karolina.percic@mbs.edu.rs. ORCID: 0000-0003-4571-1765.

² Associate Professor, Belgrade Metropolitan University, Faculty of Management, Faculty of Digital Arts, Belgrade, Serbia. Scientific affiliation: marketing, education and fashion industry. Phone: +381 11 203 0885. E-mail: milica.slijepcevic@metropolitan.ac.rs. ORCID: 0000-0002-0431-2998.

³ Senior Lecturer, Ljubljana School of Business, Tržaška cesta 42, Ljubljana, Slovenia. Scientific affiliation: strategic communication, stakeholder management. Phone: +386 12 444 214. E-mail: pedja.asanin.gole@e-studij.eu. ORCID: 0000-0003-2617-8598.

1. Introduction

The fashion industry is one of the most dynamic and fastest growing industries in the world, which comprises the production, distribution and promotion of various types of fashion products, including clothing, footwear, jewelry, bags, cosmetics and other fashion accessories (Slijepčević, 2016). The fashion industry contributes about USD 3 trillion globally, which is estimated at 2% of the world's gross domestic product (Moreno-Gavara and Jiménez-Zarco, 2019). Buying fashion products is a complex process involving various factors that can influence consumer decisions, including their preferences regarding design, quality of materials and workmanship, price, discounts and promotions, as well as the place and method of purchase.

The pandemic caused by the spread of the corona virus (COVID-19) and the subsequent lockdowns have had a major impact on people's quality of life and have significantly affected collective and consumer behaviors (Milanović and Stamenković, 2022), including the way consumers perceive, evaluate and purchase fashion products. Moreover, said have also changed the choices accessible to consumers (Esposti et al., 2021; Koch et al., 2020). The prolonged fear of the disease, the uncertainty, and the unavailability of healthier coping strategies, e.g. considerable reduction in social interactions, as well as restrictions on travelling, all impacted well-being.

The outbreak of COVID-19 has had a significant impact on consumer behavior by changing choices regarding everyday products and the most widespread habits (Mamula Nikolić et al., 2022). The unusual consumer behavior was noted during the initial stages of the pandemic, wherein consumers were hoarding staples and food (Laato et al., 2020). Sneath et al. (2009) highlighted that changes in consumer behavior often represent self-protective strategies aimed at managing depression and negative emotions by restoring a positive sense of self.

According to a study conducted by Nielsen (2020), the COVID-19 pandemic has caused a globally expressed change in consumption levels related to consumer behavior. The duration of the pandemic has led to changes in lifestyle and consumption practices. It has unpredictably changed our way of working, communicating and shopping, and it has profoundly impacted consumer attitudes and behavior. In response to the spread of the virus, consumers have implemented practices to change their consumption behavior and reorganize their shopping strategies in accordance with the quarantine and social distancing conditions imposed by the authorities (Cohen, 2020). Likewise, job insecurity and a life of insecurity experienced during the pandemic have had a negative impact on consumer behavior. The pandemic has changed consumer patterns, reducing sales of some product categories (e.g. apparel) and improving sales of other categories (e.g. entertainment products) (Baker et al., 2020). Although varying across nations,

consumers have reorganized their shopping strategies, changed established habits, and experimented with creative and innovative practices (Nielsen, 2020).

The purpose of this paper is to illustrate the results of a quantitative research project aimed at investigating habits in the purchase of fashion products before and after the outbreak of the COVID-19 pandemic. More specifically, the authors intended to examine whether and to what extent the pandemic changed the factors influencing the purchase of fashion products in Serbia before and during the COVID-19 pandemic.

Understanding these factors is crucial to gaining insights into consumer behavior and decision-making, particularly in the rapidly evolving environment of the fashion industry, where consumers are constantly exposed to changing trends, styles and promotional messages. Also, it is essential for marketers to understand the impact of these factors, as it is based on the fact that marketing strategies can be developed to correspond to the preferences of the target market. By identifying and understanding the factors that influence the customers, brands have the opportunity to develop a strategy, a unique value proposition (as a promotional message), and advertising campaigns that are more effective and more in line with the needs and mindsets of their target consumers, providing a real benefit to better satisfy the demands of customers and boost sales (Rani, 2014).

With an insight into certain factors that influence the purchase of fashion products in Serbia before and during COVID-19, the gap in knowledge would be filled, given the relevance of the current phenomenon. By comparing two different contexts, the examination can foreground potential shifts in consumer behavior and patterns that transcend contextual factors, with important implications for further research and practice that support the design of new strategies for businesses to navigate the *new normal*.

Based on the following literature review and factors that influence purchase of fashion products (quality of materials and workmanship, product design, product originality, geographical origin, brand awareness, packaging, price, discount and promotion, method of payment, place of purchase, how and by whom the product is promoted, that the product is promoted by the influencer, recommendation from friend), the research hypotheses were defined: *null hypothesis (H0)* – there is no statistically significant difference in the responses of consumers in Serbia in relation to the degree of importance of the examined factors for the purchase of fashion products, both for the periods before and during the pandemic; *alternative hypothesis H1* – there is a statistically significant difference in the responses of consumers in Serbia according to *gender* in relation to the degree of importance of the examined factors for the purchase of fashion products, both for the periods before and during the pandemic; *alternative hypothesis H2* – there is a statistically significant difference in the responses of consumers in Serbia according to *age categories (generations of consumers)* in relation to the degree of importance of the

examined factors for the purchase of fashion products, both for the periods before and during the pandemic; and *alternative hypothesis H3* – there is a statistically significant difference in the responses of consumers in Serbia according to *the percentage of monthly income allocated to the purchase of fashion products* in relation to the degree of importance of the examined factors for the purchase of said products, both for the periods before and during the pandemic.

2. Literature review and hypotheses development

This paper examines the degree of importance of a certain factor for the purchase of a fashion product in Serbia, for the period before the COVID-19 pandemic and during this pandemic, in order to determine which factors had the most influence on consumers in the purchase of fashion products before the pandemic, and which have been most important to consumers in Serbia during the pandemic.

According to the Nielsen researchers, as the *pre-COVID-19* benchmark falls further into the past, it has become difficult for consumers to understand exactly what the *new normal* is (NielsenIG, 2023). The changed attitude towards consumption has resulted in a new value system among consumers. Being uncertain about the future and preparing for extremes, consumers are in a constant state of skepticism, remaining wary of all forms of spending, suggesting hedging, contingency planning and hopeful strategizing around socio-economic barriers. This makes it all the more important to know the factors that influenced consumers' purchasing decisions before and during the pandemic.

Consumer Outlook 2023 survey (NielsenIG, 2023) shows that consumers are increasingly cautious about their purchasing decisions – and unsure of what's next. According to a fashion industry research report by McKinsey and Company in collaboration with the Business of Fashion (Amed et al., 2022), the global fashion industry has faced exceptionally challenging conditions. The pandemic has only served to exacerbate inequalities in performance: the proportion of companies generating negative economic profit in 2021 was higher than ever. Moreover, the losses of the bottom 80 percent in terms of value creation more than offset the profits of the top 20 percent. In the BoF-McKinsey State of Fashion 2023 survey (Amed et al., 2023), 84 percent of industry leaders said they expect market conditions to decrease or remain the same in 2023, but foresee a continuation of the casualization trend that took hold during the pandemic as more shoppers switch to work from home. Understanding these factors will help the fashion industry find new approaches to satisfy the changed buying habits of consumers.

As noted by Amatulli (2015), fashion marketing is characterized primarily by symbolic and hedonistic, rather than concrete and utilitarian consumption of

products, and therefore the behavior of buyers of fashion products is emotional and ambitious rather than rational and functional. Shopping determinants can be related to either personal motivation (i.e., individual style) or interpersonal motivations (i.e., status, symbolic value).

In general, consumer behavior is a complex process influenced by a variety of factors that shape consumers' perceptions, attitudes and purchase decisions in the context of fashion products (Slijepčević, 2019). Consumer behavior in the purchasing decision process is influenced by various factors and influences, which cause consumers to develop preferences regarding products and brands, and generally consumer and purchasing habits. These factors can be divided into several groups of factors: psychological factors (motivation, attitude, learning and memory), social factors (reference groups, family, individual's role and position, status), personal factors (age, profession, gender, financial situation, life style, values and beliefs), cultural (culture, social class), economic (price – monetary and non-monetary aspects, income, quality), as well as situational factors related to the time and place of purchase (physical environment – location, equipment; social environment – seller influence, time related to seasonal influences, days of the week, etc.; as a special situational factor, the pandemic situation and decisions on lockdown rendered by authorities were taken into consideration in authors' research), individual differences and environmental influences (Kotler and Armstrong, 2018; Shankar, 2011). The following was defined as the initial, null hypothesis of authors' research (H₀): there is no statistically significant difference in the responses of consumers in Serbia in relation to the degree of importance of the examined factors for the purchase of fashion products, both for the periods before and during the pandemic.

The personal factors, which are among the most important factors determining consumers' clothing purchase behavior, are age, gender, profession, level of education, level of income and marital status (Kotler and Armstrong, 2018; Solomon, 2020). It has been suggested that male and female consumers demonstrate considerably different approaches in their decision-making and purchasing behavior when shopping for clothing for a variety of different reasons (Koca and Koc, 2016). Findings from various studies (see e.g. Gupta and Gentry, 2015) show that when shopping for fashion products in rare settings, men and women tend to exhibit gender-oriented behavior that is considered more consistent with their traditional gender norms. Men are said to adhere to compulsive shopping behavior, which helps them maintain part of their traditional masculine identity, while women are said to be more likely to engage in fashion hoarding, which is said to be more consistent with their feminine identity. Some research shows that after the outbreak of the pandemic, there were subtle changes in male consumer purchasing groups, in which the purchase of certain necessities, especially everyday ones, increased (Vázquez- Martínez et al., 2021). Based on the above, the authors presented the

alternative hypothesis H1: there is a statistically significant difference in the responses of consumers in Serbia according to gender in relation to the degree of importance of the examined factors for the purchase of fashion products, both for the periods before and during the pandemic.

There are several studies on the propensity to purchase fashion products among different generations of consumers (Fine et al., 2022; Wijaya and Paramita, 2021; Nielsen, 2020; Valaei and Nikhashemi, 2017), which, among other things, confirm the appeal of fashionable but sustainable products among younger generations as well, i.e. Millennials (born between 1980 and 1994) and Generation Z (born between 1995 and 2010). According to ESW (2022), Millennials (39%) and Generation X (37%) show the highest preference rates for online vs in-store shopping. Baby Boomers and Generation Z follow them with 30%. The pandemic lockdown increased consumer concern about a possible drop in income, so some research (Gu et al., 2021) reported that affordable brands were more popular at that time. Assuming that the consumer basket previously included a wide range of goods and services, during the pandemic the focus was on basic products, such as medicines, antiseptics, and disinfectants, and on delivery services, etc. Based on these studies, the authors propose the alternative hypothesis H2: there is a statistically significant difference in the responses of consumers in Serbia according to age categories (generations of consumers) in relation to the degree of importance of the examined factors for the purchase of fashion products, both for the periods before and during the pandemic; and H3: there is a statistically significant difference in the responses of consumers in Serbia according to the percentage of monthly income allocated to the purchase of fashion products in relation to the degree of importance of the examined factors for the purchase of said products, both for the periods before and during the pandemic.

3. Methodology

Empirical, quantitative research was conducted by way of a test method. An online survey was prepared specifically for the purpose of this research and was distributed to respondents. The importance of certain factors was examined in terms of their relevance for the consumers to buy fashion products before the pandemic and during the pandemic, in the period from March 24 to June 21, 2021, in the Republic of Serbia. The sample is purposive. It consists of 1,002 respondents – consumers of both genders (male: 26%, female: 74%), aged 18 to 72. According to age categories, the structure of the sample is as follows: 18-25 (Generation Z), 18%; 26-40 (Generation Y), 31%; 41-55 (Generation X), 35%; 56-72 (Baby Boomers), 16%. According to the amount of monthly income, the structure of the sample consists of the following structure of respondents: up to RSD 50,000 (EUR 420), 43%; RSD 50,000 – 70,000 (EUR 420 – 590), 20%; RSD 70,000 – 100,000 (EUR 590 – 850),

14%; over RSD 100,000 (EUR 850), 7%. The sample includes respondents from all regions of Serbia. The statistical error of the sample is 3%. The SPSS was used for data processing and analysis. The following quantitative statistical methods were applied: descriptive statistics (frequency distribution, arithmetic mean, standard deviation) and comparative statistics (χ^2 -test, t-test, ANOVA). Some questions in the questionnaire were formulated in the form of a five-point Likert scale. The questions in the questionnaire, which refer to the examination of the degree of importance of certain factors for the purchase of fashion products for the period before and during the pandemic, contained five offered answers: it is (was) very important to me, it is (was) important to me, sometimes it is (was) important, it is (was) not so important to me, it is (was) not important to me at all, and were assigned values of 5, 4, 3, 2 and 1, respectively.

4. Empirical data and analysis

For consumers in Serbia, the quality of materials and workmanship became more important during the pandemic, compared to the period before the pandemic (85% of consumers stated that the quality of materials and workmanship was important to them before the pandemic, and even 90% of consumers stated the same thing regarding the pandemic period). The importance of product design to consumers has declined slightly during the pandemic. Before the pandemic, 93% of consumers said that design was important to them, and during the pandemic 89% of consumers highlighted the importance of product design. For 60% of consumers, product originality was important before the pandemic, and for 57% of them, product originality was important during the pandemic. In the period before the pandemic, prices, discounts, and promotions were also important to consumers in Serbia. The price of a fashion product was important for 75% of consumers before the pandemic, and for 79% of them, it has been important during the pandemic. This shows that consumers in Serbia have become slightly more price sensitive during the pandemic. A discount or sale of a fashion product was an important factor for 65% of consumers before the pandemic, and for 71% of them, it has been important during the pandemic. This also confirms that consumers have become slightly more price sensitive during the pandemic. During the period of the pandemic, the percentage of consumers for whom the place and method of payment became important increased, which was expected. When the percentages for the period before and during the pandemic are compared, it is evident that the two factors are very close as regards the following: the geographical origin of the fashion product, brand awareness, packaging, and the fact that the fashion product is promoted by the influencer. The following Table 1 shows the percentages of respondents who highlighted the listed factors as important for purchasing fashion products before and during the pandemic.

Table 1: Percentages of respondents to whom surveyed factors were important for purchasing fashion products before and during the pandemic

Tested elements that influence purchase	Before pandemic	During pandemic
quality of materials and workmanship	85%	90%
product design	93%	89%
product originality	60%	57%
geographical origin	22%	22%
brand awareness	18%	17%
packaging	14%	15%
price	75%	79%
discount and promotion	65%	71%
method of payment (online, card, cash on delivery)	45%	60%
place of purchase (physical store, online store)	49%	58%
how and by whom the product is promoted	18%	10%
that the product is promoted by the influencer	3%	3%
recommendation from friend	38%	34%

Note: The percentages shown in the table refer to the sum of respondents' answers with values of 5 and 4.

Source: Author's calculation

Based on the results shown in Table 2, it can be concluded that the factors important for purchasing fashion products in Serbia before the outbreak of the COVID-19 pandemic are: product design, quality of materials and workmanship, price, discount or promotion, and originality of the product, respectively.

Table 2: The importance of factors for buying fashion products (clothing, shoes, accessories) before the pandemic

Tested elements that influence purchase	N	Std. Deviation	Mean
product design	1,002	0.653	4.44*
quality of materials and workmanship	1,002	0.808	4.28*
price	1,002	0.822	3.98*
discount and promotion	1,002	0.930	3.84*
product originality	1,002	1.057	3.68*
place of purchase (physical store, online store)	1,002	1.210	3.36
method of payment (online, card, cash on delivery)	1,002	1.289	3.18
recommendation from friend	1,002	1.044	3.16
brand awareness	1,002	1.047	2.54
geographical origin	1,002	1.181	2.53
packaging	1,002	1.050	2.45
how and by whom the product is promoted	1,002	1.167	2.41
that the product is promoted by the influencer	1,002	0.805	1.45

Note: Mean values with the higher value than 3.5 are marked with an asterisk, because values 4 and 5 refer to the factors that respondents marked as important for the decision-making process of buying fashion products.

Source: Author's calculation

Based on the results shown in Table 3, the factors important for purchasing fashion products during the COVID-19 pandemic are quality of materials and workmanship, product design, price, discount or promotion, place of purchase (physical store or online store), originality of the product and method of payment (online card, cash on delivery), respectively. It is noted that the factors important for the process of purchasing fashion products during the pandemic have become the place of purchase and the method of payment. As for the least important factors for the decision-making process in the purchase of fashion products, both in the periods before and during the pandemic, consumers in Serbia indicated: that the product is promoted by the influencer, how the product was promoted, who promoted it, product packaging, brand awareness and the geographical origin of the fashion product.

Table 3: The importance of factors for buying fashion products (clothing, shoes, accessories) during the pandemic

Tested elements that influence purchase	N	Std. Deviation	Mean
quality of materials and workmanship	1,002	0.727	4.32*
product design	1,002	0.733	4.27*
price	1,002	0.825	4.07*
discount and promotion	1,002	0.938	3.95*
place of purchase (physical store, online store)	1,002	1.057	3.65*
product originality	1,002	1.069	3.56*
method of payment (online, card, cash on delivery)	1,002	1.220	3.55*
recommendation from friend	1,002	1.060	3.10
geographical origin	1,002	1.158	2.53
brand awareness	1,002	1.074	2.49
packaging	1,002	1.096	2.39
how and by whom the product is promoted	1,002	1.052	2.01
that the product is promoted by the influencer	1,002	0.777	1.43

Note: Mean values with the higher value than 3.5 are marked with an asterisk, because values 4 and 5 refer to the factors that respondents marked as important for the decision-making process of buying fashion products.

Source: Author's calculation

For the period before the pandemic, the t-test found a statistically significant difference in the respondents' answers according to gender concerning the following factors that influence the purchase of fashion products: quality of materials and workmanship, product design, product originality, geographical origin, brand awareness, product packaging, place of purchase, payment method, how the product was promoted and who promoted it, and recommendation from friends (Table 4). According to the same table, for the period during the pandemic, the t-test found a statistically significant difference in the respondents' answers according to gender concerning the following factors that influence the purchase of fashion products: product design, product originality, geographical origin, brand awareness, product packaging, product price, place of purchase, payment method, how and by whom the product is promoted, and recommendation from friends.

Table 4: Examination of the statistically significant difference in respondents' answers according to gender in relation to the degree of importance of factors for the purchase of fashion products, before and during the pandemic (t-test)

Tested elements that influence purchase	Before pandemic			During pandemic		
	t	df	p	t	df	p
quality of materials and workmanship	-2.599	998	0.009*	-1.993	998	0.047
product design	-5.266	998	0.000*	-4.820	998	0.000*
product originality	-2.972	998	0.003*	-3.173	998	0.002*
geographical origin	-3.572	998	0.000*	-3.026	998	0.003*
brand awareness	4.558	998	0.000*	4.985	998	0.000*
packaging	-3.165	998	0.002*	-2.089	998	0.037*
price	0.673	998	0.501	-2.237	998	0.026*
discount and promotion	-0.041	998	0.967	-1.424	998	0.155
method of payment (online, card, cash on delivery)	-4.102	998	0.000*	-5.427	998	0.000*
place of purchase (physical store, online store)	-3.224	998	0.001*	-6.436	998	0.000*
how and by whom the product is promoted	-2.265	998	0.024*	-2.661	998	0.008*
that the product is promoted by the influencer	-0.807	998	0.420	-0.401	998	0.688
recommendation from friend	-2.835	998	0.005*	-4.827	998	0.000*

Note: * $p < 0.05$

Source: Author's calculation

According to the results shown in the Table 5, the extent to which any factor, marked by male and female genders as important for the purchase of fashion products, was important in the periods before and during the pandemic. In the pre-pandemic period, the following factors were more important to female than to male consumers: quality of materials and workmanship, product design, originality of the product, geographical origin, packaging, method of payment, place of purchase and recommendation from friends. On the other hand, the following factors were more important to male consumers: brand awareness, and the way in which the product was promoted and who promoted it. During the pandemic, the following factors were more important to female than to male consumers: product design, originality of the product, geographical origin, packaging, price, method of payment, place of purchase, the way in which the product was promoted and who promoted it, and recommendation from friends. During the pandemic, the factor most important to male compared to female respondents was brand awareness.

Table 5: Distribution of respondents according to gender and the importance of the mentioned factors for the purchase of fashion products, before and during the pandemic

The importance of tested elements that influence purchase of a fashion product	Before pandemic		During pandemic	
	Male	Female	Male	Female
quality of materials and workmanship	80%	87%	88%	90%
product design	88%	94%	81%	91%
product originality	51%	63%	48%	59%
geographical origin	20%	23%	19%	23%
brand awareness	27%	15%	26%	15%
packaging	13%	17%	13%	17%
price	75%	74%	76%	80%
discount and promotion	66%	65%	70%	71%
method of payment (online, card, cash on delivery)	36%	48%	45%	65%
place of purchase (physical store, online store)	38%	52%	45%	63%
how and by whom the product is promoted	19%	16%	9%	12%
that the product is promoted by the influencer	3%	3%	3%	2%
recommendation from friend	33%	40%	27%	37%

Source: Author's calculation

Through the ANOVA test, the existence of a statistically significant difference in the answers of respondents according to age groups (18-25, 26-40, 41-55 and 56-72) was examined in relation to the degree of importance of the analyzed factors for the purchase of fashion products, before (Table 6) and during the pandemic (Table 7). Accordingly, a statistically significant difference is marked by an asterisk.

Table 6: Examining the statistically significant difference in respondents' answers according to age groups in relation to the degree of importance of factors for purchasing fashion products before the pandemic (ANOVA)

Tested elements that influence purchase of fashion products	Before pandemic				
	Sum of Squares	df	Mean Square	F	p
quality of materials and workmanship	16.355	3	5.452	8.536	0.000*
product design	6.552	3	2.184	5.190	0.001*
product originality	32.392	3	10.797	9.928	0.000*
geographical origin	162.943	3	54.314	43.967	0.000*
brand awareness	12.044	3	4.015	3.694	0.012*
packaging	1.878	3	0.626	0.567	0.637
price	14.077	3	4.692	7.079	0.000*
discount and promotion	3.078	3	1.026	1.186	0.314
method of payment	10.632	3	3.544	2.141	0.093
place of purchase	4.074	3	1.358	0.927	0.427
how and by whom the product is promoted	2.339	3	0.780	0.571	0.634
that the product is promoted by the influencer	2.434	3	0.811	1.253	0.289
recommendation from friend	8.725	3	2.908	2.683	0.046

Note: * $p < 0.05$

Source: Author's calculation

Table 7: Examining the statistically significant difference in respondents' answers according to age groups in relation to the degree of importance of factors for purchasing fashion products during the pandemic (ANOVA)

Tested elements that influence purchase of fashion products	During pandemic				
	Sum of Squares	df	Mean Square	F	p
quality of materials and workmanship	4.823	3	1.608	3.060	0.027*
product design	7.011	3	2.337	4.391	0.004*
product originality	33.968	3	11.323	10.190	0.000*
geographical origin	78.501	3	26.167	20.676	0.000*
brand awareness	12.446	3	4.149	3.626	0.013*
packaging	20.010	3	6.670	5.634	0.001*
price	5.831	3	1.944	2.873	0.035*
discount and promotion	2.529	3	0.843	0.959	0.411
method of payment	5.553	3	1.851	1.244	0.292
place of purchase	5.238	3	1.746	1.564	0.196
how and by whom the product is promoted	5.716	3	1.905	1.725	0.160
that the product is promoted by the influencer	12.073	3	4.024	6.773	0.000*
recommendation from friend	7.185	3	2.395	2.140	0.094

Note: * $p < 0.05$

Source: Author's calculation

Tables 8 and 9 show the distribution of respondents according to age groups in relation to the importance of a certain factor for purchasing fashion products, before and during the pandemic. According to those results, the older the age category, the greater the percentage of consumers who take the quality of materials and workmanship as an important factor for purchasing fashion products, both in the periods before and during the pandemic. Product originality, brand awareness, and product packaging were marked by the smallest percentage as the factors important for members of the Baby Boomer generation. As regards geographical origin, the older the generations, the more important this factor becomes. Before the pandemic, product price was a more important factor for members of Generation Y compared to other generations of consumers, and during the pandemic it is a more important factor for Generation X. During the pandemic, the fact that the product was promoted by an influencer became most important for the greatest percentage of Generation Z.

Table 8: Distribution of respondents according to age groups and the importance of the mentioned factors for the purchase of fashion products before the pandemic

Importance of tested elements that influence purchase of fashion products	Before pandemic			
	18-25 (Gen Z)	26-40 (Gen Y)	41-55 (Gen X)	56-72 (Baby Boomers)
quality of materials and workmanship	79%	82%	89%	90%
product design	93%	94%	94%	87%
product originality	63%	60%	66%	42%
geographical origin	5%	15%	31%	33%
brand awareness	17%	16%	22%	13%
packaging	18%	15%	17%	12%
price	78%	79%	71%	76%
discount and promotion	57%	70%	65%	64%
method of payment	35%	50%	44%	50%
place of purchase	48%	48%	49%	62%
how and by whom the product is promoted	17%	21%	17%	19%
that the product is promoted by the influencer	3%	3%	4%	3%
recommendation from friend	34%	34%	39%	46%

Source: Author's calculation

Table 9: Distribution of respondents according to age groups and the importance of the mentioned factors for the purchase of fashion products during the pandemic

Importance of tested elements that influence purchase of fashion products	During pandemic			
	18-25 (Gen Z)	26-40 (Gen Y)	41-55 (Gen X)	56-72 (Baby Boomers)
quality of materials and workmanship	87%	88%	89%	92%
product design	89%	90%	87%	88%
product originality	65%	60%	61%	31%
geographical origin	11%	17%	29%	26%
brand awareness	16%	15%	22%	13%
packaging	23%	14%	15%	9%
price	78%	79%	81%	74%
discount and promotion	70%	70%	73%	68%
method of payment	57%	60%	56%	67%
place of purchase	56%	55%	61%	68%
how and by whom the product is promoted	11%	10%	10%	10%
that the product is promoted by the influencer	6%	3%	3%	3%
recommendation from friend	30%	33%	37%	37%

Source: Author's calculation

When it comes to the percentage of monthly income spent by consumers before and during the pandemic, according to the research results, less than 10% of monthly income was spent by 26% of consumers before the pandemic and 53% of consumers during the pandemic; 10-15% of monthly income was spent by 32% of consumers before the pandemic and 27% of consumers during the pandemic; 15-20% of monthly income was allocated by 22% of consumers before the pandemic and 12% of consumers during the pandemic; 20-25% of monthly income was spent by 12% of consumers before the pandemic and 4% of consumers during the pandemic, and over 25% of monthly income was spent by 8% of consumers before the pandemic and 5% of consumers during the pandemic. It is noticeable that the percentage of monthly income spent by consumers on fashion products dropped during the pandemic.

According to the results shown in Table 10, for those consumers who allocated the least amount of their monthly income for the purchase of fashion products (less than 10%) before the pandemic, the price and discounts, and promotions are the

most important factors, as assumed. For consumers who set aside 10-15% of their monthly income, the most important factor for buying fashion products was the place of purchase (physical or online store). For those consumers who allocated 20-25% of their monthly income to fashion products before the pandemic, the following factors are the most important concerning other groups of consumers: quality of materials and workmanship, product design, how the product is promoted and who promotes it, whether the product is promoted by an influencer and recommendation from a friend. For those who spent the most on fashion products (over 25% of their monthly income), the following factors were the most important for purchasing fashion products before the pandemic: product originality, brand awareness, geographical origin, packaging, and payment method, compared to other groups of consumers who spent less.

Table 10: Mean values for the degree of importance of the examined factors for the purchase of fashion products in relation to the percentage of monthly income that was allocated for the purchase of fashion products before the pandemic

Importance of tested elements that influence purchase before the pandemic	Less than 10% (N = 257)	10-15% (N = 325)	15-20% (N = 220)	20-25% (N = 122)	Over 25% (N = 78)
quality of materials and workmanship	4.09	4.33	4.26	4.62*	4.18
product design	4.27	4.42	4.52	4.61*	4.54
product originality	3.46	3.61	3.80	3.93	4.00*
geographical origin	2.33	2.54	2.70	2.46	2.72*
brand awareness	2.20	2.56	2.64	2.82	2.92*
packaging	2.11	2.36	2.75	2.57	2.90*
price	4.12*	3.98	3.95	3.80	3.92
discount and promotion	3.95*	3.88	3.83	3.66	3.62
method of payment	2.99	3.19	3.25	3.30	3.41*
place of purchase	3.36	3.42*	3.28	3.30	3.41
how and by whom the product is promoted	2.26	2.35	2.49	2.62*	2.59
that the product is promoted by the influencer	1.41	1.40	1.54*	1.54*	1.44
recommendation from friend	2.99	3.25	3.24	3.28*	2.97

Note: The highest values were highlighted for each question regarding the degree of importance of the examined factors for the purchase of fashion products in relation to the percentage of monthly income allocated to the purchase of fashion products before the pandemic.

Source: Author's calculation

The χ^2 -test found a statistically significant difference in the respondents' answers according to the percentage set aside from the monthly income for the purchase of fashion products before the pandemic, in relation to the degree of importance of almost all examined factors (quality of materials and workmanship, product design, product originality, geographical origin, brand awareness, product packaging, product price, discount and promotion, place of purchase, product promotion, recommendation from friends, where $p < 0.05$), except for the following factors: method of payment, that the product is promoted by the influencer, where $p > 0.05$.

For the period during the pandemic, for consumers who set aside less than 10% of their monthly income the most important factors are the price and discounts, and promotions, but a recommendation from friends has also emerged as a new factor for this group of consumers. For consumers who spend 15-20% of their monthly income, the most important factors for purchasing fashion products are geographical origin and product packaging, and for those who spend 20-25% of their monthly income on fashion products, the following factors stand out as the most important compared to other consumer groups: quality of materials and workmanship, product design, originality of the product, method of payment, place of purchase, how the product is promoted and who promotes it, and the importance for the product to be promoted by an influencer. For those who spend more than 25% of their monthly income on fashion products, the most important factors for purchasing fashion products are brand awareness and place of purchase, compared to other groups of consumers who spend less for the mentioned purpose. Before the pandemic, the following factors were also important to the group of consumers who spend the most on fashion products: product originality, geographical origin, product packaging, and payment method. For details see Table 11.

Table 11: Mean values for the degree of importance of the examined factors for the purchase of fashion products in relation to the percentage of monthly income that was allocated for the purchase of fashion products during the pandemic

Importance of tested elements that influence purchase during the pandemic	Less than 10% (N = 257)	10-15% (N = 325)	15-20% (N = 220)	20-25% (N = 122)	Over 25% (N = 78)
quality of materials and workmanship	4.29	4.32	4.45	4.68*	4.04
product design	4.21	4.25	4.50	4.53*	4.29
product originality	3.40	3.59	3.88	4.26*	3.75
geographical origin	2.50	2.52	2.78*	2.47	2.38
brand awareness	2.33	2.49	2.90	2.74	2.92*
packaging	2.27	2.39	2.75*	2.47	2.67
price	4.12*	4.06	4.02	4.00	3.75
discount and promotion	4.00*	3.92	3.88	3.79	3.75
method of payment	3.43	3.58	3.68	4.32*	3.75
place of purchase	3.66	3.56	3.73	3.79*	3.79*
how and by whom the product is promoted	1.87	2.05	2.35	2.47*	2.08
that the product is promoted by the influencer	1.32	1.49	1.62	1.68*	1.54
recommendation from friend	3.16*	3.09	3.12	2.42	3.08

Note: The highest values were highlighted for each question regarding the degree of importance of the examined factors for the purchase of fashion products in relation to the percentage of monthly income allocated to the purchase of fashion products during the pandemic.

Source: author's calculation

The χ^2 -test found a statistically significant difference in the respondents' answers according to the percentage allocated from the monthly income for the purchase of fashion products during the pandemic, in relation to the degree of importance of almost all the examined factors (quality of materials and workmanship, product design, product originality, geographical origin, brand awareness, product packaging, product price, payment method, product promotion, the product promoted by an influencer, recommendation from friends, where $p < 0.05$), except for the following factors: discount and promotion, place of purchase, where $p > 0.05$.

5. Results and discussion

The present results of this empirical research have proved the significant impact of the pandemic on consumer behavior, similar to what other research has shown for everyday products and the most widespread habits (cf. Baker et al., 2020; Cohen, 2020; Koch et al., 2020; Esposti et al., 2021; Mamula Nikolić et al., 2022). Unlike them, in our research, we focused only on fashion products. There is a statistically significant difference in the answers of respondents – consumers in Serbia according to gender concerning the degree of importance of the examined factors for the purchase of fashion products, both for the periods before and during the pandemic, the alternative hypothesis H1 is confirmed. As it has been determined that there is a statistically significant difference in the answers of respondents in Serbia according to age categories (generations of consumers) about the degree of importance of the examined factors for the purchase of fashion products, both for the periods before and during the pandemic, the alternative hypothesis H2 is confirmed. The alternative hypothesis H3 is also confirmed, as it has been established that there is a statistically significant difference in the answers of consumers in Serbia according to the percentage of monthly income allocated for the purchase of fashion products to the degree of importance of the examined factors for the purchase of said products, both for the periods before and during the pandemic. The research null hypothesis H0 is refuted. As all the alternative hypotheses of the research have been confirmed, the null hypothesis is not confirmed, that is, it was determined that there is a statistically significant difference in the answers of respondents – consumers in Serbia concerning the degree of importance of the examined factors for the purchase of fashion products, both for the periods before and during the pandemic.

The research results show that the pandemic has led to a decrease in the purchase of fashion products, which certainly represents a serious blow to the fashion industry and requires maximum commitment and precision in determining the target groups of consumers, their characteristics, habits, and choices. Moreover, certain consumer habits of different groups of respondents have changed to a certain extent during the pandemic compared to the period before the COVID-19 pandemic. This represents an additional challenge for manufacturers of fashion products who must, in a time of recession, show readiness and exceptional motivation to establish communication with their consumers as best as possible to understand their changed needs and provide an adequate response to those needs. Marketing strategy has put the consumer in focus more than ever before. If it is a matter of products for older generations, then the quality of the workmanship and the material offered should be better, while the geographical origin of fashion products should also be considered for these generations. If the focus is on members of Generation Z, then influence marketing is the right choice for marketing strategists. During the pandemic, customers became more price sensitive, paid more attention to prices and discounts, and also to the place of purchase (physical store or online), which

became an important issue for them, as well as the method of payment. To a greater extent, they opted for online shopping, which is a great advantage for manufacturers and sellers of fashion products, since online sales require significantly less costs than sales in physical stores.

The limitation of the paper is reflected in the analysis of only selected factors that influence the purchase of fashion products. Personal affinities, such as for example colors, can influence the choice of a certain fashion product. Also, it would be important to examine how many consumers buy fashion products because they lack them in terms of satisfying a certain need or more out of a desire to follow trends; as well as how important the concepts of sustainable fashion and biodegradable materials are to consumers when making a purchase decision. It would be important to examine the behavior of consumers of fashion products in the region and compare those results, which would be useful for the export of fashion products to the countries of the region.

This research on the topic of factors that influence decision-making on the purchase of fashion products is the first research in this field in Serbia that includes an analysis of consumer behavior, both before and during the COVID-19 pandemic. In general, the field of the fashion industry is not sufficiently represented in scientific research, and the results of this research offer knowledge of the more important factors and those that are not, for the decision-making process by consumers regarding the purchase of fashion products (clothes, shoes and fashion accessories) for the period before, as well as during the pandemic period, with analyzes by gender, generations of consumers and their average monthly income. This research can be stimulating for further analysis of consumer behavior of fashion products in countries in the region.

6. Conclusion

The factors influencing the purchase of fashion products are multifaceted and interconnected, involving various personal, social, psychological, and situational influences. The quality of materials and workmanship, product design, originality of the product, prices of fashion products, discounts or promotions, geographical origin, brand awareness, packaging, and influencer promotion are among the key factors that can significantly impact consumers' purchase decisions in the context of fashion products. These factors can influence consumers' perception of product quality, value, authenticity, exclusivity, and desirability, and ultimately shape their purchase behavior. It is important for fashion marketers and retailers to understand and consider these factors in their marketing strategies, particularly in the dynamic and evolving landscape of the fashion industry, including the increasing importance of digital marketing and social media influencers. Further research and analysis

of these factors in the context of specific consumer segments, cultural differences, and market trends can provide valuable insights for fashion businesses to better understand and target consumer preferences, and develop effective marketing strategies.

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Faktori koji utječu na kupovinu modnih proizvoda prije i tijekom pandemije COVID-19: primjer Srbije

Karolina Perčić¹, Milica Slijepčević², Pedja Ašanin Gole³

Sažetak

Cilj ovog rada je analizirati čimbenike koji su najviše utjecali na potrošače pri kupnji modnih proizvoda, te čimbenike koji su potrošačima bili najvažniji tijekom pandemije COVID-19, kao i postoje li razlike između razdoblja prije pandemije i razdoblje nakon njega. Dostupna istraživanja o povezanosti pandemije i kupovnih navika potrošača te čimbenika koji utječu na kupnju proizvoda većinom su se bavila robom široke potrošnje, potaknuta inicijalnim stvaranjem zaliha higijenskog materijala i hrane, knjiga, opreme za rekreaciju i sl. Kvantitativno empirijsko istraživanje putem online ankete provedeno je na namjenskom uzorku od 1002 punoljetna ispitanika na području Srbije u razdoblju od ožujka do lipnja 2021. godine. SPSS je korišten za obradu i analizu podataka te za interpretaciju rezultata istraživanja. Uz deskriptivnu statistiku (distribucija frekvencija, srednja vrijednost, standardna devijacija) korištena je i komparativna statistika (χ^2 -test, ANOVA, t-test). Promjena odnosa prema potrošnji dovela je do uvođenja novog sustava vrijednosti potrošača pri kupnji modnih proizvoda. Razumijevanje ovih čimbenika pomoći će modnoj industriji da pronađe nove pristupe kako bi zadovoljila promijenjene kupovne navike potrošača.

Cljučne riječi: modna industrija, modni proizvodi, ponašanje potrošača, čimbenici kupnje, Covid-19 pandemija

JEL klasifikacija: D9, L67, M31, M37

¹ Docent, Moderna poslovna škola, Terazije 27, Beograd, Srbija. Znanstveni interes: marketing i obrazovanje. Tel: + 381 63 361 319. E-mail: karolina.percic@mbs.edu.rs. ORCID: 0000-0003-4571-1765.

² Izvanredni profesor, Beograd Metropolitan Univerzitet, Fakultet za menadžment, Fakultet digitalnih umjetnosti, Beograd, Srbija. Znanstveni interes: marketing, obrazovanje i modna industrija. Tel: + 381 11 203 0885. E-mail: milica.slijepcevic@metropolitan.ac.rs. ORCID: 0000-0002-0431-2998.

³ Viši predavač, Ljubljana School of Business, Tržaška cesta 42, Ljubljana, Slovenija. Znanstveni interes: strateško komuniciranje, upravljanje dionicima. Tel: + 386 1 2444 214. E-mail: pedja.asanin.gole@e-studij.eu. ORCID: 0000-0003-2617-8598.

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Validity and reliability of consumer attitude toward online shopping scale*

Zührem Yaman¹, Onur Köksal²

Abstract

With the rapid developments in information technologies in recent years, the Internet has more place in our daily lives, and as a result, the Internet, used as a means of communication at first, has resulted in changes in the shopping preferences of today's consumers. Online shopping is one of the most drastic of these changes. It is believed that having more information about the reasons for consumer preferences on shopping online or avoiding online shopping and defining the processes related to online shopping conducted by businesses can contribute to the efficiency of online shopping. In the present study, an attitude scale toward online shopping is developed and this scale is tested for validity and reliability. There are various attitude scales toward online shopping in the related literature. The purpose of developing this scale is to define new attitudes of consumers toward online shopping that have adapted to changing conditions of the world and technology. With the opinions of 5 academics in the fields of marketing and business management, the number of items, which was 24 on the draft scale, was reduced to 20. For the pre-study, data were collected from 60 consumers and analyzed. A pilot study of the draft scale was conducted on 154 consumers. At the end of this study, a scale consisting of 2 dimensions and 14 items with high validity and reliability was developed. Obtained findings are presented in detail in the paper.

Keywords: online, online shopping, marketing, attitude, attitude scale

JEL classification: M03, M31

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¹ Associate Professor, Selçuk University, Beyşehir Ali Akkanat Faculty of Tourism, Selçuklu-Konya, Turkey. Scientific affiliation: service marketing, consumer behavior, product and brand management. Phone: + 90 332 512 05 45. E-mail: zyaman@selcu.edu.tr / zuhremyaman@gmail.com. ORCID: 0000-0001-9796-7063.

² Professor, Selçuk University, Beyşehir Ali Akkanat Faculty of Tourism, Selçuklu-Konya, Turkey. Scientific affiliation: education and teaching programmes, educational administration, education technologies. Phone: +90 0332 223 11 07. E-mail: onurkoksal@selcuk.edu.tr / onurkoksal38@hotmail.com. ORCID: 0000-0003-0798-3620.

1. Introduction

With the acceleration in Internet use in the 21st century, there were developments in information and technologies, which were the greatest steps toward being an information society (Kuimova et al, 2017). This way, the number of Internet users increased, and important opportunities formed for online shopping (Tsao and Tseng, 2011; Ahmadian and Ferdosipour, 2021), and traditional commerce transformed into modern or e-commerce with the new technologies. As a result, there were drastic increases in the number of consumers, who shop online, and the sales made on online shopping sites of businesses worldwide (Akbar and James, 2014; Karaca, 2020). Today, individuals attach great importance to social media and use it as a means of communication, which resulted in changes in their traditional purchasing attitudes affecting their online shopping attitudes (Bayrakdaroğlu et al., 2017; Waqar, 2020). Various factors affect consumer preferences in online shopping which have advantages and also risks. Consumer preferences for shopping using the Internet and their intentions for Internet use are defined by their attitudes toward online shopping (Yağcı et al., 2017; Rad and Ferdosipour, 2020).

Consumer purchasing attitudes play an important role in the consistency, profitability, and forming customer loyalty in online shopping. To be successful in their operations, businesses need to know what affects the purchasing behaviors of consumers, who conduct online shopping activities and act accordingly. Businesses can develop important strategies that affect purchasing behaviors of consumers by focusing on understanding whether consumers have anxiety or hesitations about shopping online. This way, the number of consumers, who prefer online shopping, will increase. Businesses must meet consumer demands and expectations and know the factors that affect their attitudes and behaviors to increase the tendency toward online shopping.

The hypotheses of this research are as follows:

1. Examine the perceived benefits and risks of online shopping
2. Develop a scale measuring the perceived benefits and risks of online shopping

Research questions are as follows:

- 1) What affects the purchasing behaviors of consumers?
- 2) Do consumers have anxiety or hesitations about shopping online?
- 3) What are the consumer demands and expectations that affect their attitudes and behaviors to increase the tendency toward online shopping?

With this in mind, the present study aims at developing a scale adapted to changing world and technological conditions to define new attitudes of consumers toward shopping online.

2. Literature review

An increasingly popular tool for facilitating information search, selection, and purchase is the Internet. The extent to which consumers are now using the Internet as a channel for shopping highlights the need to better comprehend and anticipate consumers' online shopping behaviors. Wolfenbarger and Gilly (2001) noted in previous research that making decisions about strategy, technology, and marketing as well as web site design can and should be based on a clear understanding of what drives consumers to shop online. Both the perceived benefits and risks of online shopping are anticipated to play important roles in explaining consumers' current shopping behaviors and predicting their intention to continue shopping online, given that online shoppers are known to be motivated to maximize benefits and minimize risks.

2.1. Online Shopping

Online shopping refers to customers' shopping using websites (Broekhuizen and Huizingh, 2009; Pop, 2020). With online shopping, consumers can make research about any product or service whenever and wherever they need and want, and they can compare between options (Demirel, 2010). An online shopping site is an online infrastructure version, which enables shopping using the Internet and where all activities related to traditional purchasing are done through Internet (Yoo and Donthu, 2001; Kalafatoglu, 2021).

Online shopping behaviors have changed with the increase in the number of businesses, which formed the infrastructure supporting online shopping. While consumers have to shop in stores to meet their needs and wants in traditional shopping, today this is no longer a necessity. Now products and services can be accessed for more economic prices, more shortly and easily (Fitsumbirhan et al., 2020; Simbarashe and Zirima, 2020; Utemissova et al., 2021). These advantages provided by online shopping for customers increased the number of consumers, who prefer it, yet create intense pressure on businesses. Businesses need to be preferable and have a competitive advantage on the Internet. The most important factor in being preferred and having a competitive advantage is providing satisfaction and trust by offering high-quality, high-speed, and low-price products and services.

Today the living conditions of consumers have changed, they want to have more time for themselves by saving time, their needs have varied, online shopping has a cost advantage over traditional shopping, it is possible to compare the price and quality of products on e-commerce sites, consumers can access the products they need immediately and they have access to consumer comments on certain products. These are among the most prominent of the many reasons that make consumers prefer online shopping (İzgi and Şahin, 2013; Ağaç and Solak, 2016). The consumers

can look into products they like without any time or space limitations, they can access user information about the products, make use of the experiences of previous customers and decide accordingly. It is very important to know about consumers' shopping behaviors since it is not very easy to define their needs and wants and the variables that motivate them without understanding consumer behaviors. Therefore, it is necessary for marketing experts that pre-define the demands, expectations, and preferences of the target audience-the consumers-are pre-defined and they develop strategies accordingly (Gürbüz et al., 2015; Turkmen et al., 2020). Consumers' online shopping attitudes toward the products or services may change positively or negatively when their demands and expectations are met.

2.2. Purchasing attitudes in online shopping

The most important factor for businesses to compete among the businesses that have online sales operations is tracking the changes in consumer behaviors. Because online shopping is affecting economic, commercial, and social life more and more every day (Vijayarathy, 2004; Suteyeva and Sarsembayeva, 2021), online consumer behavior has become related to many disciplines, such as information systems, marketing, administrative science, psychology and social psychology (Hoffman and Novak, 1996; Koufaris, 2002; Gefen et al., 2003; Pavlou, 2003; Cheung et al., 2005; Pavlou and Fygenson, 2006; Zhou et al., 2007; Chen, 2009).

Attitude is defined as individuals' constant feelings, intentions, partiality, impartiality, or evaluations of an object or an idea (Durmaz, 2008). According to Peter and Olson (1994), it refers to human beings' evaluation of a phenomenon and covers a range of evaluations including products, services, or ideas. Behavioral, cognitive, and emotional elements should be brought together effectively to form a new attitude or change an existing one. The cognitive aspect is formed of opinions, knowledge, and beliefs related to the attitude, while the emotional aspect includes positive (happiness, joy, appreciation, and satisfaction) or negative (regret anger, boredom, fear, etc.) feelings rather than objective information (Koç, 2007). The behavioral aspect is defined as the transformation of attitude to a behavior (Kalinina et al., 2021; Koç, 2007; Keser et al., 2021). The studies in the related literature on the factors affecting businesses' e-commerce operations mostly focus on the individuals' attitudes toward online shopping and their intention to shop. Studies report that the consumers, who use the Internet more frequently, shop online and they exhibit more positive attitudes toward online shopping (Bellman et al. 1999; Alao et al., 2021; Tugun, 2021).

With the increase in the number of online shopping sites, virtual stores are replacing traditional stores. This radical change in the form of stores has directly affected the decision-making mechanisms of consumers (Koufaris 2002; Tezer, 2020). Businesses that have the opportunity to sell their products and services online have

had to develop different ways to offer consumers more value due to increasing competition. By enriching the values offered to customers, businesses can make consumers develop positive attitudes toward themselves. Even the Internet provides its users with advantages such as saving time, accessing more information in a shorter time, competitive prices, and more options, the consumers often feel timid about shopping online and prefer traditional shopping methods (Iucu, 2021).

Improving the quality of virtual store environments directly affects customer satisfaction (Ateş, 2017). In addition, a well-designed virtual store can define the decision-making styles of consumers by stimulating them emotionally and making them develop positive attitudes. For these reasons, businesses aim at creating a positive effect on consumers' purchasing intentions by making them spend more time on their websites. This operation is among the primary objectives of online stores (Hsu et al. 2012). Studies show that consumers, who go online to look into a product for any reason, have more positive attitudes toward online shopping and are more prone to shopping online (Bellman and Johnson, 1999).

Sam and Chatwin (2015) tried to define online consumer decision-making styles to be adapted to online shopping environments. This scale they developed focuses on the criteria to be considered about the products and the factors affecting online shopping. According to the research conducted with this scale, the most important factors affecting consumers' decision on online purchasing or rejecting any product or service are privacy, security, saving time, convenience, and pleasure (Udo, 2001; Cockburn and McKenzie, 2001; Liao and Cheung, 2001; McKnight et al. 2002; Abu-Rumman, 2021). According to Akbar and James (2014), consumers' purchasing decisions are formed by perception, motivation, learning, attitude, and beliefs, and studies show that consumer attitudes affect customer satisfaction, trust, and loyalty. Chang and Chen (2009) state that the main reason for customers to not prefer online shopping is the lack of perception of trust. Therefore, the most important factor affecting consumers' online shopping attitudes is safety. One of the most important reasons that prevent consumers from shopping online or make them hesitate is insecure payment methods or operation systems (Nazir et al., 2012; Kaldiyarov et al., 2019).

While consumers find the Internet to offer a number of advantages, the Internet tends to amplify some of the uncertainties involved in any purchasing process. Consumers perceive a higher level of risk when shopping on the Internet than in traditional retail formats (Lee and Tan, 2003; Tan, 1999). This is not surprising, as studies have consistently shown that consumers perceive a higher risk of non-store purchases, such as shopping over the phone (Akaah and Korgaonkar, 1989), mail order (Van den Poel and Leunis, 1999), catalog (Eastlick and Feinberg, 1999) and direct selling (Peterson et al., 1989).

Two types of risk have been linked to online shopping: financial risk and product performance risk (Bhatnagar and Ghose, 2004a, 2004b; Bhatnagar et al., 2000).

Three types of risk—product performance risk, financial risk, and time/convenience risk—were related to the frequency of online search with purchase intent, according to other studies (Forsythe et al., 2002; Forsythe and Shi, 2003). Although there are similar studies that have been done before, a current study is needed because these studies are out of date and due to new technological developments.

3. Methodology

Research methodology is explained through applied approach of general screening model. Also, the process of developing the scale Attitude toward online shopping is presented.

3.1. Research model and work group

The present study adopts a general screening model. The general screening model refers to an implementation on a universe or group, or sample from a universe formed of many elements to reach a general judgment of that universe (Karasar, 2005). With the screening model, researchers can have a general opinion about a general group. The present study is conducted by analyzing data collected from 154 participants selected randomly.

3.2. The Process of the development of the attitude toward online shopping scale

In the process of developing the scale of attitude toward online shopping, individuals selected online. They were shared a link to participate in the research. Therefore, participants were selected randomly. and were asked to write a text expressing their feelings and thoughts about online shopping. This question has been asked in terms of product and services. These texts written by individuals were analyzed and the statements expressing their attitudes were selected. Additionally, the related literature was reviewed to study the items in the scales about attitudes toward online shopping. An item pool was formed with the statements from the texts and items from the literature review. In this process, 7 experts of marketing were given the task to share their opinions and mark each statement as appropriate, not appropriate, and appropriate with revisions in terms of marketing strategies. Opinions of 5 faculty members from the department of Turkish Language were asked to avoid ambiguity. The items in the scale were graded as *Totally Agree*, *Agree*, *Partially Agree*, *Agree a Little*, and *Totally Disagree*. While ordering the items within the scale, the items were presented unorderly to avoid leading participants. Then, 4 items were removed from the item pool, and 1 item was revised based on the opinions of the academics from the department of Turkish

Language. This way, a 20-item draft scale was obtained. Finally, an instruction informing about the purpose of the scale was included at the beginning of the scale. The draft scale was tested on 154 individuals online.

4. Empirical data and analysis

In addition to expert opinions, item analysis was conducted by calculating the correlations between the answer to each item and the total score from the scale for validity. Analysis results are presented in findings. According to the analysis, the scale had two dimensions, and the items were ready for factor analysis.

Exploratory factor analysis (EFA) was conducted to define the structure of the scale. Factor structure can be defined completely with EFA (Daniel, 1995). Confirmatory factor analysis (CFA) was conducted on AMOS-22 package software to confirm the structure defined with EFA. Interpretations of the fit index values were based on the criteria defined by Schermelleh-Engel et al. (2003) and Byrne (2013). Standardized factor load values, regression coefficients, and t statistics for each item were obtained with CFA. Additionally, because the non-standardized estimate value was fixed to 1 for one item in each factor, t statistics were not calculated for 2 items, yet it was observed that factor load values for factor ways were high. To improve the fit index values in CFA, modification ways were defined between items 8 and 12 in the first factor and items 14 and 20 in the second factor. Cronbach Alpha internal consistency coefficient was calculated to test the applicability of the scale, and the development steps for attitude toward online shopping scale were completed.

Tavşancıl (2002) defines construct validity as the ability of a scale to measure the whole structure to be measured. Construct validity enables the explanation of what the results obtained from the scale are related to (Akyüz, 2018). To define the construct validity of the scale, exploratory and confirmatory factor analyses were conducted. Before the analysis, the adequacy of the number of the sample on which the scale is implemented should be defined (Kahn and Best, 2017). Kaiser-Meyer-Olkin (KMO) value was calculated to define the adequate sample size. The closer the obtained value is to 1, the more perfect it is, and the values below .50 are considered unacceptable (Tavşancıl, 2002), since the distribution in the universe should be normal for factor analysis (Karakaş and Turanlı, 2008). The distribution in the universe was analyzed with the Barlett test. According to the results, the KMO coefficient of the scale was over .50 and the Barlett test significance value was 0.00, which indicates that the data obtained from the participants were fit for factor analysis. Following these procedures, EFA was conducted to define the factor structure of the scale. To define the factor structure of the scale Component Matrix and Rotated Component Matrix-Varimax analyses were conducted, the purpose of which was meeting the two requirements for an item to be included in a factor in

the scale. These values should be 0.35 more than the load of the factor the item to be included in and the load value of the item in the factor should be 0.10 more than its load values in other factors (Tavşancıl, 2002). According to the results of the factor analyses conducted on 20 items in the scale with Rotated Component Matrix-Varimax analysis the KMO coefficient was 0.913, and the Barlett significance coefficient was 0.00. (Table 1).

Table 1: Factor Names and EFA Results for Consumer Attitude Toward Online Shopping Scale

Item No		Factors and Items	Cronbach Alpha Coefficient	Variance Explanation Percentage	Eigenvalues
		1 st Factor	0.897	49.762	6.967
Item 8	I prefer online shopping due to practicality.	0.784			
Item 4	I prefer shopping online to save time.	0.750			
Item 17	I don't have to go out to shop online.	0.747			
Item 5	I prefer online shopping as it offers many options for products.	0.738			
Item 18	I prefer online shopping due to return guarantee.	0.713			
Item 2	I prefer online shopping due to convenience.	0.669			
Item 19	Products in online shopping attract my interest more.	0.640			
Item 12	I prefer online shopping because the products are cheaper.	0.639			
		2 nd Factor	0.878	11.923	1.669
Item 14	I don't prefer online shopping due to my lack of knowledge.	0.832			
Item 20	Online shopping has always frightened me.	0.793			
Item 9	I don't feel safe shopping online.	0.765			
Item 10	I don't like shopping online.	0.736			
Item 3	I have difficulty shopping online.	0.707			
Item 6	I don't prefer online shopping as I cannot see the product live.	0.618			

KMO Value = 0.913, Total Explained Variance = 61.685, Cronbach Alpha Coefficient=0.714
 Source: Author's calculation

After all the aforementioned procedures, there were 14 items left on the scale. Table 2 below presents the common factor total correlations for the items in the scale.

Table 2: Common factor total correlations of items

Items	Corrected Item	Total Correlation
Item 4	0.679	
Item 8	0.724	
Item 17	0.396	
Item 18	0.516	
Item 5	0.571	
Item 2	0.714	
Item 19	0.524	0.714
Item 12	0.413	
Item 14	0.571	
Item 20	0.662	
Item 9	0.465	
Item 10	0.645	
Item 3	0.518	
Item 6	0.464	

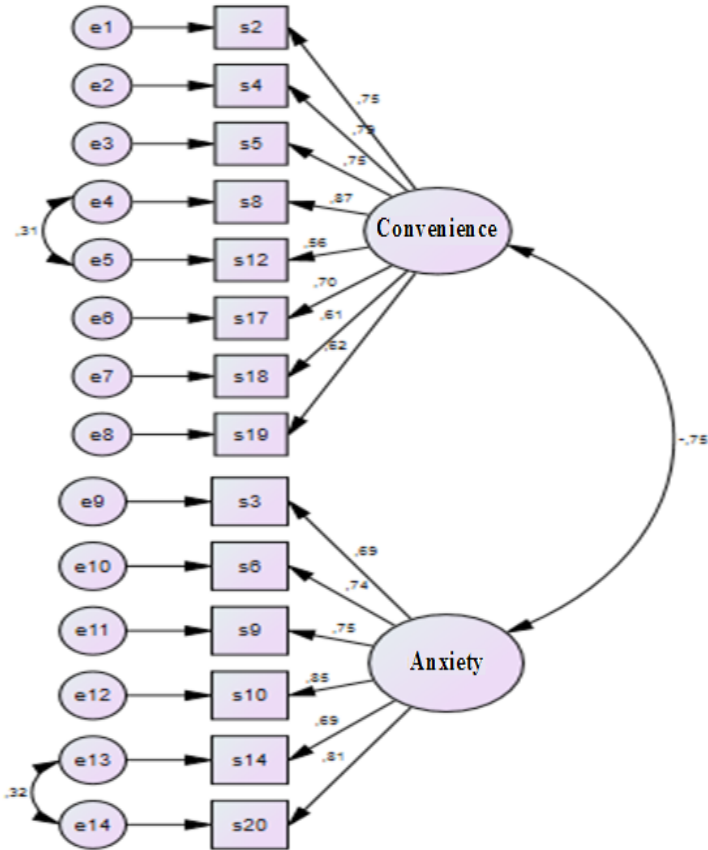
Source: Author's calculation

According to Table 2, common factor variances of the items range between 0.396 and 0.724, and factor load values of these items are under two factors. After all the procedures, a valid two-factor scale with 14 items was obtained.

Following the EFA, CFA was done on 14 items to define the extent to which they measure.

The CFA was conducted in two steps. At the first step, fit statistics and modification index results were obtained based on CFA results. Modification indices were studied then for the fitness of factor structure of items with the data. Based on the modification results, modification ways were defined between items to improve item fit index values.

Figure 1: 1st level 2-factor CFA Model for Consumer Attitude toward Online Shopping Scale



Source: Author's elaboration

Figure 1 on the 1st level 2-factor CFA model for Attitude toward Online Shopping Scale presents the standardized factor load values, regression coefficients, and t statistics obtained with confirmatory factor analysis.

Table 3: Fit Index Values from the CFA

Fit Index	CFA	Perfect Fit Criteria	Acceptable Fit Criteria	Evaluation
$\chi^2/ (df)$	1.75	$0 \leq \chi^2 \leq 3$	$3 < \chi^2 \leq 5$	Perfect Fit
RMSEA	0.068	$0 \leq RMSEA \leq 0.05$	$0,05 < RMSEA \leq 0.08$	Acceptable Fit
TLI/NNFI	0.95	$0,97 \leq TLI \leq 1.00$	$0,95 \leq TLI < 0.97$	Acceptable Fit
CFI	0.96	$0,97 \leq CFI \leq 1.00$	$0,95 \leq CFI < 0.97$	Acceptable Fit
NFI	0.90	$0,95 \leq NFI \leq 1.00$	$0,90 \leq NFI < 0.95$	Acceptable Fit
AGFI	0.86	$0,90 \leq AGFI \leq 1.00$	$0,85 \leq AGFI < 0.90$	Acceptable Fit
GFI	0.90	$0,95 \leq GFI \leq 1.00$	$0,90 \leq GFI < 0.95$	Acceptable Fit

Source: Author’s calculation

According to the fit index values of the 1st level, the 2-factor CFA model formed with a 2-factor 14-item structure defined with EFA presented in Table 5, $\chi^2/ (df)$ value was calculated as 1.75, which indicates perfect fit (Byrne, 2013). RMSEA fit index, which was calculated at 0.068, indicates an acceptable fit. TLI/NNFI, CFI, NFI, AGFI and GFI values also indicate acceptable fit (Schermelleh-Engel et al., 2003). Consequently, the 2-factor, 14-item structure defined before was confirmed with the data collected from 154 participants.

Table 4: Measurement Model Results

			Standardized Factor Loads	R ²	T Statistics	p
i2	<---	Factor1	0.76	0.57	Constant	
i4	<---	Factor1	0.79	0.63	10.47	.000
i5	<---	Factor1	0.75	0.56	9.83	.000
i8	<---	Factor1	0.87	0.76	11.59	.000
i12	<---	Factor1	0.56	0.32	7.01	.000
i17	<---	Factor1	0.70	0.48	9.03	.000
i18	<---	Factor1	0.61	0.37	7.83	.000
i19	<---	Factor1	0.62	0.38	7.94	.000
i3	<---	Factor2	0.70	0.48	Constant	
i6	<---	Factor2	0.74	0.55	8.72	.000
i9	<---	Factor2	0.76	0.57	8.83	.000
i10	<---	Factor2	0.85	0.72	9.78	.000
i14	<---	Factor2	0.69	0.47	8.06	.000
i20	<---	Factor2	0.81	0.66	9i41	.000

Source: Author’s calculation

As presented above in Table 4, factor load values of the items in the first-factor range between 0.61 and 0.87. The R^2 value for the first factor shows that the highest contribution is from item 8 with 0.76 and the lowest is from item 18 with 0.37. According to the t fit statistics of the items in the first factor, all items are fitted with the first factor according to $p < .05$, therefore they can all be included in the scale.

Factor load values of the items in the second-factor range between 0.69 and 0.85. The R^2 value for the second factor shows that the highest contribution is from item 10 with 0.72 and the lowest is from item 14 with 0.47. According to the t fit statistics of the items in the first factor, all items are fitted with the second factor according to $p < .05$, therefore they can all be included in the scale.

Cronbach Alpha internal consistency value was calculated to test the reliability of the scale. The reliability coefficient for the whole scale was found as 0.714, which indicates that the scale is highly reliable. All conducted analyses show that the developed scale is a two-dimensional scale with high validity and reliability.

5. Results and discussion

The development of the scale relies on appropriate scale development procedures, supported by information gained from analyses. The purpose of developing this scale has been to define new attitudes of consumers toward online shopping, which is adapted to the changing world and technological conditions. In the present study, scale development steps have been followed by a literature review, then a 20-item pool has been formed with the data collected from the randomly selected consumers, who were the target audience of the scale. After getting expert opinions for the items in the item pool, EFA was conducted on the draft scale, which revealed that the scale consisted of 14 items and 2 dimensions. Then, CFA has been conducted on 14 items using AMOS-22 package software. All values obtained from CFA confirm the construct obtained from EFA. For the reliability of the scale, Cronbach Alpha's internal consistency value has been calculated. A 14-item attitude scale with high validity and reliability has been obtained, which can be used to measure consumer attitudes toward online shopping.

The related literature presents various attitude scales and field studies for online shopping. Ateş (2017) developed a 21-item 3-dimension Customer Perceptions of Online Shopping Scale. Cronbach Alpha reliability of this scale was found as 0.95. However, in our study, the reliability coefficient for the whole scale has been found as 0.714.

Saydan and Nart (2009) conducted a scale development study titled Inducement for Online Consumers: Determinants of Persuasion Process on the Virtual Arena. This attitude scale consisted of 5 dimensions and 21 items. The reliability coefficient

of the scale was found as 0.75, as the average of each dimension. Similar to the previous study, this study shows that the reliability coefficient for the whole scale is 0.714, which indicates the scale is highly reliable.

Zhou, Zhang (2007), and Hassan (2010) also developed scales to define consumer attitudes toward online shopping. In studies of Yağcı et al. (2017) they developed a 7-dimension and 33-item scale with a reliability coefficient of 0.70. In this study, the reliability coefficient for the whole scale is found as 0.714, which indicates that the scale is highly reliable and relatable.

According to these findings, it may be said that these scales are highly reliable even if their reliability coefficients differ in terms of online shopping.

Consumers' attitudes toward online shopping can be defined with this scale, and therefore businesses can conduct studies to affect and guide consumer behaviors related to online marketing. The 14-item final version of the scale is presented below in Table 5.

Table 5: Consumer Attitudes towards Online Shopping Scale

	Totally Agree	Agree	Partially Agree	Partially Disagree	Totally Disagree
I prefer online shopping due to convenience.					
I have difficulty shopping online.					
I prefer shopping online to save time.					
I prefer online shopping as it offers many options for products.					
I don't prefer online shopping as I cannot see the product live.					
I prefer online shopping due to practicality.					
I don't feel safe shopping online.					
I don't like shopping online.					
I prefer online shopping because the products are cheaper.					
I don't prefer online shopping due to my lack of knowledge.					
I don't have to go out to shop online.					
I prefer online shopping due to return guarantee.					
Products in online shopping attract my interest more.					
Online shopping has always frightened me.					

Source: Author's representation

6. Conclusion

In this study, the type and intensity of perceived online shopping risks differentiate online visitors and purchasers. Online shoppers may be categorized as visitors (those who search for product information through the Internet without purchasing online) or purchasers (those who purchase online). The scale developed here captures a variety of reasons why people shop online (or choose not to purchase online).

In the 5-point Likert scale developed within the present study, higher scores from the scale indicate positive attitudes s online shopping, while lower scores indicate negative attitudes. Therefore, the scale can be utilized in any study on online shopping. The review of the related literature did not present any contemporary scales to measure consumer attitudes toward online shopping, which makes the present study important.

Online retailers could use the scale when it comes to creating appealing website environments and developing marketing communication strategies. Retailers benefit from gaining a deeper understanding of distinct customer segments. Websites may need to be redesigned, for instance, to address concerns regarding security, privacy, and order fulfillment in order to convert some visitors into customers. Then again, to more readily serve online purchasers, it could be important to stress convenience and choice.

Online retailers could use the scale to study the direction and strength of various benefits and risk perceptions among their current customers in addition to shopper segmentation. An online retailer can gain additional insight into the extent and types of online shopping perceptions that influence its customers by creating an online benefit/risk profile of its current customer base. In light of such information, the online retailer would have the option to situate their blemish marketing procedures to draw in new web-based customers (or to retain current buyers) by tending to the shopping impression of various customer gatherings. Examining perceptions of online shopping over time offers online retailers guidance for expanding their operations. For example, despite the fact that perceptions of the monetary gamble and time/comfort risk have been reduced with the reception of cutting-edge Web technology, item risk stays a key component influencing online buying in numerous item classifications. Therefore, improving online sales may be made possible by lowering consumer perceptions of product risk.

Retailers may also use the scale to determine how benefit and risk perceptions affect outcomes of online purchases, such as satisfaction and loyalty. Retailers may examine, for instance, whether customers who are strongly driven by utilitarian advantages are more likely than customers who are strongly motivated by hedonic benefits to be pleased and return to the online retailer. In conclusion, the scale created here may offer online retailers a tool to use to examine the reasons why

current and potential website visitors shop online, providing retailers with customer information that may inform future website design and marketing strategies.

New studies can be done with wider participation. In this study, the number of participants remained limited, as people tried to be reached online.

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Valjanost i pouzdanost stajališta potrošača prema online kupovnoj skali

Zührem Yaman¹, Onur Köksal²

Sažetak

S obzirom na brzi razvoj informacijskih tehnologija posljednjih godina, internet ima više mjesta u našim svakodnevnim životima, a kao rezultat toga internet, koji se koristio kao sredstvo komunikacije u početku, rezultirao je promjenama u željama kupaca današnjih potrošača. Online kupovina je jedna od najdrastičnijih promjena. Vjeruje se da ima više informacija o razlozima za preferencije potrošača u vezi s kupovinom na internetu ili izbjegavanjem online kupovine te definiranjem postupaka povezanih s internetskom trgovinom koji obavljaju poduzeća mogu doprinijeti učinkovitosti internetske kupovine. U ovoj studiji razvijeno je stajalište prema online kupovanju, a ta se skala ispituje radi valjanosti i pouzdanosti. Postoje različite skale stava prema online kupovini u relevantnoj literaturi. Svrha izrade ove skale je definiranje novih stavova potrošača prema online kupovini koji su prilagođeni promjenjivim uvjetima svijeta i tehnologije. S obzirom na mišljenja pet znanstvenika u području marketinga i upravljanja poslovanjem, broj predmeta, koji je bio 24 na nacrtu skale, smanjen je na 20. Za prethodno istraživanje podaci su prikupljeni od 60 potrošača i analizirani. Pilot-studija nacрта ljestvice provedena je na 154 potrošača. Na kraju ove studije, napravljena je skala koja se sastoji od dvije dimenzije i 14 predmeta s visokim rokom valjanosti i pouzdanosti. Dobiveni rezultati detaljno su prikazani u ovom znanstvenom radu.

Ključne riječi: online, online kupovina, marketing, stav, skala stavova

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¹ Izvanredni profesor, Selçuk University, Beyşehir Ali Akkanat Faculty of Tourism, Selçuklu-Konya, Turska. Znanstveni interes: marketing usluga, ponašanje potrošača, upravljanje proizvodima i markama. Tel.: +90 332 512 05 45. E-mail: zyaman@selcu.edu.tr / zuhremyaman@gmail.com. ORCID: <https://orcid.org/0000-0001-9796-7063>.

² Redoviti profesor, Selçuk University, Beyşehir Ali Akkanat Faculty of Tourism, Selçuklu-Konya, Turska. Znanstveni interes: obrazovni i nastavni programi, obrazovna administracija, obrazovne tehnologije. Tel.: +90 0332 223 11 07. E-mail: onurkoksal@selcuk.edu.tr / onurkoksal38@hotmail.com. ORCID: <https://orcid.org/0000-0003-0798-3620>.

Productivity shocks and industry specific effects on export and internationalisation: VAR approach*

Maja Bašić¹, Mile Bošnjak², Ivan Novak³

Abstract

This study examines the industry-specific effects of productivity shocks on exports and the internationalisation of the largest Croatian exporters. In order to answer two research questions: (1) Which hypothesis, the productivity-led hypothesis or export-led hypothesis, holds in the case of the largest Croatian exporters? (2) Are the effects of productivity shocks on exports and internationalization sectoral dependent, and in what way? The authors tested 300 largest exporters' micro-financial data for the 2006-2015 period by using a vector autoregression (VAR) method. Three productivity measures examined are total factor productivity, labour productivity and capital productivity. The results imply that productivity-led hypothesis holds for majority of Croatian largest exporters' sectors. Rather than a specific export-led hypothesis, a bi-directional flow has proved to have greater influence on several industrial sectors, including professional and scientific services and administrative services sectors, and to a lesser extent, transport and warehousing, accommodation and food sectors. It is predominantly negative in terms of TFP and positive in terms of labour productivity (agriculture, electricity and gas supply, wholesale and transport and warehousing, and information and communication) and capital productivity (electricity and gas supply). Managerial and policy implications of productivity shocks are discussed in the paper.

Keywords: export, productivity, VAR, industry sectors, Croatia

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¹ Lecturer, University of Zagreb, Faculty of Economics and Business, J.F. Kennedy Square 6, 10000 Zagreb, Croatia. Scientific affiliation: international economics. Phone: +381 1 2383 333. E-mail: mbasic1@net.efzg.hr.

² Associate Professor, University of Zagreb, Faculty of Economics and Business, J.F. Kennedy Square 6, 10000 Zagreb, Croatia. Scientific affiliation: international economics, nonlinear econometrics, applied econometrics, neural networks. Phone: +381 1 2383 333. E-mail: mbosnjak1@net.efzg.hr.

³ Associate Professor, University of Zagreb, Faculty of Economics and Business, J.F. Kennedy Square 6, 10000 Zagreb, Croatia. Scientific affiliation: international economics, nonlinear econometrics, applied econometrics, neural networks. Phone: +381 1 2383 333. E-mail: inovak@efzg.hr.

1. Introduction

Export-led growth or productivity-based export growth hypotheses provide inconclusive results (Arnade and Vasavada, 1995). Export-led growth has shown that entering export markets leads to increases in the number of advanced technologies used, increases in foreign sourcing for advanced technologies, and improvements in the information available to firms about advanced technologies (Baldwin and Gu, 2004). Although exporting firms are more productive than non-exporting firms (Gjini, 2017), a causality of the relationship is unclear when industrial sectors become more efficient. Namely, export-led hypothesis does not hold for all countries (Kacou et al., 2022) because countries with abundant natural resources are often deprived of structural transformation (McMillan and Rodrik, 2011).

The Republic of Croatia is a resource-abundant country whose GDP growth excels due to service exports connected to tourism. As heterogeneity perseveres in the productivity of Croatian firms (Iootty et al., 2014), studies on Croatia's total factor productivity do not imply a statistically significant effect of total factor productivity on the GDP growth rate (Raguž Krištić et al., 2016). Still, microeconomic studies that observe total factor productivity in Croatian firms find that total factor productivity is crucial for export competitiveness (Jakšić et al., 2020). The rationale for this study is fourfold. Firstly, total factor productivity is composed of labour productivity, capital productivity, and efficiency. Total factor productivity growth in private firms is unstable (Botrić and Broz, 2017). Although low labour productivity persists with exports in resource-abundant countries (Csordás, 2018), gains in labour productivity continue to be an integral component of real wage growth, whereby real wage growth drives the GDP growth through consumption and imports. Secondly, there are differences in Croatian industrial sectors and each is worth examining. Industrial sectors such as tourism are highly prone to seasonality and adverse global developments (Gričar et al., 2021), making increases in labour productivity in tourism highly versatile. Moreover, labour productivity is dependent on demographic trends, such as labour market participation rate (Lovrinčević, 2019). Thirdly, the Malmquist total factor productivity index shows that productivity growth in Croatia is the result of 0.67% efficiency gain, 3.01% technological progress, and 0.03% scale efficiency improvement (Jebali and Essid, 2020), making capital investment a crucial component of productivity improvement. The advancement of the economy depends on an increase in labour productivity, capital productivity, and total factor productivity. As each industrial sector has its specificities, it is important to determine differences in productivity on sectoral levels in order to arrive at appropriate policy conclusions and recommendations. Fourthly, although previous studies confirmed the existence of the productivity-led hypothesis in the case of Croatian firms (Jakšić et al., 2020), there still has not been a thorough examination of the productivity-led vs. export-

led hypothesis on the sectoral level. This paper aims to fill in this gap by identifying industry-specific effects of productivity shocks on exports and internationalisation of the largest Croatian exporters. In order to examine industry-specific evidence of whether productivity-led hypothesis or export-led hypotheses hold for Croatian industry sectors, three different productivity measures are examined in the paper: (a) total factor productivity, (b) labour productivity, and (c) capital productivity. This paper posits the following research questions:

- (1) *Which of the two hypotheses, productivity-led or export-led, holds in the case of the largest Croatian exporters?*
- (2) *Are the effects of productivity shocks on exports and internationalisation sectoral dependent, and in what way?*

Three hypotheses are tested based on the above stated research questions. Hypothesis 1 states that a productivity-led hypothesis rather than export-led hypothesis holds for a majority of Croatian industrial sectors. Hypothesis 2 states that the effects of productivity shocks on export and internationalisation differ between industrial sectors based on productivity measure used. Subsequently, the paper jointly explores both research questions to identify the sources of productivity-led growth by identifying sectors in which productivity-led hypothesis holds depending on the productivity measure used. Hence, Hypothesis 3 states that productivity-led hypothesis holds in cases of labour productivity and capital productivity, and not in cases of total factor productivity in case of largest Croatian exporters.

The structure of paper is as follows. The second section depicts the relevant literature in the field of productivity of industrial sectors and connected export-led growth. The third section explains the methodology of the research, while the fourth section states the results of the empirical analysis. The fifth section discussed the finding thereby providing policy implications. The paper concludes with summary of the paper's main findings, portrays research limitations and provides guidelines for future research.

2. Literature review

Export-led hypothesis states that firms looking beyond national borders to sell their products and services are motivated to increase their productivity. This hypothesis was tested using cointegration and Granger causality techniques, applied and supported in both developed and developing countries (Marin, 1992; Kwan and Kwok, 1995; Siliverstovs and Herzer, 2006). Studies examining the unidirectional causal relationship between exports and productivity is rejected in case of China as Shan and Sun (1998) find bi-directional flows between exports and output. It is

also rejected in case of Greece (Panas and Vamvoukas, 2002). In order to address the debate whether exports drive productivity growth or productivity growth induces exports, Ciarli et al. (2019) examine the already exporting companies from Chile and find that exporting does not affect productivity. Kacou et al. (2022) find that only highly open countries insulate essential productivity gains; thus, productivity gains can make domestic market production more efficient by reducing imports and improving the structure of exports, while the dependence on primary commodity exports is associated with lower labour productivity. Moreover, for exports to generate significant positive effect on TFP growth, a well-developed domestic market and a neutral, outward-oriented policy are necessary (Fu, 2005). While Dreger and Herzer (2013) find that the long-run effects of exports on non-export growth is negative, some studies examined only specific industries to test the export-led growth hypothesis, such as tourism (Mitra, 2019) or manufacturing (Tang and Abosedra, 2019; Athukorala and Patunru, 2022). In case of Central and Eastern Europe, export-led growth is predominantly derived from GVC participation, imports of technology and capital deepening (Hagemeyer and Mućk, 2019).

The effect of productivity growth on exports is explained through the lens of productive industries or firms that are motivated to export due to higher gains in exporting (Mahadevan, 2009). Mahadevan (2009) further explains that there exist uni-directional effect of labour productivity and total factor productivity effects on exports. Hence, export-led hypothesis is revisited as productivity-led hypothesis in the Ricardian model of international trade that exemplifies models of new trade theory (Nesset, 2004). Nesset (2004) furthers his explanation of productivity-led hypothesis by explaining labour as “superexogenous” variable that explains productivity-led growth. Uni-directional relationship between productivity growth and exports has been found in cases of China, Hong Kong, Malaysia, Indonesia and the Philippines (Liao and Liu, 2009). Hahn and Park (2012) used a bidirectional panel VAR and found a positive effect of productivity on exporting. Kunst and Marin (1989) found a positive link between productivity per unit of factor input and exports, and no causal effect of exports on productivity on a sample of Austrian firms. Burger et al. (2017) used a panel VAR approach to analyse Central and Eastern European firms’ resilience to crisis whereby investments of large young firms and exporters was the most responsive to financial shocks. Hereby, exporters more than non-exporters prove to be more resilient to external demand shocks. Moreover, by using panel VAR approach on a sample of 115 countries in the period 1990-2011, manufacturing was found to be the only strategic sector that drives economic growth in majority of developing countries (Gabriel and de Santana Ribeiro, 2019). Although paper examining specific industries have been studied (e.g., Barros and Alves, 2004; Stauvermann and Kumar, 2017), as in case of exports, there is no extensive comparative study of sectoral tested flows between productivity and exports in case of Croatian economy. Hence, Hypothesis 1 states:

Hypothesis 1: Productivity-led hypothesis rather than export-led hypothesis holds for majority of Croatian industrial sectors.

Productivity measures differ based on: (a) macro/micro level measures, (b) frontier/non-frontier measures, and (c) deterministic/econometric measures (Del Gatto et al., 2011), and are often used to compare technology miss-match between countries, industries or firms whereby labour productivity between countries is examined as an ultimate differential (e.g., Acemoglu and Zilibotti, 2001). Labour productivity is examined as output per worker or output per working hour, depending on the available data. It is often inseparable to study labour productivity from capital productivity. Capital productivity is the amount of output per capital or fixed assets. As a single factor productivity measures, both labour productivity or capital productivity can be examined based on gross output or based on value added (Schreyer and Pilat, 2001). Total factor productivity includes both labour and capital inputs, their productivity levels, while the remaining factors are attributed to other inputs and efficiency. Increase in labour productivity often come from capital employment, i.e., lately from digitalisation (Varlamova and Larionova, 2020). Comparisons of different measures of productivity have been analysed in the literature, especially based on sectoral levels (e.g., Baumol and Wolff, 1984). However, there are a lack of comparative productivity studies measuring the effect of productivity on exports in Croatia. Hence, Hypothesis 2 states:

Hypothesis 2: The effects of productivity shocks on export and internationalisation differ between industrial sectors based on productivity measure used.

Hypothesis 3 stems from Hypothesis 1 and 2 due to several notions. Firstly, labour is considered as an exogenous factor driving growth, and as such a single most important factor driving export and internationalisation growth. Secondly, labour productivity comes jointly with capital productivity and both are, therefore, to have a significant effect on exports. Thirdly, Croatian economic activity is characterised with low innovation activities, lack of investment in research and development and high costs, making it unattractive for investment. Fourthly, above average productivity is seen in the following sectors: mining and quarrying, professional and scientific services and other support services (Bašić et al., 2023). Hence, Hypothesis 3:

Hypothesis 3: The productivity-led hypothesis only holds in cases of labour productivity and capital productivity.

Challenges that economies must overcome to compensate for covid-19 pandemic productivity losses include productivity improvements in infrastructure equivalent to at least three times the historical average (Ahumada et al., 2022). This is especially true for transitional countries' export growth, which had been low compared with the rest of the world.

3. Methodology

This study used micro-financial data on firms from the Orbis (2016) database, provided temporarily by the Bureau Van Dijk. Data on the 300 largest exporters are extracted based on their export revenues in the period 2006-2015. All financial data was depicted in euros in nominal values. In order to make a valid comparison, data were deflated based on producer price indices obtained on the website of the Croatian National Bank (2022). Industry classification is based on European classification NACE Rev. 2, whereby A stands for agriculture, B for mining and quarrying, C for manufacturing, D for electricity and gas supply, E for water supply; sewerage, waste management, and remediation activities, F for construction, G for wholesale, H for transport and warehousing, I for accommodation and food, J for information and communication, M for professional and scientific services, N for administrative services and S for support services.

The data on the number of employees, turnover, cost of employees, fixed assets, total assets, tangible fixed assets, export revenues, value-added, operating revenue, material costs, inventory, and capital were used in the following way: (1) Export revenue (EX) as a logarithm of export revenue; (2) Export intensity (EI) as a logarithm of the ratio of export revenue to operating revenue; (3) value added (VA) as a logarithm of sales minus material costs minus inventory (Bournakis and Mallick, 2017); (4) Total factor productivity (TFP1) as a logarithm of TFP calculated as $(\log(\text{sales}) - \beta_1 \log(\text{tangible fixed assets}) - \beta_2 \log(\text{costs of employees}) - \beta_3 \log(\text{material costs}))$ (Dvoulety and Blažkova, 2021); (5) Total factor productivity (TFP2) as a logarithm of TFP calculated as $(\log(\text{added value}) - \beta_1 \log(\text{cost of employees}) - \beta_2 \log(\text{fixed assets}))$ (Bournakis and Mallick (2017) based on Levinsohn and Petrin/ (2003) and Olley and Pakes (1996)); (6) Total factor productivity (TFP3) is logarithm of TFP calculated as $(\log(\text{added value}) - \beta_1 \log(\text{cost of employees}) - \beta_2 \log(\text{capital}))$ (Bournakis and Mallick (2017) based on Levinsohn and Petrin/ (2003) and Olley and Pakes (1996)); (7) Labour productivity (LP) as a logarithm of the ratio of turnover to employment; and (8) Capital productivity (CP) as a logarithm of the ratio of turnover to capital. Firstly, production functions were estimated for each industry present in the sample (Appendix Table A1), then total factor productivities were calculated based on coefficients estimated in production functions. Descriptive statistics and cross-correlations per industry are available from authors upon request. Cross-correlations between export revenue and export intensity are relatively high, above 0.6, apart from the accommodation and food sector and professional services sector.

Dynamic relationships among the variables is tested using vector autoregression (VAR), i.e., the Granger causality test, and impulse response functions. A VAR model as a system of regression equations, is utilized to determine the dynamic interdependences of several time series (Sims, 1980). It uses standard ordinary least

squares (OLS) framework that should meet the assumption of no autocorrelation (LM), no autoregressive conditional heteroscedasticity (ARCH) and Doornik–Hansen normality. A hypothetical VAR:

$$Z_t = A_0 + A_1 Z_{t-1} + \dots + A_p Z_{t-p} + \varepsilon_t \quad (1)$$

where Z_t is a 2x1 vector of two endogenous variables X and Y , A_0 is 2x1 vector of intercept terms, $A_1 \dots A_p$ are (2×2) matrices of coefficients and ε_t is a white noise vector process. Optimum lag lengths were estimated using VAR lag order selection criteria: AIC, Schwarz and Hannan-Quinn information criterion.

To identify dynamic responsiveness in variables, i.e., how a shock in productivity affects export growth or export intensity growth, vector autoregression analysis (VAR) on panel data was used to exhibit the effects and enable their forecasting. Panel Granger causality test is used. Granger causality tests show the extent to which one variable's past observations explain another one in the current period. Namely, for testing the Granger causality, we specify a model with dynamic error correction representation. Knowing that VAR requires stationary variables, unit roots of all variables were tested. Panel unit root tests are presented in Appendix Table A2 and Table A3. The majority of variables are stationary at the level. Those that are not were differenced, whereby the sector that includes the most non-stationary variables at level is the sector of mining and quarrying, and as such used in the vector autoregression analysis.

4. Empirical data and analysis

Tables A4-13 present the results of the VAR. Table A4 shows the results of the Granger effect of TFP1 on export revenue. Herein, it is noticeable that TFP1 Granger causes changes in export revenues in manufacturing, electricity and gas supply, water supply, construction, accommodation, professional services, and administrative services sectors. Table A5 shows the VAR of TFP1 on export intensity or internationalization. In electricity and gas supply, water supply, accommodation, professional and scientific services, and administrative and support services sectors TFP1 Granger causes changes in export intensity. Table A6 portrays the VAR of TFP2 on exports, while Table A7 of TFP2 on export intensity. TFP2 Granger causes changes in exports in professional and scientific service sectors, and that relationship is not only endogenous but also bi-directional. In the water supply sector, TFP2 Granger causes changes in export intensity. Tables A8 and A9 show the effect of TFP3 on exports and export intensities, respectively. TFP3 does not have a statistically significant Granger change in exports in any sector, while the Granger causes changes in export intensity in the administrative service sector being bi-directional (Table A9).

VAR exhibiting the effect of labour productivity on exports (Table A10) shows that labour productivity Granger causes changes in exports in manufacturing, electricity and gas supply, wholesale, transport, accommodation, and professional and scientific services, while in terms of export intensity labour productivity, Granger causes changes in agriculture, electricity and gas supply, wholesale, transport, accommodation, information and communication, and professional and scientific service sectors (Table A11).

Finally, in terms of capital productivity's effect on export and export intensity, capital productivity Granger causes changes in exports in agriculture, manufacturing, electricity, gas supply, and construction sectors (Table A12). Capital productivity Granger causes changes in export intensity in electricity and gas supply, professional and scientific services, and administrative and support service sectors (Table A13).

The extent of the one standard deviation shock of TFP1, TFP2, LP, and CP on export and export intensity is illustrated by using impulse response functions in Appendix, Figures A1 and A2. The effects of one standard deviation shock of TFP on exports are positive in cases of manufacturing, professional and scientific services, and negative in electricity and gas supply, water supply, construction and accommodation, and food. The effect of one standard deviation shock in labour productivity on exports is positive in manufacturing, electricity, gas supply, wholesale, transport and warehousing, and accommodation and food sectors, and negative in the professional and scientific services sectors. The effect of one standard deviation shock in capital productivity on exports is positive in agriculture, manufacturing, electricity and gas supply, and construction.

As for export intensity, one standard deviation shock of TFP are predominantly negative in the following sectors: electricity and gas supply, water supply, accommodation and food, professional and scientific services, and administrative services. Shock in labour productivity on export intensity is predominantly positive in the following sectors: agriculture, electricity and gas supply, wholesale, transport and warehousing, and information and communication; and negative in professional and scientific services. Finally, shocks in capital productivity on export intensity are positive in electricity and gas supply and negative in professional and scientific services.

5. Results and discussion

The aim of this paper is to identify industry-specific effects of shocks in total factor productivity, labour productivity, and capital productivity that affect exports and internationalisation of the largest Croatian exporters and provide industry-specific evidence of whether the productivity-led hypothesis or export-led hypothesis holds

for Croatian industry sectors. Transitional countries' export growth had been low compared with the rest of the world, making export promotion imperative for firms, labour, and infrastructure investment (Morrissey and Filatotchev, 2000). For the majority of Croatian largest exporting sectors, Hypothesis 1 cannot be rejected, i.e., the productivity-led hypothesis holds for the period 2006-2015. Bi-directional or opposite flows indicate the presence of the export-led hypothesis identified predominantly in transport and warehousing, accommodation and food, and professional and scientific services and administrative services sectors. The analysis has shown that the effects of productivity increases have been sector dependent and that Hypothesis 2 cannot be rejected. Table 1 shows the summary of Hypotheses 2 and 3, while Appendix 1 presents detailed results of the hypothesis testing.

Table 1: Summary of Hypotheses 2 and 3

	Productivity indicator	Export	Internationalisation
<i>Hypothesis 2: The effects of productivity shocks on export and internationalisation differ between industrial sectors based on productivity measure used.</i>	TFP, LP, CP	C, D	D, M
	TFP, LP	I, M	-
	TFP, CP	F	N
	TFP	E, N	E, I
	LP	G, H	A, G, H, J
	CP	A	-
<i>Hypothesis 3: The productivity-led hypothesis only holds in cases of labour productivity and capital productivity.</i>	TFP	M	-
	LP	C, D, G, H, I	A, D, G, H, J
	CP	A, D, F	D

Source: Author's elaboration

In terms of export growth, an increase in TFP positively affects construction, professional and scientific service, and administrative service sectors, and negatively affects electricity and gas supply, water supply, construction and accommodation, and food sectors. Labour productivity's effect on exports is positive in manufacturing, electricity and gas supply, wholesale, transport and warehousing, and accommodation and food sectors, and negative in the professional and scientific services sector. The effect of a standard deviation shock in capital productivity on exports in agriculture, manufacturing, electricity and gas supply, and construction is predominantly positive.

In terms of export intensity, which interests us in terms of the global value chain inclusion of Croatian firms, an increase in TFP is mainly negative in electricity and gas supply, water supply, accommodation and food, professional and scientific services, and administrative services sectors. Shocks in labour productivity are predominantly positive in the following sectors: agriculture, electricity and

gas supply, wholesale and transport and warehousing, and information and communication; negative in professional and scientific services; while shocks in capital productivity on export intensity are positive in electricity and gas supply and negative in professional and scientific services.

This study finds that the productivity-led hypothesis holds for the majority of Croatian largest exporters' sectors. It is predominantly negative in terms of TFP and positive in terms of labour productivity (agriculture, electricity, gas supply, wholesale and transport and warehousing, and information and communication) and capital productivity (electricity and gas supply). As productivity differentials among countries are important (Iranoust, 2017), this study suggests increasing productivity. As Cassiman et al. (2010) argue, a positive link between productivity and exports depends on firms' innovation decisions, it would be useful to inspect innovation per industry and its effect on exports in future studies. As total factor productivity growth in private firms is not stable (Botrić and Broz, 2017), it can be aided by government investment whereby investment in human capital is crucial at the sectoral level (Borkovic and Tabak, 2018). Human capital is the single most important productivity growth factor that affects export growth and internationalisation growth, links to capital productivity, and is a crucial part of total factor productivity. As total factor productivity has a lower influence on export and internationalisation than labour productivity, there is a productivity loss and loss in efficiency that needs to be ameliorated in each industrial sector, which is a practical implication of this study.

6. Conclusion

This paper examined the industry specific effects of productivity shocks on exports and internationalisation. Financial data on 300 largest Croatian exporters in the period 2006-2015 were studied to arrive at three productivity measures: (a) total factor productivity, (b) labour productivity, and (c) capital productivity. Two questions were of research interest: (1) *Which hypothesis, the productivity-led hypothesis or export-led hypothesis, holds in case of the largest Croatian exporters?* and (2) *Are the effects of productivity shocks on exports and internationalisation sectoral dependent, and how?* Based on the two research questions three hypotheses were formed and tested. Hypothesis 1 tested whether a productivity-led hypothesis rather than export-led hypothesis holds for a majority of Croatian industrial sectors. Results of the VAR model confirmed this hypothesis. Productivity-led hypothesis holds for majority of the largest Croatian exporters grouped by industrial sectors. A bi-directional flow, rather than a specific export-led hypothesis holds for a minority of industrial sectors, including professional and scientific services and administrative services sectors, and to a lesser extent for transport and warehousing, accommodation and food sectors. Hypothesis 2 examined the effects of productivity

shocks on export and internationalisation differ between industrial sectors based on productivity measure used. The effects of productivity shocks differ based on the productivity measure and industrial sector examined. Hypothesis 2 could not be rejected. Hypothesis 3 examined the productivity-led hypothesis in cases of labour productivity, capital productivity and total factor productivity. The results have shown that the productivity-led hypothesis dominates in cases of labour productivity and capital productivity, and does not in cases of total factor productivity. Hypothesis 3 also could not be rejected. The results imply that an increase in labour productivity and capital productivity lead to an increase in export revenue and internationalisation, while total factor productivity increase lead to a decrease in exports. This is an interesting finding as both labour productivity and capital productivity are included in a measure of total factor productivity. Hence, differential between the measures implies that the measure of production efficiency of Croatian largest exporters is low, i.e., the cause of the decreasing total factor productivity, and a measure of production efficiency that is lower than both labour productivity and capital productivity is the cause of the lack of effect of an increase in total factor productivity on exports or internationalisation. In terms of industrial sectors this results present a novel finding. A cause of the efficiency effect on exports or internationalisation could be due to inertia or institutional or organisational setting, which should be further examined in future research. Taking a deeper look into the predominant effect of loss in efficiency is a research limitation of this study. Lack of data on all industrial sectors, limited time span due to data availability are also research limitations. Future research should additionally address these research limitations. Financial investment is a prerequisite for improvement, but this study shows that investment in labour and capital productivity do provide gains for largest exporters. However, it also shows where these gains are lost. It should be useful to examine whether the loss of efficiency is sector specific (institutional) or firm-related, and make to appropriate recommendations. Namely, if the loss of efficiency is sector specific, such as in cases of D, F and I, or gains of efficiency such as in case of sector M, in the future institutional support can contribute to their prevention. However, if the loss of efficiency is firm-specific, that managers should examine organisational inertia, communication channels, information technology used in order to increase efficiency.

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Šokovi u produktivnosti i specifični učinci industrije na izvoz i internacionalizaciju: Pristup VAR modela

Maja Bašić¹, Mile Bošnjak², Ivan Novak³

Sažetak

Ova studija ispituje specifične učinke šokova u produktivnosti na izvoz i internacionalizaciju najvećih hrvatskih izvoznika. Kako bi se odgovorilo na dva istraživačka pitanja: (1) Koja hipoteza: o rastu vođenom produktivnosti ili rastu vođenom izvozom, je aplikabilna u slučaju najvećih hrvatskih izvoznika?, te (2) Jesu li učinci šokova produktivnosti na izvoz i internacionalizaciju sektora ovisni i na koji način? Autori su testirali mikro-financijske podatke 300 najvećih izvoznika za razdoblje od 2006. do 2015. godine koristeći metodu vektorske autoregresije (VAR). Ispitane su tri mjere produktivnosti: ukupna produktivnost faktora proizvodnje, produktivnost rada i produktivnost kapitala. Rezultati pokazuju da hipoteza o produktivnosti koja vodi rastu izvoza vrijedi za većinu industrijskih sektora najvećih hrvatskih izvoznika. Umjesto specifične hipoteze o izvozu, pokazalo se da dvosmjerni protok ima veći utjecaj na nekoliko industrijskih sektora, uključujući znanstveni i stručni sektor te administrativni sektor, a u manjoj mjeri na sektore prijevoza i skladištenja, smještaja i prehrane. Utjecaj ukupne faktorske produktivnosti većinom je negativan, a pozitivan prema utjecaju produktivnosti rada (poljoprivreda, opskrba električnom energijom i plinom, trgovina na veliko, promet i skladištenje te informacije i komunikacije) i produktivnosti kapitala (opskrba električnom energijom i plinom). Rad zaključuje s raspravom o implikacijama šokova produktivnosti za privatni sektor i donosiće ekonomske politike.

Ključne riječi: izvoz, produktivnost, VAR, industrijski sektori, Hrvatska

JEL klasifikacija: F10, D24, F14, F17

¹ Predavačica, Sveučilište u Zagrebu, Ekonomski fakultet, Trg J.F. Kennedyja 6, 10000 Zagreb, Hrvatska. Znanstveni interes: međunarodna ekonomija. Tel.: +381 1 2383 333. E-mail: mbasic1@net.efzg.hr.

² Izvanredni profesor, Sveučilište u Zagrebu, Ekonomski fakultet, Trg J.F. Kennedyja 6, 10000 Zagreb, Hrvatska. Znanstveni interes: međunarodna ekonomija, nelinearna ekonometrija, primjenjena ekonometrija, neuronske mreže. Tel.: +381 1 2383 333. E-mail: mbošnjak1@net.efzg.hr.

³ Izvanredni profesor, Sveučilište u Zagrebu, Ekonomski fakultet, Trg J.F. Kennedyja 6, 10000 Zagreb, Hrvatska. Znanstveni interes: međunarodna ekonomija, nelinearna ekonometrija, primjenjena ekonometrija, neuronske mreže. Tel.: +381 1 2383 333. E-mail: inovak@efzg.hr.

Appendices

Table A1: Production function estimates: industry-based

	(1)	(2)		(3)	(4)		(5)		(6)	(7)		(8)		(9)	(10)	(11)		(12)
	y_1	y_2	y_3	y_3	y_1	y_2	y_3	y_2	y_3	y_1	y_2	y_3	y_2	y_3	y_1	y_2	y_3	
constant	0.12* (0.05)	-7.18* (2.23)	-5.74** (1.71)	0.78* (0.35)	2.01 (1.32)	1.75 (3.06)	0.03 (0.04)	0.25*** (0.07)	0.52*** (0.08)	-0.04 (0.12)	0.05 (0.08)	0.05 (0.08)	0.05 (0.08)	0.13† (0.07)				
cost of employees	-0.03 (0.02)	6.53† (3.00)	4.51 (2.72)	0.03 (0.15)	-0.84 (0.56)	0.38 (0.40)	0.15*** (0.03)	0.51*** (0.04)	0.75*** (0.03)	0.20 (0.15)	1.18*** (0.06)	1.05*** (0.06)						
material costs	0.94*** (0.06)			0.73*** (0.05)			0.84*** (0.02)								0.95*** (0.07)			
tangible fixed assets	0.07 (0.05)			0.12 (0.13)			0.06** (0.02)								-0.11 (0.08)			
fixed assets		-1.12 1.46			1.26* (0.46)			0.39*** (0.04)			0.07 (0.05)							
capital			-0.22 (2.89)			0.20 (0.79)						0.14*** (0.03)						0.19*** (0.04)
Number of observations	60	14	14	30	28	28	1535	1192	1197	85	57	73	9	9	9	9	9	9
Number of firms	6	3	3	3	3	3	156	150	150	9	9	9	9	9	9	9	9	9
R2	1.00	0.99	0.99	1.00	0.99	0.98	0.97	0.95	0.94	0.97	0.98	0.97	0.98	0.97	0.98	0.97	0.97	0.96
Adjusted R2	1.00	0.98	0.98	1.00	0.99	0.98	0.97	0.94	0.93	0.96	0.97	0.96	0.97	0.96	0.97	0.96	0.96	0.96
S.E. of regression	0.07	0.13	0.13	0.05	0.18	0.20	0.23	0.31	0.35	0.48	0.28	0.30	0.28	0.30	0.28	0.28	0.30	0.30
Log likelihood	76.47	12.04	11.60	52.21	11.76	7.86	151.61	-216.14	-346.27	-51.64	-1.24	-8.61						
Probability (F-statistic)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Akaike info criterion	-2.25	-1.01	-0.94	-3.08	-0.48	-0.20	0.01	0.62	0.83	1.50	0.43	0.54						
Schwarz criterion	-1.93	-0.78	-0.72	-2.80	-0.24	0.03	0.56	1.27	1.48	1.84	0.82	0.88						
Hannan-Quinn criterion	-2.13	-1.03	-0.96	-2.99	-0.41	-0.13	0.22	0.86	1.08	1.64	0.58	0.67						
Durbin-Watson statistic	2.44	3.32	3.22	1.94	1.41	1.84	1.46	1.43	1.37	2.07	1.60	1.12						

Note: *** p < 0.001, ** p < 0.01, * p < 0.05, †p < 0.1
 Fixed effect OLS. Dependent variables: y_1 sales revenue, y_2 and y_3 value added. All variables are deflated and in log form.
 Source: Author's calculations based on data form Orbis database (2016)

Table A1: Production function estimates: industry-based (continued)

	E			F			G			H		
	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
	y_1	y_2	y_3	y_1	y_2	y_3	y_1	y_2	y_3	y_1	y_2	y_3
constant	-0.17 (0.90)	-0.04 (0.29)	0.71* (0.30)	-2.43 (1.63)	-3.56** (1.06)	-3.35*** (0.71)	-0.05 (0.14)	-0.10 (0.15)	0.74*** (0.18)	0.12† (0.07)	0.03 (0.07)	0.14† (0.07)
cost of employees	-0.26 (0.52)	0.34† (0.19)	0.93*** (0.09)	0.85 (0.90)	2.51** (0.64)	2.62*** (0.50)	0.26*** (0.06)	0.89*** (0.11)	0.51*** (0.07)	0.35*** (0.07)	0.76*** (0.06)	0.64*** (0.06)
material costs	0.99** (0.36)			1.91*** (0.43)			0.78*** (0.04)			0.80*** (0.05)		
tangible fixed assets	0.27 (0.40)			-1.04* (0.40)			0.11* (0.05)			-0.06* (0.03)		
fixed assets		0.61** (0.19)			-0.38 (0.31)			0.21* (0.09)			0.27*** (0.05)	
capital						-0.59† (0.33)			0.39*** (0.09)			0.40*** (0.06)
Number of observations	50	40	41	30	21	21	365	209	227	229	216	218
Number of firms	5	5	5	3	3	3	38	34	35	23	23	23
R2	0.86	0.98	0.97	0.74	0.93	0.93	0.94	0.94	0.89	0.99	0.98	0.98
Adjusted R2	0.83	0.97	0.96	0.69	0.91	0.91	0.93	0.93	0.87	0.98	0.98	0.98
S.E. of regression	0.77	0.27	0.34	1.02	0.34	0.32	0.45	0.45	0.60	0.23	0.25	0.26
Log likelihood	-53.78	-0.98	-10.01	-39.74	-4.21	-3.23	-204.34	-108.86	-187.33	23.26	4.97	-0.89
Probability (F-statistic)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Akaike info criterion	2.47	0.40	0.83	3.05	0.88	0.78	1.34	1.39	1.98	0.02	0.19	0.24
Schwarz criterion	2.78	0.69	1.12	3.33	1.13	1.03	1.78	1.96	2.53	0.41	0.58	0.63
Hannan-Quinn criterion	2.59	0.51	0.94	3.14	0.93	0.84	1.52	1.62	2.20	0.18	0.34	0.39
Durbin-Watson statistic	2.30	0.56	0.92	1.52	1.10	1.24	1.45	0.92	0.82	2.07	1.42	1.31

Note: *** p < 0.001, ** p < 0.01, * p < 0.05, †p < 0.1

Fixed effect OLS. Dependent variables: y_1 sales revenue, y_2 and y_3 value added. All variables are deflated and in log form.

Source: Author's calculations based on data form Orbis database (2016)

Table A1: Production function estimates: industry-based (continued)

	I			J			M			N		
	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)
	y_1	y_2	y_3	y_1	y_2	y_3	y_1	y_2	y_3	y_1	y_2	y_3
constant	-0.05 (0.10)	0.06 (0.04)	0.10* (0.04)	0.33* (0.149)	0.46*** (0.07)	0.40*** (0.09)	11.45*** (1.58)	1.25 (0.90)	0.47 (0.84)	0.06 (0.11)	0.41** (0.15)	0.71** (0.21)
cost of employees	1.31*** (0.10)	1.44*** (0.09)	1.17*** (0.07)	0.74*** (0.09)	0.42*** (0.08)	1.01*** (0.04)	0.28 (0.34)	0.61* (0.27)	0.72** (0.21)	0.18* (0.06)	0.53*** (0.06)	0.85*** (0.06)
material costs	-0.08 (0.09)			0.33*** (0.07)			-1.85*** (0.40)			0.70*** (0.04)		
tangible fixed assets	-0.08* (0.03)			-0.00 (0.09)			0.09 (0.14)			0.23*** (0.04)		
fixed assets		-0.30*** (0.07)			0.55*** (0.08)			0.11 (0.12)			0.44*** (0.06)	
capital			-0.09 (0.06)			-0.02 (0.04)			0.24** (0.08)			0.06 (0.06)
Number of observations	190	183	184	70	66	67	58	55	55	90	87	87
Number of firms	19	19	19	7	7	7	6	6	6	9	9	9
R2	0.96	0.99	0.99	0.96	0.99	0.98	0.98	0.99	0.99	0.99	0.96	0.93
Adjusted R2	0.96	0.99	0.99	0.95	0.99	0.98	0.98	0.99	0.99	0.99	0.95	0.92
S.E. of regression	0.28	0.11	0.12	0.26	0.13	0.17	0.28	0.20	0.18	0.16	0.25	0.33
Log likelihood	-17.62	162.09	137.36	1.55	48.43	28.98	-4.54	15.46	19.95	43.57	4.07	-21.45
Probability (F-statistic)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Akaike info criterion	0.42	-1.54	-1.26	0.24	-1.19	-0.60	0.47	-0.27	-0.43	-0.70	0.16	0.75
Schwarz criterion	0.79	-1.17	-0.90	0.56	-0.90	-0.30	0.79	0.02	-0.14	-0.37	0.47	1.06
Hannan-Quinn criterion	0.57	-1.39	-1.12	0.37	-1.08	-0.48	0.59	-0.16	-0.32	-0.57	0.28	0.87
Durbin-Watson statistic	1.90	1.75	1.72	2.01	0.96	0.42	2.04	0.98	1.25	1.24	1.15	1.36

Note: *** p < 0.001, ** p < 0.01, * p < 0.05, † p < 0.1
 Fixed effect OLS. Dependent variables: y_1 sales revenue, y_2 and y_3 value added. All variables are deflated and in log form.
 Source: Author's calculations based on data form Orbis (2016)

Table A1: Production function estimates: industry-based (continued)

	(37)	(39)	(40)
	S		
	y ₁	y ₂	y ₃
constant	1.05 (0.64)	6.05*** (1.36)	5.38*** (1.22)
cost of employees	0.03 (0.12)	-0.08 (0.23)	-0.12 (0.23)
material costs	0.77*** (0.08)		
tangible fixed assets	0.08 (0.08)		
fixed assets		-0.28 (0.28)	
capital			-0.10 (0.28)
Number of observations	20	20	20
Number of firms	2	2	2
R2	0.90	0.88	0.87
Adjusted R2	0.88	0.86	0.85
S.E. of regression	0.13	0.25	0.25
Log likelihood	15.84	1.84	1.31
Probability (F-statistic)	0.00	0.00	0.00
Akaike info criterion	-1.08	0.22	0.27
Schwarz criterion	-0.84	0.42	0.47
Hannan-Quinn criterion	-1.04	0.26	0.31
Durbin-Watson statistic	1.11	2.44	2.12

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, † $p < 0.1$

Fixed effect OLS. Dependent variables: y_1 sales revenue, y_2 and y_3 value added. All variables are deflated and in log form.

Source: Author's calculations based on data from Orbis (2016)

Table A2: Panel unit root tests

Industry	Variable	Method	Statistic	Probability	Cross-sections	Observations
A	Export	Levin, Lin & Chu	-4.81	0.00	6	53
		Hadri Z-stat	3.58	0.00	6	60
	Export intensity	Levin, Lin & Chu	-3.83	0.00	6	50
		Hadri Z-stat	3.46	0.00	6	57
	TFP1	Levin, Lin & Chu	-9.00	0.00	6	52
		Hadri Z-stat	1.63	0.05	6	60
	TFP2	Levin, Lin & Chu	-3.57	0.00	1	8
		Hadri Z-stat	2.90	0.00	2	13
	TFP3	Levin, Lin & Chu	-3.58	0.00	1	8
		Hadri Z-stat	1.81	0.04	1	10
	LP	Levin, Lin & Chu	-6.98	0.00	6	50
		Hadri Z-stat	4.03	0.00	6	57
	CP	Levin, Lin & Chu	-10.28	0.00	6	49
		Hadri Z-stat	2.45	0.00	6	57
B	Export*	Levin, Lin & Chu	-4.19	0.00	3	25
		Hadri Z-stat	1.37	0.08	3	30
	Export intensity	Levin, Lin & Chu	-2.26	0.01	3	25
		Hadri Z-stat	2.17	0.02	3	30
	TFP1	Levin, Lin & Chu	-3.11	0.00	3	26
		Hadri Z-stat	2.20	0.01	3	30
	TFP2	Levin, Lin & Chu	-3.25	0.00	3	23
		Hadri Z-stat	2.25	0.01	3	28
	TFP3*	Levin, Lin & Chu	-4.01	0.00	3	24
		Hadri Z-stat	2.24	0.01	3	28
	LP	Levin, Lin & Chu	-1.05	0.15	3	25
		Hadri Z-stat	0.56	0.29	3	30
	CP	Levin, Lin & Chu	-0.93	0.18	3	26
		Hadri Z-stat	2.09	0.02	3	30
C	Export	Levin, Lin & Chu	-106.16	0.00	155	1354
		Hadri Z-stat	15.40	0.00	156	1560
	Export intensity	Levin, Lin & Chu	-61.11	0.00	154	1285
		Hadri Z-stat	13.79	0.00	155	1487
	TFP1	Levin, Lin & Chu	-235.40	0.00	153	1315
		Hadri Z-stat	11.80	0.00	154	1523
	TFP2	Levin, Lin & Chu	-99.01	0.00	124	922
		Hadri Z-stat	9.85	0.00	138	1172
	TFP3	Levin, Lin & Chu	-48.88	0.00	117	893
		Hadri Z-stat	11.02	0.00	135	1156
	LP	Levin, Lin & Chu	-23.06	0.00	153	1274
		Hadri Z-stat	15.54	0.00	154	1470
	CP	Levin, Lin & Chu	-15.06	0.00	154	1288
		Hadri Z-stat	18.89	0.00	155	1492

Note: * all variables included intercept apart from those marked(*) which included intercept and trend

Source: Author's calculations based on data form Orbis (2016)

Table A2: Panel unit root tests (continued)

Industry	Variable	Method	Statistic	Probability	Cross-sections	Observations
D	Export	Levin, Lin & Chu	-24.16	0.00	7	62
		Hadri Z-stat	3.09	0.00	9	90
	Export intensity	Levin, Lin & Chu	-2.02	0.02	8	47
		Hadri Z-stat	3.82	0.00	8	58
	TFP1	Levin, Lin & Chu	-6.86	0.00	9	71
		Hadri Z-stat	1.28	0.10	9	85
	TFP2	Levin, Lin & Chu	23.80	1.00	7	38
		Hadri Z-stat	11.96	0.00	8	56
	TFP3	Levin, Lin & Chu	-5.06	0.00	8	51
		Hadri Z-stat	2.76	0.00	9	73
	LP	Levin, Lin & Chu	-56.90	0.00	8	48
		Hadri Z-stat	2.74	0.00	8	57
	CP	Levin, Lin & Chu	-7.05	0.00	7	40
		Hadri Z-stat	2.71	0.00	9	60
E	Export	Levin, Lin & Chu	-2.61	0.00	5	45
		Hadri Z-stat	3.11	0.00	5	50
	Export intensity	Levin, Lin & Chu	-3.43	0.00	5	39
		Hadri Z-stat	2.74	0.00	5	44
	TFP1*	Levin, Lin & Chu	-35.91	0.00	5	44
		Hadri Z-stat	13.68	0.00	5	50
	TFP2*	Levin, Lin & Chu	-2.52	0.01	4	27
		Hadri Z-stat	6.24	0.00	5	40
	TFP3	Levin, Lin & Chu	-6.91	0.00	4	24
		Hadri Z-stat	1.98	0.02	5	41
	LP*	Levin, Lin & Chu	-11.89	0.00	4	35
		Hadri Z-stat	5.20	0.00	5	44
	CP	Levin, Lin & Chu	-4.33	0.00	5	36
		Hadri Z-stat	2.92	0.00	5	44
F	Export*	Levin, Lin & Chu	-2.31	0.01	2	16
		Hadri Z-stat	2.41	0.01	3	30
	Export intensity	Levin, Lin & Chu	-1.67	0.05	2	17
		Hadri Z-stat	2.08	0.02	3	28
	TFP1*	Levin, Lin & Chu	-27.70	0.00	3	26
		Hadri Z-stat	3.20	0.00	3	30
	TFP2	Levin, Lin & Chu	-3.59	0.00	3	17
		Hadri Z-stat	1.89	0.03	3	21
	TFP3	Levin, Lin & Chu	-3.53	0.00	3	17
		Hadri Z-stat	2.25	0.01	3	21
	LP	Levin, Lin & Chu	-0.25	0.40	3	25
		Hadri Z-stat	2.29	0.01	3	29
	CP*	Levin, Lin & Chu	-2.63	0.00	3	26
		Hadri Z-stat	3.57	0.00	3	29

Note: * all variables included intercept apart from those marked(*) which included intercept and trend

Source: Author's calculations based on data form Orbis (2016)

Table A2: Panel unit root tests (continued)

Industry	Variable	Method	Statistic	Probability	Cross-sections	Observations
G	Export	Levin, Lin & Chu	-12.70	0.00	35	304
		Hadri Z-stat	6.28	0.00	37	370
	Export intensity	Levin, Lin & Chu	-8.95	0.00	32	267
		Hadri Z-stat	6.34	0.00	36	337
	TFP1	Levin, Lin & Chu	-13.45	0.00	36	307
		Hadri Z-stat	3.34	0.00	37	360
	TFP2	Levin, Lin & Chu	-16.91	0.00	23	146
		Hadri Z-stat	6.62	0.00	28	202
	TFP3	Levin, Lin & Chu	-10.71	0.00	22	147
		Hadri Z-stat	6.73	0.00	30	218
	LP	Levin, Lin & Chu	-10.04	0.00	34	279
		Hadri Z-stat	8.20	0.00	35	328
	CP	Levin, Lin & Chu	-3.74	0.00	32	270
		Hadri Z-stat	7.56	0.00	34	316
H	Export	Levin, Lin & Chu	-94.66	0.00	23	201
		Hadri Z-stat	6.51	0.00	23	230
	Export intensity	Levin, Lin & Chu	-2.17	0.02	21	166
		Hadri Z-stat	6.11	0.00	23	201
	TFP1	Levin, Lin & Chu	-11.68	0.00	23	198
		Hadri Z-stat	3.40	0.00	23	229
	TFP2	Levin, Lin & Chu	15.50	1.00	23	182
		Hadri Z-stat	4.70	0.00	23	216
	TFP3	Levin, Lin & Chu	-9.35	0.00	21	175
		Hadri Z-stat	4.34	0.00	23	218
	LP	Levin, Lin & Chu	-64.46	0.00	21	169
		Hadri Z-stat	5.50	0.00	23	201
	CP	Levin, Lin & Chu	-1.91	0.03	23	175
		Hadri Z-stat	6.64	0.00	23	202
I	Export	Levin, Lin & Chu	-85.06	0.00	19	165
		Hadri Z-stat	5.49	0.00	19	190
	Export intensity	Levin, Lin & Chu	-66.35	0.00	19	154
		Hadri Z-stat	4.85	0.00	19	179
	TFP1	Levin, Lin & Chu	-4.15	0.00	19	164
		Hadri Z-stat	2.55	0.00	19	190
	TFP2	Levin, Lin & Chu	-5.80	0.00	18	153
		Hadri Z-stat	3.72	0.00	19	183
	TFP3	Levin, Lin & Chu	-5.98	0.00	18	156
		Hadri Z-stat	4.18	0.00	19	184
	LP	Levin, Lin & Chu	-11.79	0.00	19	153
		Hadri Z-stat	4.65	0.00	19	179
	CP	Levin, Lin & Chu	-3.83	0.00	19	154
		Hadri Z-stat	5.97	0.00	19	179

Note: * all variables included intercept apart from those marked(*) which included intercept and trend

Source: Author's calculations based on data form Orbis (2016)

Table A2: Panel unit root tests (continued)

Industry	Variable	Method	Statistic	Probability	Cross-sections	Observations
J	Export	Levin, Lin & Chu	-3.34	0.00	7	63
		Hadri Z-stat	2.25	0.01	7	70
	Export intensity*	Levin, Lin & Chu	-5.90	0.00	7	58
		Hadri Z-stat	4.40	0.00	7	67
	TFP1	Levin, Lin & Chu	-8.82	0.00	7	60
		Hadri Z-stat	2.91	0.00	7	70
	TFP2	Levin, Lin & Chu	-4.59	0.00	7	54
		Hadri Z-stat	3.03	0.00	7	66
	TFP3	Levin, Lin & Chu	-4.72	0.00	7	56
		Hadri Z-stat	3.63	0.00	7	67
	LP	Levin, Lin & Chu	-11.55	0.00	7	56
		Hadri Z-stat	3.73	0.00	7	66
	CP	Levin, Lin & Chu	-3.82	0.00	7	56
		Hadri Z-stat	3.40	0.00	7	67
M	Export	Levin, Lin & Chu	-8.62	0.00	5	43
		Hadri Z-stat	2.19	0.01	6	60
	Export intensity	Levin, Lin & Chu	-2.42	0.01	5	45
		Hadri Z-stat	2.72	0.00	5	50
	TFP1	Levin, Lin & Chu	-8.75	0.00	5	42
		Hadri Z-stat	1.80	0.04	5	50
	TFP2	Levin, Lin & Chu	-7.21	0.00	6	47
		Hadri Z-stat	3.32	0.00	6	55
	TFP3	Levin, Lin & Chu	-5.85	0.00	5	41
		Hadri Z-stat	2.12	0.02	5	47
	LP	Levin, Lin & Chu	-5.06	0.00	5	40
		Hadri Z-stat	2.52	0.01	5	49
	CP*	Levin, Lin & Chu	-2.77	0.00	5	43
		Hadri Z-stat	5.17	0.00	5	50
N	Export*	Levin, Lin & Chu	-5.95	0.00	9	79
		Hadri Z-stat	3.93	0.00	9	90
	Export intensity*	Levin, Lin & Chu	-4.10	0.00	8	70
		Hadri Z-stat	5.47	0.00	9	84
	TFP1	Levin, Lin & Chu	-5.87	0.00	9	79
		Hadri Z-stat	3.32	0.00	9	90
	TFP2	Levin, Lin & Chu	-8.28	0.00	9	72
		Hadri Z-stat	3.54	0.00	9	87
	TFP3	Levin, Lin & Chu	-2.50	0.01	9	72
		Hadri Z-stat	2.58	0.00	9	87
	LP	Levin, Lin & Chu	-17.33	0.00	9	74
		Hadri Z-stat	4.29	0.00	9	84
	CP	Levin, Lin & Chu	-55.66	0.00	9	74
		Hadri Z-stat	2.99	0.00	9	84

Note: * all variables included intercept apart from those marked(*) which included intercept and trend

Source: Author's calculations based on data form Orbis (2016)

Table A2: Panel unit root tests (continued)

Industry	Variable	Method	Statistic	Probability	Cross-sections	Observations
S	Export	Levin, Lin & Chu	-6.50	0.00	2	18
		Hadri Z-stat	1.93	0.03	2	20
	Export intensity*	Levin, Lin & Chu	-1.60	0.05	2	17
		Hadri Z-stat	2.95	0.00	2	20
	TFP1*	Levin, Lin & Chu	-0.58	0.28	2	17
		Hadri Z-stat	1.72	0.04	2	20
	TFP2	Levin, Lin & Chu	-4.40	0.00	2	16
		Hadri Z-stat	3.16	0.00	2	20
	TFP3	Levin, Lin & Chu	-3.56	0.00	2	18
		Hadri Z-stat	2.94	0.00	2	20
	LP	Levin, Lin & Chu	-4.44	0.00	2	18
		Hadri Z-stat	2.00	0.02	2	20
	CP	Levin, Lin & Chu	-1.83	0.03	2	16
		Hadri Z-stat	2.47	0.01	2	20

Note: * all variables included intercept apart from those marked(*) which included intercept and trend

Source: Author's calculations based on data form Orbis (2016)

Table A3: Panel unit root tests for non-stationary variables

Industry	Variable	Method	Statistic	Probability	Cross-sections	Observations	Variable	Method	Statistic	Probability	Cross-sections	Observations
B	D (Export)	Levin, Lin & Chu	-5.91	0.00	3	23	D (LP,2)	Levin, Lin & Chu	-5.18	0.00	3	19
		Hadri Z-stat	2.95	0.00	3	27						
	D (LP)	Levin, Lin & Chu	-2.10	0.02	3	24		Hadri Z-stat	2.29	0.01	3	24
		Hadri Z-stat	0.66	0.25	3	27						
D	D (CP)	Levin, Lin & Chu	-2.72	0.00	3	24	D (TFP2)	Levin, Lin & Chu	27.67	0.00	8	41
		Hadri Z-stat	2.69	0.00	3	27						
	D (TFP2)	Levin, Lin & Chu	-5.01	0.00	5	21		Hadri Z-stat	27.67	0.00	8	41
		Hadri Z-stat	27.67	0.00	8	41						
F	D (LP)	Levin, Lin & Chu	-8.60	0.00	3	22	D (TFP1)	Levin, Lin & Chu	-2.55	0.01	2	15
		Hadri Z-stat	3.75	0.00	3	26						
	D (TFP2)	Levin, Lin & Chu	-12.09	0.00	22	150		Hadri Z-stat	3.49	0.00	2	18
		Hadri Z-stat	6.21	0.00	23	187						
S	D (Export intensity)	Levin, Lin & Chu	-3.61	0.00	2	16	D (TFP1)	Levin, Lin & Chu	-2.55	0.01	2	15
		Hadri Z-stat	7.60	0.00	2	18						
	D (TFP1)	Levin, Lin & Chu	-2.55	0.01	2	15		Hadri Z-stat	3.49	0.00	2	18
		Hadri Z-stat	3.49	0.00	2	18						

Source: Author's calculations based on data from Orbis (2016)

Table A4: VAR: TFP1 -> Export revenue

Industry	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Number of observations	LM Autocorrelation test at lag 8	Granger causality	Lags	White test	R2	Adjusted R2	S.E. equation	F-statistic	Log likelihood	AIC	Schwarz criterion	Number of coefficients
A	42	3.66	0.53	3	63.96**	0.79	0.76	0.70	22.38	11.81	0.10	0.68	14
B	24	6.05	1.14	1	22.67*	0.05	-0.04	0.43	0.58	21.73	-1.31	-1.02	6
C	1214	0.88	11.64**	2	293.82***	0.72	0.72	0.80	764.73	-964.99	1.61	1.65	10
D	73	12.64* ¹	4.23*	1	8.39	0.73	0.72	1.34	92.46	-178.63	5.06	5.25	6
E	45	7.56	6.65**	1	12.23	0.56	0.54	1.43	26.44	-123.46	5.75	5.99	6
F	27	2.68	6.59*	1	23.34*	0.52	0.48	1.59	13.07	-84.38	6.69	6.98	6
G	250	8.75†	18.02***	3	190.63***	0.77	0.77	0.92	137.96	-451.57	3.72	3.92	14
H ²	111	7.33	8.91	5	135.39***	0.85	0.84	0.52	58.19	-75.16	1.75	2.29	22
I	171	0.47	11.69***	1	134.57***	0.54	0.53	0.83	96.82	-240.70	2.89	3.00	6
J	63	7.73	0.84	1	50.68***	0.43	0.41	1.26	22.89	-110.21	3.69	3.89	6
M ²	45	29.29***	92.33**	2	65.31***	0.95	0.94	0.38	188.05	-18.67	1.27	1.68	10
N	54	6.11	10.10*	4	60.37	0.59	0.51	1.21	8.01	-29.32	1.75	2.42	18
S ²	16	7.38	0.04	1	5.22	0.01	-0.14	1.38	0.10	-5.33	1.42	1.71	6
Total	1644	2.77	16.57**	4	567.58***	0.68	0.68	2.04	431.21	-5015.19	6.12	6.18	18

Note: *** p – value < 0.001 ** p – value < 0.01 * p – value < 0.05 † p – value < 0.1. ¹ only significant at 8th lag. All other lags show insignificant LM correlations. ² Granger causality in the opposite direction.

Source: Author's calculations based on data form Orbis (2016)

Table A5: VAR: TFP1 -> Export intensity

Industry	(1) Number of observations	(2) LM Autocorrelation test at lag 8	(3) Granger causality	(4) Lags	(5) White test	(6) R2	(7) Adjusted R2	(8) S.E. equation	(9) F-statistic	(10) Log likelihood	(11) AIC	(12) Schwarz criterion	(13) Number of coefficients
A	51	3.19	0.38	1	47.23***	0.90	0.89	0.03	208.39	155.01	-5.84	-5.62	6
B	27	7.76	0.22	1	17.51	0.74	0.72	0.05	34.36	84.52	-5.82	-5.53	6
C	844	1.25	2.12	4	168.88***	0.74	0.74	0.04	293.79	2069.39	-4.86	-4.76	18
D	38	1.03	7.62*	2	46.09**	0.53	0.47	0.09	9.12	23.62	-0.72	-0.29	10
E	29	2.09	10.53*	3	39.80	0.50	0.36	0.07	3.60	10.01	0.28	0.94	14
F	24	2.16	0.69	1	22.49*	0.08	-0.01	0.09	0.89	-5.36	0.95	1.24	6
G	219	1.27	1.35	3	190.30	0.62	0.61	0.07	56.91	154.88	-1.29	-1.07	14
H	132	18.16**	1.51	3	189.66***	0.73	0.72	0.03	56.89	293.54	-4.24	-3.93	14
I ²	160	0.79	6.56*	1	100.05	0.20	0.19	0.06	19.85	201.40	-2.44	-2.33	6
J	60	10.14*	1.16	1	41.62***	0.66	0.64	0.07	54.28	66.64	-2.02	-1.81	6
M	45	2.24	20.18***	1	44.02***	0.84	0.84	0.04	112.95	62.98	-2.53	-2.29	6
N	48	7.17	9.72*	4	80.69**	0.59	0.51	0.06	7.12	125.55	-4.48	-3.78	18
S	16	5.83	0.12	1	8.70	0.05	-0.10	0.06	0.32	37.08	-3.89	-3.60	6
Total	706	0.57	27.81***	7	718.52***	0.58	0.58	0.13	69.47	-27.31	0.16	0.36	30

Note: *** p – value < 0.001 ** p – value < 0.01 * p – value < 0.05 † p – value < 0.1. ¹ only significant at 8th lag. All other lags show insignificant LM correlations.² Granger causality in the opposite direction.

Source: Author's calculations based on data from Orbis database (2016)

Table A6: VAR: TFP2 -> Export revenue

Industry	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Number of observations	LM Autocorrelation test at lag 8	Granger causality	Lags	White test	R2	Adjusted R2	S.E. equation	F-statistic	Log likelihood	AIC	Schwarz criterion	Number of coefficients
A ³	11	0.97	0.11	1	10.07	1.00	1.00	0.03	5502.11	27.89	-3.98	-3.76	6
B	17	4.03	0.69	2	29.81	0.13	-0.16	0.50	0.45	3.63	0.75	1.24	10
C	803	9.84*	0.29	2	117.32***	0.79	0.79	0.73	734.06	-990.05	2.49	2.55	10
D	29	0.07 (7 th lag)	0.54	1	23.02*	0.88	0.87	0.96	91.63	-45.42	3.55	3.83	6
E	31	3.91	2.96†	1	31.71**	0.65	0.63	1.27	26.48	-38.26	2.86	3.13	6
F	17	1.95	2.80†	1	13.68	0.28	0.18	1.93	2.77	-36.51	5.00	5.30	6
G	162	7.84†	0.74	1	37.66***	0.75	0.75	1.07	244.51	-314.53	3.96	4.07	6
H ²	136	22.91*	0.89	2	111.70***	0.75	0.74	0.78	96.04	-162.14	2.53	2.75	10
I ²	125	1.83	5.23	3	132.20***	0.66	0.64	0.64	37.76	-9.30	0.37	0.69	14
J	57	13.17*	0.11	1	20.07†	0.42	0.39	1.30	19.22	-47.23	1.87	2.08	6
M ²	48	5.57	8.38**	1	30.95**	0.76	0.75	0.91	70.24	-40.71	1.95	2.18	6
N	75	2.60	0.05	1	12.92	0.49	0.48	1.48	35.12	-131.34	3.66	3.85	6
S	18	2.65	0.54	1	17.79	0.16	0.05	1.34	1.40	-28.66	3.85	4.15	6
Total	1538	15.12**	0.31	2	271.40***	0.74	0.74	2.03	1092.48	-4883.68	6.36	6.40	10

Note: *** p – value < 0.001 ** p – value < 0.01 * p – value < 0.05 † p – value < 0.1. ¹ only significant at 8th lag. All other lags show insignificant LM correlations. ² Granger causality in the opposite direction. ³ VAR does not satisfy the stability condition.

Source: Author's calculations based on data form Orbis database (2016)

Table A7: VAR: TFP2 -> Export intensity

Industry	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Number of observations	LM Autocorrelation test at lag 8	Granger causality	Lags	White test	R2	Adjusted R2	S.E. equation	F-statistic	Log likelihood	AIC	Schwarz criterion	Number of coefficients
A	9	2.09 (7 th lag)	1.31	2	14.59	0.89	0.86	0.00	24.79	46.08	-8.91	-8.78	6
B	24	20.72***	0.88	1	21.70*	0.73	0.70	0.05	28.40	50.81	-3.73	-3.44	6
C	620	6.26	2.74	3	136.13***	0.80	0.80	0.04	418.67	1125.07	-3.58	-3.48	14
D	17	2.45 (3 rd lag)	0.21	1	23.09*	0.54	0.48	0.09	8.32	10.06	-0.48	-0.18	6
E	25	1.04	5.52*	1	23.00*	0.65	0.61	0.04	20.14	55.36	-3.95	-3.66	6
F	17	4.81	0.01	1	13.75	0.01	-0.13	0.09	0.10	15.81	-1.15	-0.86	6
G	133	2.35	0.77	1	94.29***	0.45	0.44	0.08	53.68	82.80	-1.15	-1.02	6
H ²	143	10.30*	0.73	1	73.61***	0.43	0.42	0.04	52.69	240.11	-3.27	-3.15	6
I ²	115	0.33	1.87	3	46.69	0.19	0.15	0.06	4.35	346.52	-5.78	-5.45	14
J	54	14.18**	0.91	1	16.08	0.64	0.63	0.07	45.57	110.07	-3.85	-3.63	6
M	42	2.85	1.07	1	27.75**	0.88	0.87	0.03	147.59	102.72	-4.61	-4.36	6
N	69	0.89	1.14	1	16.74	0.49	0.48	0.07	32.19	86.57	-2.34	-2.14	6
S	16	4.69	0.18	1	18.30	0.05	-0.10	0.06	0.35	17.86	-1.48	-1.19	6
Total	1142	1.68	1.84	3	227.80***	0.67	0.67	0.12	382.63	-205.35	0.38	0.45	14

Note: *** p – value < 0.001 ** p – value < 0.01 * p – value < 0.05 † p – value < 0.1. ¹ only significant at 8th lag. All other lags show insignificant LM correlations.² Granger causality in the opposite direction.

Source: Author's calculations based on data form Orbis database (2016)

Table A8: VAR: TFP3 -> Export revenue

Industry	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Number of observations	LM Autocorrelation test at lag 8	Granger causality	Lags	White test	R2	Adjusted R2	S.E. equation	F-statistic	Log likelihood	AIC	Schwarz criterion	Number of coefficients
A ³	11	4.44	12.22***	1	14.02	1.00	1.00	0.03	5432.24	27.85	-3.97	-3.76	6
B	21	13.20*	1.02	1	27.12**	0.05	-0.05	0.45	0.52	-2.88	0.85	1.14	6
C	807	9.68*	1.27	2	117.79***	0.79	0.79	0.73	747.87	-1064.72	2.66	2.72	10
D	56	11.44*	1.07	1	16.27	0.84	0.83	1.03	136.01	-77.74	2.99	3.21	6
E	26	1.01	0.10	2	46.11**	0.87	0.85	0.75	35.19	-15.12	1.93	2.42	10
F	17	1.91	2.91†	1	13.17	0.29	0.19	1.92	2.84	-36.89	5.05	5.34	6
G	108	1.22	3.37	3	44.83	0.78	0.77	1.05	61.02	-214.36	4.23	4.58	14
H	189	0.88	0.01	1	38.85***	0.71	0.71	0.96	233.76	-266.16	2.88	2.98	6
I ²	126	0.71	5.55	3	149.67***	0.66	0.64	0.64	38.23	-19.49	0.53	0.85	14
J	58	8.80†	1.88	1	19.64†	0.43	0.41	1.27	20.99	-43.08	1.69	1.91	6
M	48	0.95	0.51	1	20.62†	0.72	0.70	0.99	56.57	-52.57	2.44	2.67	6
N	43	2.56	6.28	4	84.44***	0.60	0.50	1.35	6.27	-65.48	3.88	4.62	18
S	18	1.89	0.28	1	15.59	0.14	0.03	1.35	1.25	-27.53	3.73	4.02	6
Total	1538	13.19*	0.37	2	311.35***	0.74	0.74	2.03	1092.54	-4943.94	6.44	6.48	10

Note: *** p – value < 0.001 ** p – value < 0.01 * p – value < 0.05 † p – value < 0.1. ¹ only significant at 8th lag. All other lags show insignificant LM correlations. ² Granger causality in the opposite direction. ³ VAR does not satisfy the stability condition.

Source: Author's calculations based on data form Orbis database (2016)

Table A9: VAR: TFP3 -> Export intensity

Industry	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Number of observations	LM Autocorrelation test at lag 8	Granger causality	Lags	White test	R2	Adjusted R2	S.E. equation	F-statistic	Log likelihood	AIC	Schwarz criterion	Number of coefficients
A	9	1.33 (7 th lag)	1.06	1	15.69	0.88	0.85	0.00	23.83	45.54	-8.79	-8.65	6
B	24	22.84***	0.98	1	17.98	0.73	0.71	0.05	28.57	44.28	-3.19	-2.90	6
C	623	4.83	5.17	3	187.63***	0.80	0.80	0.04	422.60	1121.99	-3.56	-3.46	14
D	39	0.54	1.96	1	12.60	0.55	0.52	0.08	21.94	41.30	-1.81	-1.55	6
E	26	3.46	2.99†	1	19.02†	0.61	0.57	0.05	17.79	50.88	-3.45	-3.16	6
F	17	4.47	0.00	1	13.10	0.01	-0.13	0.09	0.10	15.39	-1.10	-0.81	6
G	146	3.50	1.98	1	108.06***	0.46	0.46	0.08	61.54	83.83	-1.07	-0.94	6
H ²	165	6.35	1.33	1	64.86***	0.58	0.57	0.04	111.12	287.88	-3.42	-3.30	6
I ²	116	0.40	3.51	3	63.99***	0.22	0.18	0.06	5.15	359.98	-5.97	-5.63	14
J ²	55	11.08*	2.58	1	15.58	0.64	0.63	0.07	46.07	119.11	-4.11	-3.89	6
M	42	2.85	0.00	1	20.39†	0.88	0.87	0.03	143.14	93.30	-4.16	-3.91	6
N ²	69	1.73	5.18*	1	19.81†	0.52	0.51	0.07	36.12	67.40	-1.78	-1.59	6
S	16	2.96	0.16	1	22.18*	0.05	-0.10	0.06	0.34	18.71	-1.59	-1.30	6
Total	1391	4.62	4.03	2	305.05***	0.68	0.68	0.12	737.45	-435.52	0.67	0.70	10

Note: *** p – value < 0.001 ** p – value < 0.01 * p – value < 0.05 † p – value < 0.1. ¹ only significant at 8th lag. All other lags show insignificant LM correlations. ² Granger causality in the opposite direction. ³ VAR does not satisfy the stability condition.

Source: Author's calculations based on data from Orbis database (2016)

Table A10: VAR: LP -> Export revenue

Industry	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Number of observations	LM Autocorrelation test at lag 8	Granger causality	Lags	White test	R2	Adjusted R2	S.E. equation	F-statistic	Log likelihood	AIC	Schwarz criterion	Number of coefficients
A	51	1.71	2.86†	1	36.00***	0.88	0.88	0.55	182.93	-8.59	0.57	0.80	6
B	15	7.49	0.49	3	41.52	0.22	-0.37	0.51	0.37	4.03	1.33	1.99	14
C	1162	2.50	42.54***	2	264.39***	0.64	0.63	0.76	505.41	-877.93	1.53	1.57	10
D	49	0.71	6.98**	1	34.10***	0.60	0.58	1.17	33.92	-132.21	5.64	5.87	6
E	39	1.26	2.36	1	55.31***	0.30	0.26	1.43	7.57	-63.15	3.55	3.80	6
F	23	20.72***	0.06	1	27.96**	0.31	0.24	1.92	4.46	-76.42	7.17	7.46	6
G	291	0.67	12.19***	1	30.60**	0.73	0.73	0.83	399.08	-418.97	2.92	3.00	6
H	178	0.72	21.90***	1	60.17***	0.64	0.64	0.70	158.09	-95.77	1.14	1.25	6
I	103	1.18	10.37*	4	49.82	0.49	0.44	0.58	11.36	-6.16	0.47	0.93	18
J	58	13.11*	2.82†	1	13.26	0.61	0.59	0.94	42.73	-68.63	2.57	2.79	6
M ²	43	2.66	17.95***	1	62.38***	0.72	0.71	0.27	52.68	14.25	-0.38	-0.14	6
N	66	5.92	4.67†	2	58.05***	0.46	0.42	1.36	12.96	-68.38	2.38	2.71	10
S	16	12.44*	0.44	2	30.85	0.06	-0.29	1.47	0.16	-19.49	3.69	4.17	10
Total	2049	2.31	65.87***	2	400.37***	0.64	0.64	1.91	897.35	-5575.18	5.45	5.48	10

Note: *** p – value < 0.001 ** p – value < 0.01 * p – value < 0.05 † p – value < 0.1. ¹ only significant at 8th lag. All other lags show insignificant LM correlations. ² Granger causality in the opposite direction. ³ VAR does not satisfy the stability condition.

Source: Author's calculations based on data form Orbis database (2016)

Table A11: VAR: LP -> Export intensity

Industry	(1) Number of observations	(2) LM Autocorrelation test at lag 8	(3) Granger causality	(4) Lags	(5) White test	(6) R2	(7) Adjusted R2	(8) S.E. equation	(9) F-statistic	(10) Log likelihood	(11) AIC	(12) Schwarz criterion	(13) Number of coefficients
A	45	2.09	7.10*	2	52.30***	0.91	0.90	0.03	96.46	136.95	-5.64	-5.24	10
B	21	5.86	1.67	1	18.50	0.69	0.65	0.05	19.91	45.24	-3.74	-3.44	6
C	853	3.45	7.42	4	155.99***	0.74	0.74	0.04	296.42	1841.71	-4.28	-4.18	18
D	47	2.47	12.44***	1	20.05†	0.63	0.61	0.07	37.61	29.18	-0.99	-0.75	6
E	39	1.81	0.01	1	48.28***	0.27	0.23	0.08	6.74	45.19	-2.01	-1.75	6
F	21	4.69	0.58	1	16.74	0.06	-0.05	0.09	0.54	22.53	-1.57	-1.28	6
G	252	1.97	11.16**	2	58.36***	0.64	0.64	0.07	111.49	363.68	-2.81	-2.67	10
H	178	3.52	5.93*	1	49.31***	0.70	0.69	0.04	201.20	411.52	-4.56	-4.45	6
I ²	160	0.39	0.01	1	88.17***	0.17	0.16	0.06	15.91	295.76	-3.62	-3.51	6
J	58	15.52**	4.07*	1	10.83	0.83	0.82	0.05	131.39	101.19	-3.28	-3.07	6
M ²	38	2.35	62.30***	2	36.60*	0.92	0.91	0.03	94.84	105.84	-5.04	-4.61	6
N	66	4.65	3.53	2	48.91**	0.47	0.43	0.07	13.37	125.63	-3.50	-3.17	10
S ²	18	1.12	0.23	1	20.83†	0.05	-0.09	0.06	0.38	32.16	-3.27	-2.98	6
Total	1759	5.06	12.46**	3	217.34***	0.69	0.69	0.12	659.24	504.53	-0.56	-0.51	14

Note: *** p – value < 0.001 ** p – value < 0.01 * p – value < 0.05 † p – value < 0.1. ¹ only significant at 8th lag. All other lags show insignificant LM correlations. ² Granger causality in the opposite direction. ³ VAR does not satisfy the stability condition.

Source: Author's calculations based on data form Orbis database (2016)

Table A12: VAR: CP -> Export revenue

Industry	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Number of observations	LM Autocorrelation test at lag 8	Granger causality	Lags	White test	R2	Adjusted R2	S.E. equation	F-statistic	Log likelihood	AIC	Schwarz criterion	Number of coefficients
A	45	2.46	17.79***	2	41.89*	0.95	0.95	0.35	194.21	25.68	-0.70	-0.30	10
B	18	2.04	4.04	3	38.70	0.49	0.21	0.40	1.77	17.02	-0.34	0.36	14
C	1182	0.62	12.05**	2	430.41***	0.65	0.65	0.79	545.16	-720.06	1.24	1.28	10
D	50	1.90	6.41*	1	9.79	0.61	0.60	1.47	37.20	-148.77	6.19	6.42	6
E	29	5.01	2.95	3	50.03†	0.33	0.15	1.55	1.80	-28.37	2.92	3.58	14
F	26	5.86	5.30*	1	13.11	0.48	0.43	1.64	10.59	-29.23	2.71	3.00	6
G	283	3.82	1.89	1	78.69***	0.75	0.75	0.84	417.70	-485.69	3.47	3.55	6
H	179	4.29	0.00	1	83.81***	0.60	0.59	0.77	130.29	-235.74	2.70	2.81	6
I	141	0.64	0.47	2	46.21**	0.38	0.36	0.59	20.58	219.97	-2.98	-2.77	10
J	60	8.36†	0.52	1	30.01**	0.39	0.37	1.23	18.32	-85.17	3.04	3.25	6
M	45	0.22	0.04	1	20.59†	0.08	0.03	0.88	1.72	-81.69	3.90	4.14	6
N	75	4.03	0.06	1	45.97***	0.39	0.38	1.40	23.45	-183.13	5.04	5.23	6
S	16	7.80	1.89	2	23.07	0.16	-0.14	1.39	0.53	-31.25	5.16	5.64	10
Total	2066	2.74	16.67***	2	705.14***	0.63	0.63	2.03	895.42	-6066.38	5.88	5.91	10

Note: *** p – value < 0.001 ** p – value < 0.01 * p – value < 0.05 † p – value < 0.1. ¹ only significant at 8th lag. All other lags show insignificant LM correlations. ² Granger causality in the opposite direction. ³ VAR does not satisfy the stability condition.

Source: Author's calculations based on data form Orbis database (2016)

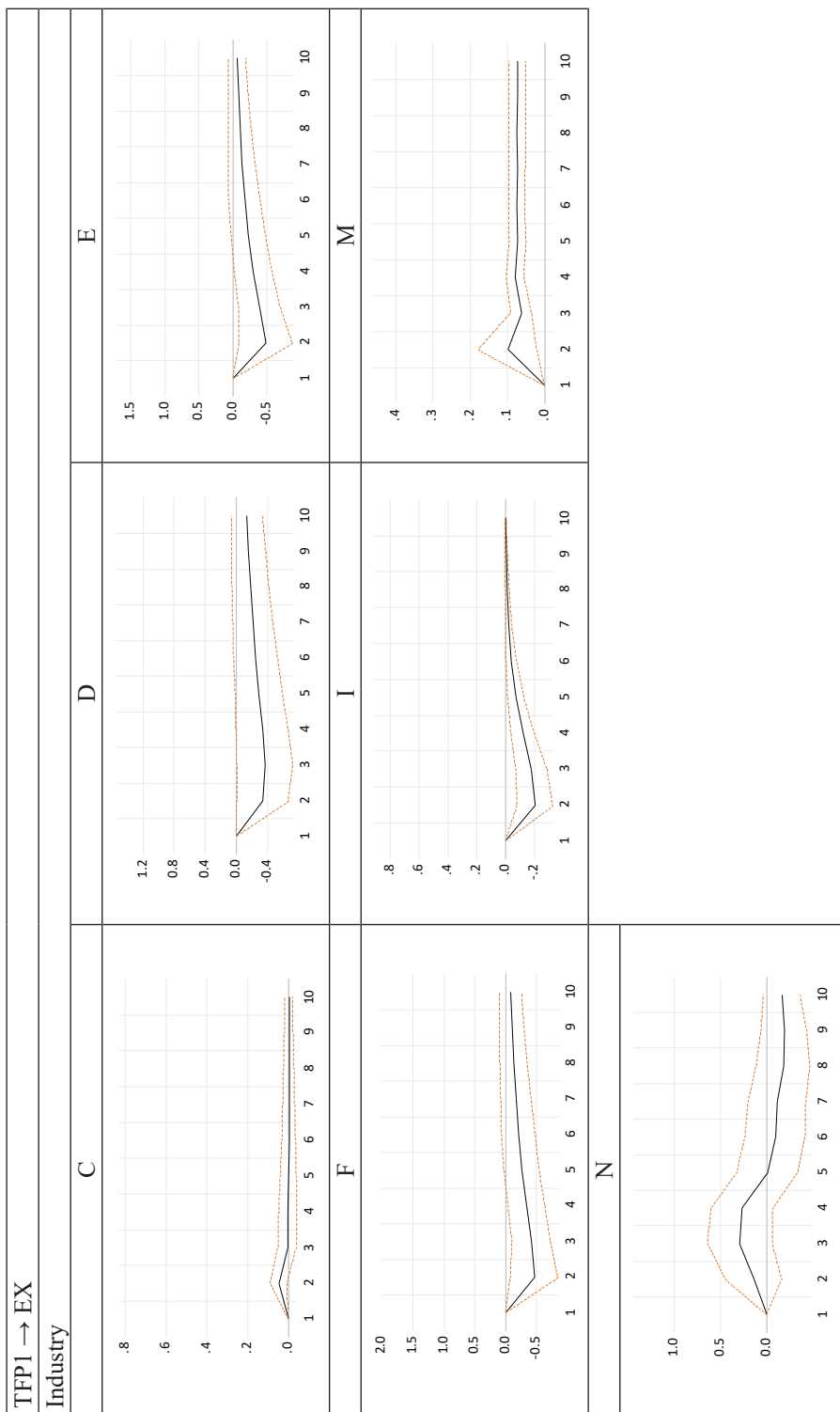
Table A13: VAR: CP -> Export intensity

Industry	(1) Number of observations	(2) LM Autocorrelation test at lag 8	(3) Granger causality	(4) Lags	(5) White test	(6) R2	(7) Adjusted R2	(8) S.E. equation	(9) F-statistic	(10) Log likelihood	(11) AIC	(12) Schwarz criterion	(13) Number of coefficients
A	45	4.59	0.94	1	55.46***	0.89	0.88	0.04	82.54	130.60	-5.36	-4.96	10
B	24	3.85	0.38	1	5.64	0.70	0.68	0.05	25.49	62.57	-4.71	-4.42	6
C	1176	2.32	3.13	2	333.47***	0.74	0.74	0.05	851.00	2640.20	-4.47	-4.43	10
D	39	0.61	8.38**	1	14.22	0.54	0.51	0.09	20.84	-5.85	0.61	0.86	6
E	39	12.44*	0.67	1	20.14†	0.29	0.25	0.08	7.19	26.56	-1.05	-0.80	6
F	24	4.35	0.13	1	8.76	0.05	-0.04	0.09	0.60	42.03	-3.00	-2.71	6
G	243	3.38	4.05	2	95.10***	0.62	0.61	0.07	95.88	201.94	-1.58	-1.44	10
H	177	1.77	1.08	1	84.04***	0.69	0.69	0.04	196.00	286.66	-3.17	-3.06	6
I	160	1.49	2.11	1	42.60***	0.18	0.17	0.06	17.18	621.97	-7.70	-7.58	6
J	60	6.22	3.02†	1	18.18	0.67	0.65	0.07	56.93	85.75	-2.66	-2.45	6
M	45	1.92	4.45*	1	25.04*	0.79	0.78	0.05	79.07	51.76	-2.03	-1.79	6
N	40	8.94†	14.01*	4	90.58**	0.59	0.44	0.06	4.11	68.94	-2.35	-1.42	22
S	16	0.09	1.02	1	13.65	0.11	-0.03	0.06	0.79	13.35	-0.92	-0.63	6
Total	1762	6.42	10.29*	3	608.26***	0.68	0.68	0.12	615.59	-148.79	0.18	0.23	14

Note: *** p – value < 0.001 ** p – value < 0.01 * p – value < 0.05 † p – value < 0.1. ¹ only significant at 8th lag. All other lags show insignificant LM correlations. ² Granger causality in the opposite direction. ³ VAR does not satisfy the stability condition.

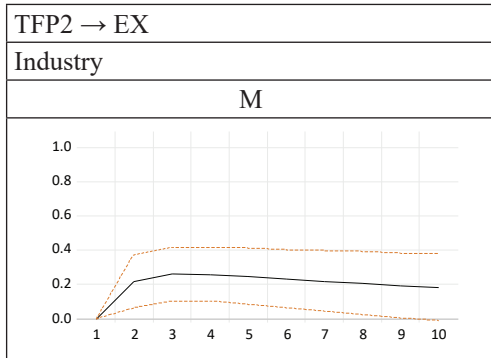
Source: Author's calculations based on data form Orbis database (2016)

Figure A1: Impulse response functions (dependent variable: Export)



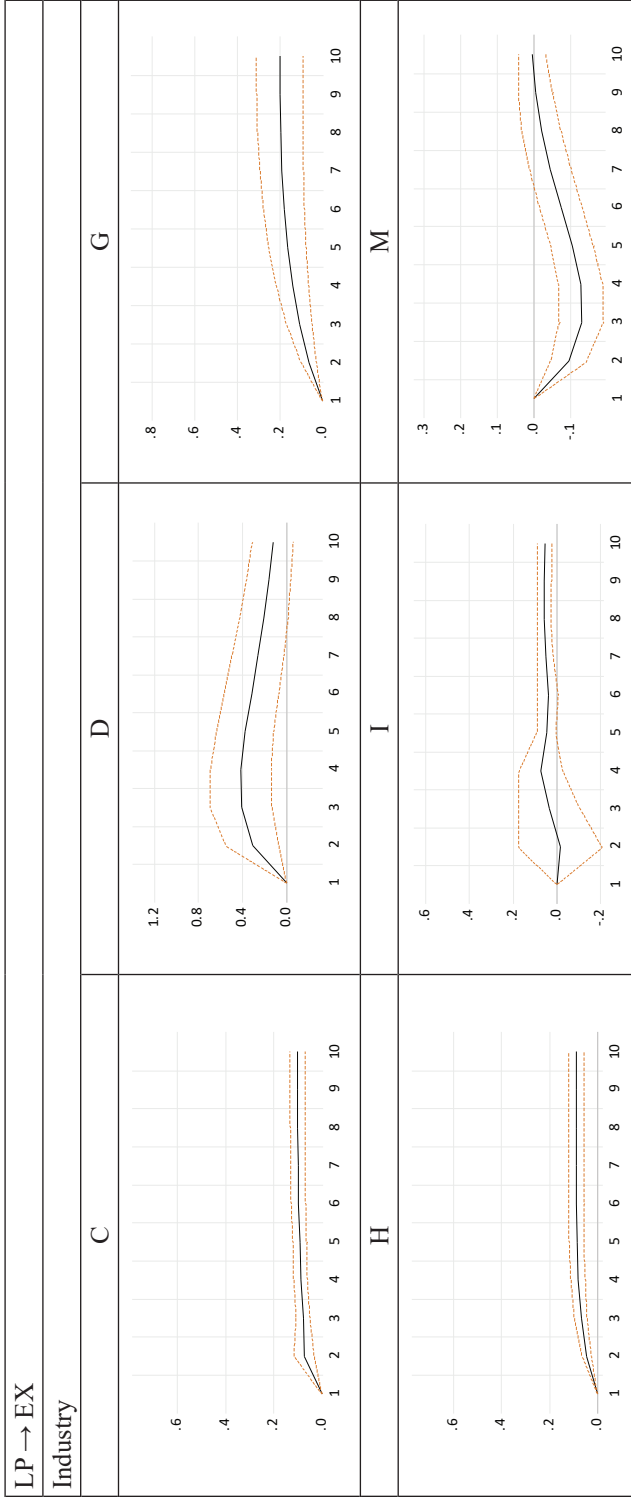
Source: Author's representation based on data form Orbis (2016)

Figure A1: Impulse response functions (dependent variable: Export) (continued)



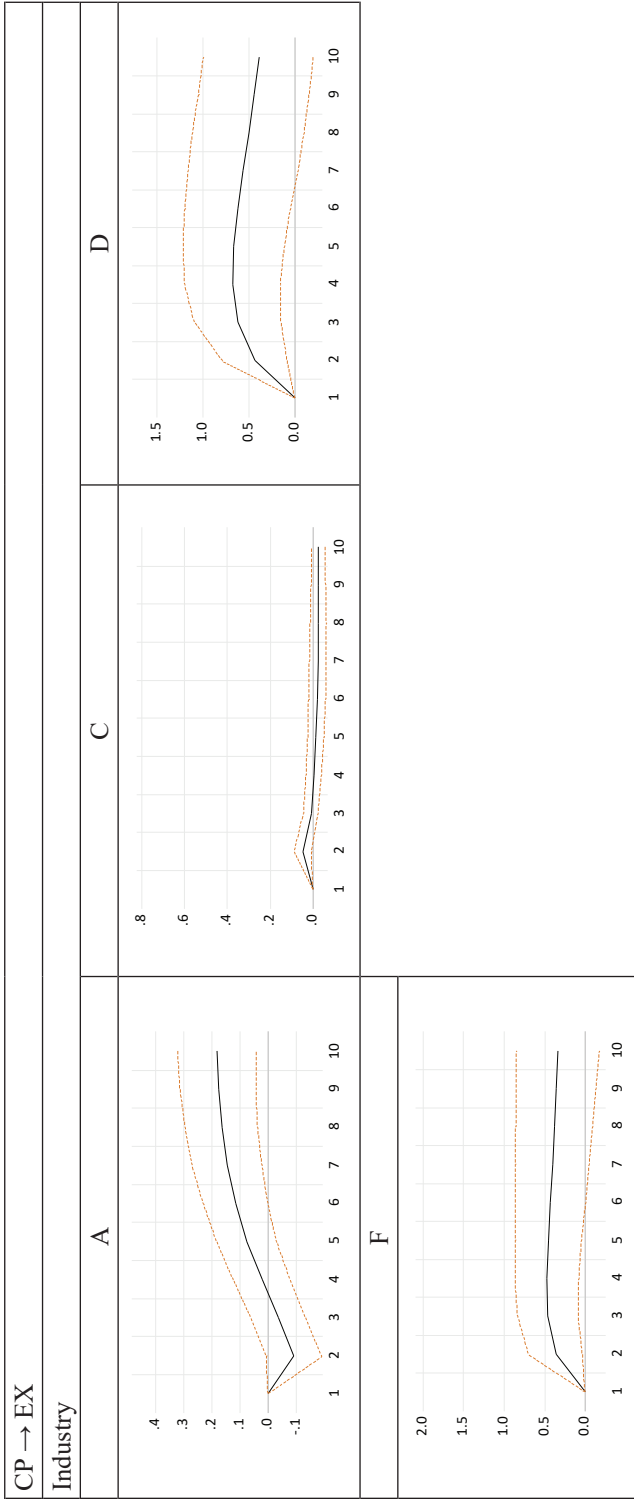
Source: Author's representation based on data from Orbis (2016)

Figure A1: Impulse response functions (dependent variable: Export) (continued)



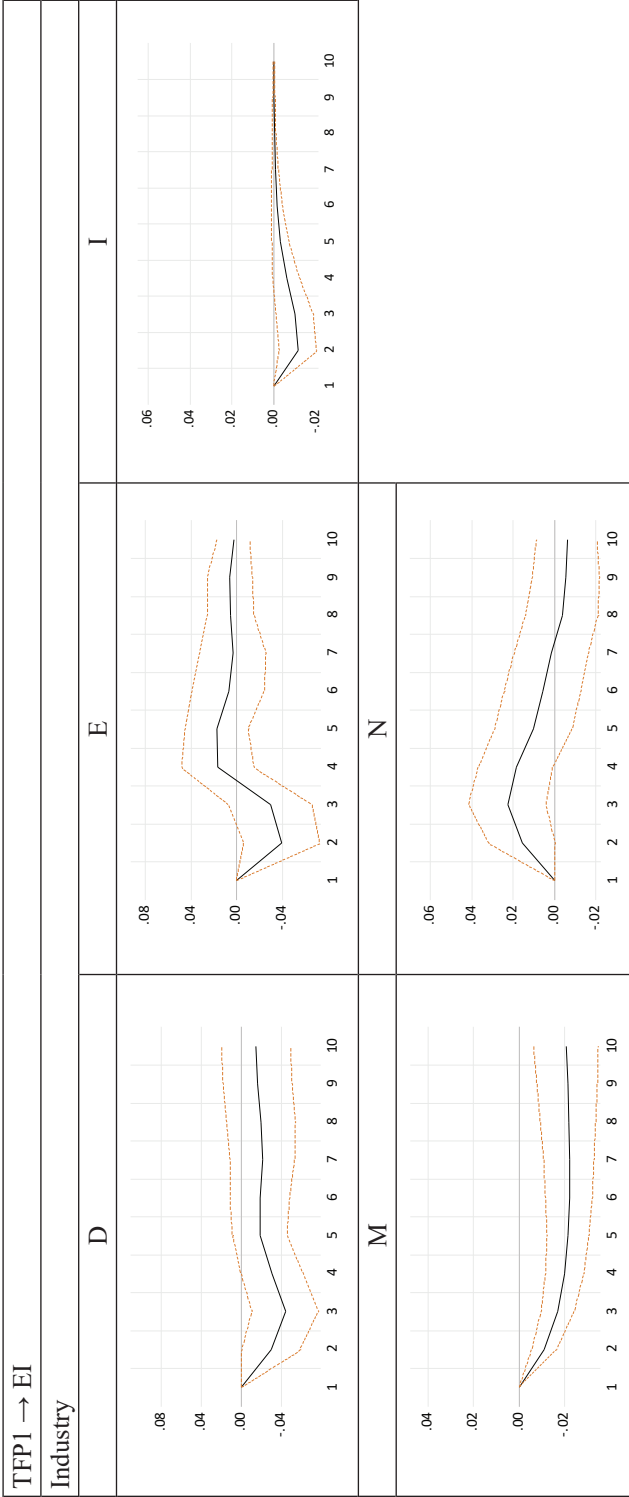
Source: Author's representation based on data form Orbis (2016)

Figure A1: Impulse response functions (dependent variable: Export) (continued)



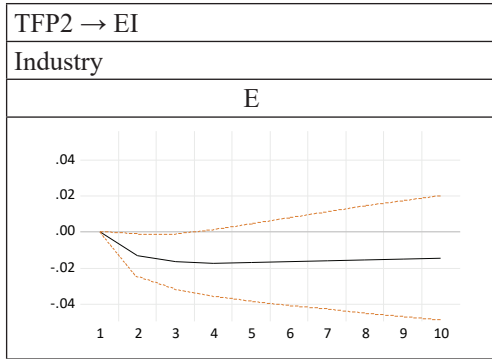
Source: Author's representation based on data form Orbis (2016)

Figure A2: Impulse response functions (dependent variable: Export intensity)



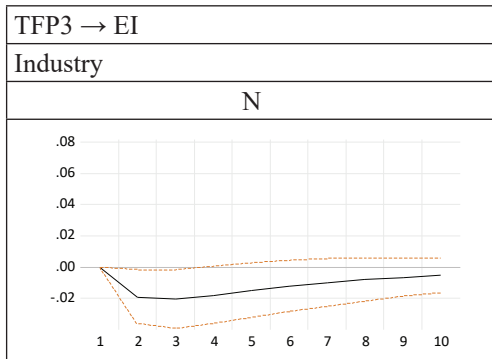
Source: Author's representation based on data form Orbis (2016)

Figure A2: Impulse response functions (dependent variable: Export intensity)
 (continued)



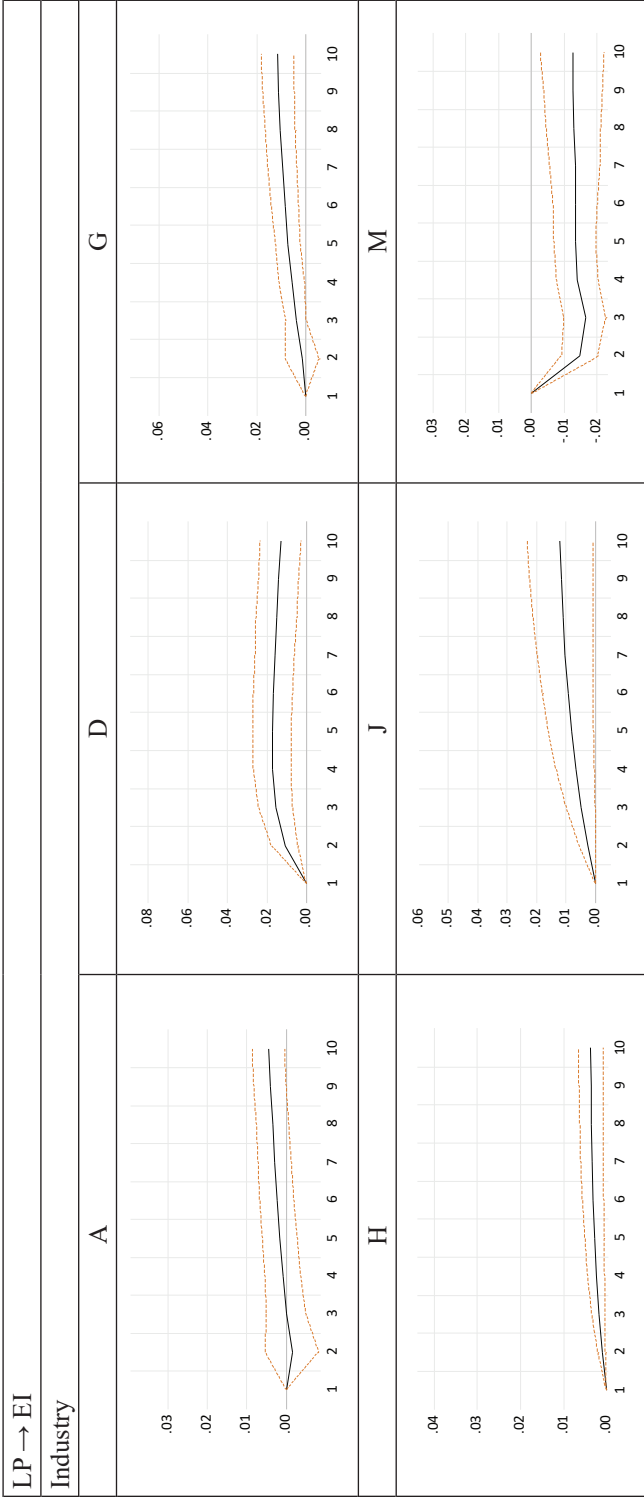
Source: Author’s representation based on data form Orbis (2016)

Figure A2: Impulse response functions (dependent variable: Export intensity)
 (continued)



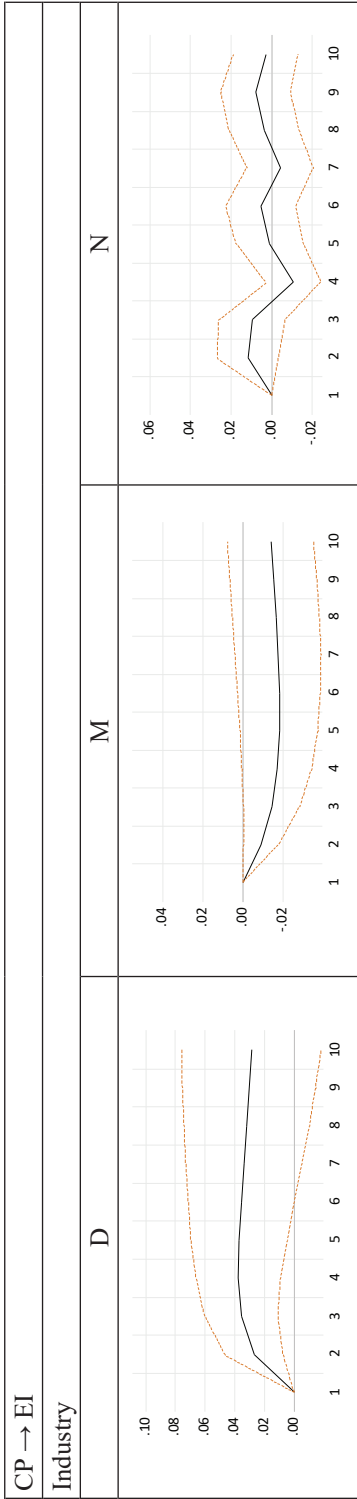
Source: Author’s representation based on data form Orbis (2016)

Figure A2: Impulse response functions (dependent variable: Export intensity) (continued)



Source: Author's representation based on data form Orbis (2016)

Figure A2: Impulse response functions (dependent variable: Export intensity) (continued)



Source: Author's representation based on data form Orbis (2016)

Decision trees do not lie: Curiosities in preferences of Croatian online consumers*

Ana Marija Filipas¹, Nenad Vretenar², Ivan Prudky³

Abstract

Understanding consumers' preferences has always been important for economic theory and for business practitioners in operations management, supply chain management, marketing, etc. While preferences are often considered stable in simplified theoretical modelling, this is not the case in real-world decision-making. Therefore, it is crucial to understand consumers' preferences when a market disruption occurs. This research aims to recognise consumers' preferences with respect to online shopping after the COVID-19 outbreak hit markets. To this purpose, we conducted an empirical study among Croatian consumers with prior experience in online shopping using an online questionnaire. The questionnaire was completed by 350 respondents who met the criteria. We selected decision-tree models using the J48 algorithm to determine the influences of the found shopping factors and demographic characteristics on a consumer's preference indicator. The main components of our indicators that influence consumer behaviour are the stimulators and destimulators of online shopping and the importance of social incidence. Our results show significant differences between men and women, with men tending to use fewer variables to make decisions. In addition, the analysis revealed that four product groups and a range of shopping mode-specific influencing factors are required to evaluate consumers' purchase points when constructing the consumers' preference indicator.

Keywords: decision-making, consumers' preferences, data mining, decision trees, shopping behaviour indicators

JEL classification: C44, D12

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¹ Teaching assistant, University of Rijeka, Faculty of Economics and Business, Ivana Filipovića 4, 51000, Rijeka, Croatia. Scientific affiliation: quantitative economics, econometrics, statistics. Phone: +385 51 355 162. E-mail: ana.marija.filipas@efri.hr.

² Associate professor, University of Rijeka, Faculty of Economics and Business, Ivana Filipovića 4, 51000, Rijeka, Croatia. Scientific affiliation: organization theory, operational management, decision theory. Phone: +385 51 355 163. E-mail: nenad.vretenar@efri.hr.

³ Teaching assistant, University of Rijeka, Faculty of Economics and Business, Ivana Filipovića 4, 51000, Rijeka, Croatia. Scientific affiliation: quantitative economics, decision theory, sports economics. Phone: +385 51 355 161. E-mail: ivan.prudky@efri.hr.

1. Introduction

The adoption of online shopping differs between Croatia and the rest of the EU countries, as Croatia has some catching up to do, compared to these countries. Some of the reasons for the lag in adoption could be explained by understanding what is pulling Croatian consumers away from engaging in online shopping. With an average number of landline internet connections per 100 inhabitants of 35.5 in the EU-27 in 2020, Croatia is at the bottom of the list with 25.1 landline internet connections per 100 inhabitants, surpassing only Poland (Our World in Data, 2022). A lower number of internet users buying products is also evident from the number of people who bought products online in 2019: 34.97% of Croatians bought products online, while the EU-27 average is 48.97% (Eurostat, 2023-a). Interestingly, men buy more online (38.98% in Croatia and 49.81% in EU-27) than women (31.17% in Croatia and 48.15% in EU-27). However, fewer landline internet connections are not the primary determinant of Croatian consumers' shopping habits.

Various perceived barriers and problems in online shopping shape their decisions. According to Eurostat data (2023-b), individuals prefer shopping in person (29.04%) much more than the EU-27 average (17.40%), and they like to see the product while shopping, are loyal to stores, are forced to buy in stores, or do so out of habit. Another barrier to shopping online, again much higher than the EU-27 average, is concern about the cost of delivery of goods (Croatia: 7.07% of individuals; EU-27 average: 2.79% of individuals). Concern about payment security or privacy as the next main barrier is again higher in Croatia than in the EU-27 average: 5.82% and 5.61% of individuals, respectively, report such concerns. The reasons for such behaviour are also not supported by factual circumstances, as online shopping problems are less common in Croatia than in the EU-27 average (Eurostat, 2023-c). Although 31.50% of individuals did not experience problems purchasing through a website or app for personal use (4.90 PP. less than the EU-27 average), only 13.87% of individuals reported encountering problems while making online purchases (4.83 PP. less than the EU-27 average). The most important problem is the duration of delivery, which is criticised by 6.98% of individuals in Croatia, compared to an average of 11.82% of people in the EU-27. The use of websites that are too complicated or do not work satisfactorily is the second most common problem, reported by 4.10% of individuals in Croatia, which is also lower than the EU-27 average of 5.29%. A more common problem than the EU-27 average is the foreign seller not selling in their country as 3.41% of Croatian respondents struggled with this, compared to an EU-27 average of 2.28%. Other, less common problems, such as faulty or damaged delivered goods, difficulty finding information, satisfactory responses to complaints about products, or final costs that differ from those quoted, were all less common than the EU-27 averages. Different views of online shopping influence the decision to use it, but they are not the only determining factors. According to the data presented, people in Croatia perceive fewer barriers to online shopping than the EU-27 average. The

problems they encountered when shopping online were also less frequent than the EU-27 average. Nevertheless, Croatians prefer shopping in stores for several reasons that should be explored.

The observed curiosities lead to the formulation of some working research hypotheses: *consumers choose their preferred shopping method differs depending on sociodemographic subgroups; shopping mode-specific factors influence consumers' shopping decisions, and men and women have different shopping decision patterns.* Mode-specific factors are undoubtedly important in the decision between shopping in stores and shopping online. However, different sociodemographic characteristics of consumers also influence the final decision on how to shop. Shifts in influencing factors can be observed especially during and after the market disruption of COVID-19. The factors influencing consumers' decisions on their preferred mode of purchase are the subject of this paper, considering this decision as the dependent variable. The manner and the importance of the influence of the shopping mode-specific characteristics, as well as the sociodemographic characteristics of the consumers, are considered variables that influence the consumers' final decision on the preferred shopping types.

The *Literature review* section of this paper presents previous findings on consumers' preferences and the theoretical grounds for the chosen methods. A more detailed insight into the use of algorithms, tests, and constructed (in)dependent variables is provided in the *Methodology* section. The *Empirical Data and Analysis* section provides a general overview of the data collection, the research sample and a detailed insight into the analysis conducted, which leads directly into the *Results and Discussion* section, where the main findings are compared to previous ones and the new insights and main contributions of our research are highlighted. The *Conclusion* section highlights the main findings and suggests possible lanes for future research.

2. Literature review

A variety of factors influence consumers' shopping preferences. Consumers' preferences can change fundamentally when hit by severe market disruptions, both short- and long-term. Thus, the influencing factors to a consumer's shopping decision will be looked at from two separate aspects: the *sociodemographic characteristics* of consumers and *shopping mode specifics* as influencing variables. The sociodemographic characteristics found to be most influential in previous research were gender, age, employment or work status, education level, personal income, and urbanisation level of the residence. Regarding shopping mode-specific factors, they proved to have a positive or stimulative, or negative or destimulative influence on consumers' shopping decisions.

Gender differences are noticeable when choosing the shopping mode (Kim et al., 2020). According to Yahya and Sugiyanto (2020), who studied the effects of demographic and socioeconomic factors on a person's decision to shop online, women are more likely to shop online than men. Further, consistent conclusions were presented in the research papers of Hood et al. (2020) and Moon et al. (2021), demonstrating a higher likeliness of women to shop online than men. Moreover, women will spend more shopping online than men (Truong and Truong, 2022). Undesirable aspects such as prolonged delivery time don't affect women's decision to shop online or not. Even when delivery times are longer, women are more likely to shop online than men (Dias et al., 2022).

Expected is that distinct *age groups* have different attitudes towards shopping modes. Hood et al. (2020) found statistically significant evidence that people aged 25 to 44 are more likely to shop online than other age groups. Similar results came from Moon et al. (2021), stating consumers in their late 20s and 30s are most likely to shop online. Dias et al. (2022) and Buhaljoti et al. (2022) discovered that consumers' intentions to shop online decrease as they age. Giannakopoulou et al. (2022) conducted a study in Cyprus and found that age influences online grocery shopping. Younger individuals, in particular, tend to shop online more frequently. Rummo et al. (2022) conclude that the lack of social interaction while shopping online will discourage older consumers from doing so. Regarding spending habits, Truong and Truong (2022) find that with the increase in a consumer's age, the odds of spending more while shopping online increase, while the same decrease while shopping in-store.

The work status of an individual may as well determine their shopping habits. Due to its simplicity and time-saving advantages, online purchasing may become more common, particularly in households with full-time employment and young children (Frank and Peschel, 2020). According to Garín-Muñoz et al. (2022), most Spanish online consumers are employed. Furthermore, studies by López Soler et al. (2021) and Smith et al. (2022) supported these findings by demonstrating that full-time employees in European countries are likely to make online purchases.

Regarding attained *education level*, it is argued that people with a higher education level typically have more confidence when implementing new technologies. Therefore, educated individuals prefer online shopping to traditional in-store shopping (Van Droogenbroeck and Van Hove, 2017). In addition, Dominici et al. (2021) found that Belgian consumers who purchase groceries online are mainly highly educated. Truong and Truong (2022) found that higher educated consumers will tend to make online purchases but will be more considerate and spend less than consumers with lower levels of education.

Yahya and Sugiyanto (2020) showed that the *urbanisation level of the residence* is an important factor influencing the decision of whether to shop online or in-store.

Their results indicated that individuals who live in urban areas have a stronger tendency to shop online. These findings are consistent with those of AbdulHussein et al. (2022), whose survey used data from Canadian consumers, and those of Anderson and Srinivasan (2003). Residents of rural areas have low shopping accessibility and therefore choose to shop online for specific groups of products (Yousefi et al., 2023). This is in line with Hood et al. (2020), who state higher, but constant levels of online shopping from consumers in urban areas, whereas consumers from rural areas shop less frequently online, but if they do so, their spending is much higher.

Personal monthly income has also been shown to be one of the determining factors in the decision to shop online. Both Hood et al. (2020) and Giannakopoulou et al. (2022) have shown that higher-income individuals are more likely to shop online than in-store. In addition, a study of U.S. consumers by Duffy et al. (2022) confirmed the relationship between higher income and online purchases. Truong and Truong (2022) conclude that higher-income individuals will spend more while shopping in-store and less while shopping online than lower-income individuals.

Besides sociodemographic characteristics, *shopping mode-specific determinants* influence consumers' shopping decisions. In his influential work on the two-factor motivation theory, Herzberg examined 14 factors for job satisfaction and then divided them into two groups: motivators and hygiene factors (Herzberg et al., 2017). According to his findings, satisfaction, and dissatisfaction are on two separate continuums, i.e., independent of each other. Unlike motivators, hygiene factors do not lead to higher motivation, but their absence leads to dissatisfaction. Inspired by the intuitive correctness of his approach, we opted for a similar division of factors in our analysis of factors influencing consumers' attitudes and decisions when shopping online. Thus, the first group of factors, referred to as online shopping destimulators (OSD), contains variables that might discourage consumers from shopping online, making them similar to Herzberg's hygiene factors. The other group, online shopping stimulators (OSS), contains factors that could stimulate consumers to shop online. These two composite indicators were the first nodes of the decision-tree model in this paper. Online shopping characteristics such as convenience, privacy, promotion, and pricing, as well as delivery attributes such as the importance and influence of delivery time, fees, and reception, were part of the research paper of Dias et al. (2021), supporting the argument for choosing the OSS and OSD as a basis for shopping mode decision. Aw et al. (2021) determined a list of shopping mode-related factors influencing consumers' online shopping decisions: online search convenience, perceived usefulness of online reviews, immediate possession of products, and smart shopping perception while researching products online. Aw et al. (2021) and Hermes et al. (2022) point out the influence of perceived risks and trust in

online shopping to also shape the shopping mode choice. Influencing factors for in-store shopping were the need for interaction and perceived helpfulness of in-store salespeople, the need for a touch of products, price comparison orientation, and product knowledge. Rathee and Rajain (2019) and Hermes et al. (2022) point out that the consumer's need for touch is also essential, posing a challenge to choose online over the in-store shopping mode. As per Rummo et al. (2022), the lack of social interaction discouraged online shopping. Loyalty to a store and habit-influenced behaviour will also affect consumers' decisions in shopping mode (Audrain-Pontevia and Vanhuele, 2016).

Analysing consumers' shopping behaviour proved to be challenging due to the (in)ability to collect relevant data and because of appropriate data analysis methods selection. The procedure of exploring and analysing vast amounts of data with the goal of identifying relevant patterns and trends is referred to as *data mining* (Song et al., 2001). *Decision trees* have become one of this field's most widely used and powerful techniques. The nodes and leaves of a decision tree produce an understandable hierarchical structure. A class is represented by each leaf of the tree, and an attribute is tested by each node. A categorisation applicable to all instances that reach that node is formed by organising cases in a decision tree from the root to that leaf node. There are numerous methods to build decision trees. One of the key differences between them is the ability to identify the feature that results in the best split of the source dataset. Depending on the algorithm used to create the decision tree, a splitting criterion can be established using a variety of metrics. The dataset is split until the previously defined stopping condition is met, or there are no more attributes (Quinlan, 1993).

The best-known method for constructing a decision tree is the *C&RT (Classification & Regression Tree) algorithm* (Breimann, 1984). However, subsequent publications (for example, Mingers, 1989) have shown that overfitting and selection bias are common problems when using this algorithm. For this reason, Strasser and Webber (1999) proposed a new set of algorithms, *Conditional Inference Trees (CTree)*, based on a framework that combines recursive binary partitioning and permutation tests. Nevertheless, Gomes et al. (2020) compared the predictive power of these two algorithms, and their results suggest that the C&RT algorithm generally gives better results than the CTree algorithm for large datasets, while Bertsimas et al. (2022) concluded that the CTree algorithm gives the most stable results for smaller datasets.

Principal component analysis (PCA) (Bro and Smilde, 2014; Vidal and Sastry, 2016; Kherif and Latypova, 2020) is a practical algorithm that linearly transforms and scales complex data. During the PCA process, the number of components decreases while maximising the variance of explained data. Moreover, using PCA enables the isolation and quantification of patterns which can reveal connections between variables and samples or create the ability to form new hypotheses. The

power of the PCA process to reduce the number of components has proven helpful before using decision-tree algorithms (Howley et al., 2006; Hu et al., 2009). Reduction of factors (independent variables) results in efficiency gains in data processing, decision-tree structure optimisation, and higher forecast accuracy of decision trees (Nasution et al., 2018), making PCA a very useful tool to be used before creating a decision tree.

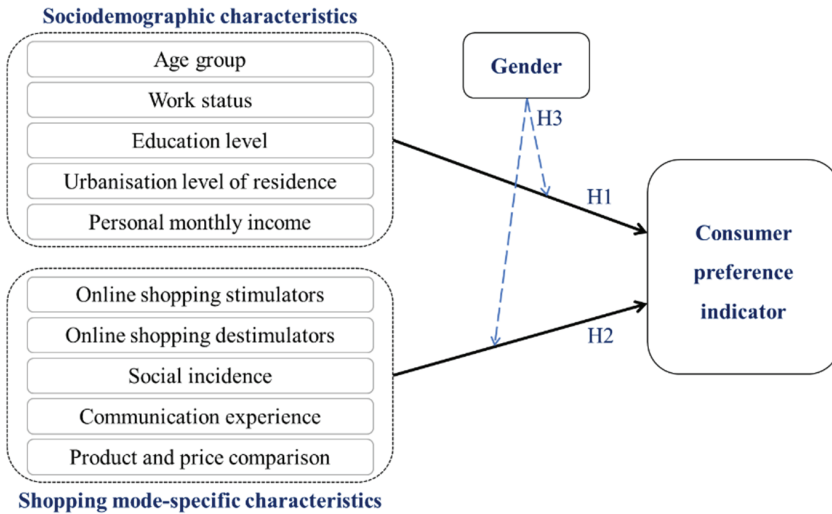
Recent research shows that decision trees are a valuable analytical tool for understanding consumers' behaviour. The C&RT and CTree algorithms have been widely used in consumer behaviour research. For example, Wah et al. (2011) used the C&RT algorithm to construct a decision tree to study consumers' car purchase behaviour and achieved 89.00% accuracy. On the other hand, Šebalj et al. (2017) studied in-store shopping intentions using several current decision-tree algorithms: J48, RandomForest, and REPTree (Reduced Error Pruning Tree). The results obtained from the study indicated that the *J48 algorithm* achieved the highest accuracy, with a classification rate of 84.75%. In addition, Ansari and Riasi (2019) also used the J48 tree algorithm to analyse consumers' preferences regarding shopping locations. The results of their study again showed that the J48 algorithm could be used as a strong tool for predicting consumers' behaviour due to its high accuracy. Furthermore, some authors studied shopping habits using PCA and decision trees. Significant results were presented in the work of Bucko et al. (2018), in which they used PCA to determine factors that influence consumers' purchase behaviour. Finally, Romano et al. (2014) successfully used PCA before constructing the decision tree to evaluate consumers' purchase decisions.

In assessing shopping behaviour with decision-tree algorithms using the mean values of multiple observed variables, some authors (Šebalj et al., 2017; Ansari and Riasi, 2019) constructed an indicator of shopping intention and shopping location preference indicator as binary variables. In their study of shopping mode preferences, Farag et al. (2007) found a relationship between the desired product type and the chosen shopping mode. In addition, Schmid and Axhausen (2018) examined in-store and online shopping preferences using the product groups of groceries and standard electronic devices, and Rossolov et al. (2021) did the same for a wide range of experiences and search goods. The collective results show that the shopping mode choice differs according to the product purchased. This suggests that the *consumer's preference indicator* can be built on evaluating the preferred shopping mode based on different product groups.

Based on the set working hypotheses and grounded in the conducted and presented literature review, we were able to shape a research model presented in Figure 1 and specify the following research hypotheses:

H1: Sociodemographic characteristics of consumers have a significant influence on a preferred shopping mode choice.

Figure 1: Consumer's preference indicator influences



Source: Author's construction

While a specific age range of consumers portrays the highest tendency to shop online (Hood et al., 2020; Moon et al., 2021), it is generally the case that with an increase in age, consumers are more likely to shop in-store (Dias et al., 2022; Buhajoti et al., 2022; Giannakopoulou et al., 2022). Higher educated consumers (Van Droogenbroeck and Van Hove, 2017; Dominici et al., 2021; Truong and Truong, 2022) and those with higher PMI (Hood et al., 2020; Giannakopoulou et al., 2022; Duffy et al., 2022) are more likely to shop online. Consumers' work status and time management (Frank and Peschel, 2020; Garín-Muñoz et al., 2021; López Soler et al., 2021; Smith et al., 2022), together with the urbanisation level of residence (Yahya and Sugiyanto, 2020; AbdulHusein et al., 2020; Yousefi et al., 2023) affect the consumer's shopping mode choice as well.

H2: Shopping mode-specific characteristics have a significant influence on a preferred shopping mode choice.

Importance of social interaction and staff helpfulness, physical product features, product comparison ability or shop loyalty (Audrain-Pontevia and Vanhuele, 2016; Rathee and Rajain, 2019; Hermes et al., 2022; Rummo et al., 2022), perceived risk and trust influence of online shopping (Aw et al., 2021; Hermes et al., 2022), online shopping convenience, information, review availability and privacy (Dias et al., 2022; Aw et al., 2021), all will influence the shopping mode choice.

H3: Male and female consumers have significantly different shopping mode decision patterns.

Men and women prefer to choose different shopping modes based on specific products purchasing (Kim et al., 2020; Yahya and Sugiyanto, 2020), with women's tendency to shop more online generally (Hood et al., 2020; Moon et al., 2021) and spend more while shopping online as well (Truong and Truong, 2022). Undesirable shopping mode aspects will also affect the genders' shopping mode choices differently (Dias et al., 2022).

3. Methodology

In order to gain better insight into influential factors while deciding on the purchase method, consumers answered a wide range of questions evaluating shopping specifics from different viewpoints. To make a large amount of gathered data more easily analysed, a principal component analysis was conducted with the aim of identifying comprehensive factors of influence (Bro and Smilde, 2014; Vidal and Sastry, 2016; Kherif and Latypova, 2020). Consumers evaluated their shopping preferences in buying different groups of products: *groceries, clothing and footwear, technical equipment, and gifts and presents*. Grounded in the papers of Šebalj et al. (2017) and Ansari and Riasi (2019), based on the respondents' evaluation results, a *consumer's preference indicator (CPI)* was constructed, which takes on the values 1 = consumer prefers shopping in stores, and 2 = consumer prefers shopping online. Since the dependent variable can only take the values of 1 or 2, the problem of determining the respondents' shopping preferences is presented as a classification problem. Three classification algorithms (C&RT, CTree, J48) were used to build the decision-tree models. The C&RT algorithm uses *Gini impurity* (Breimann, 1984) as a splitting criterion, which is defined as follows:

$$Gini\ impurity(D) = 1 - \sum_{i=1}^n p_i^2, \quad (1)$$

where D is a dataset that consists of n classes and p_i is the probability that an instance belongs to class i . The CTree algorithm, on the other hand, uses the permutation test framework to find the optimal binary split (Strasser and Webber, 1999). Moreover, the J48 algorithm, as an implementation of the C4.5 algorithm (Quinlan, 1996), uses *Gain Ratio* as a splitting criterion:

$$Gain\ Ratio(A) = \frac{Gain(A)}{Entropy(A)}, \quad (2)$$

where *Gain* and *Entropy* are defined as follows:

$$Gain(A) = Entropy(A) - \sum_{j=1}^m \frac{|D_j|}{|D|} * Entropy(D_j) \quad (3)$$

and

$$\text{Entropy}(A) = -\sum_{i=1}^n p_i \log_2 p_i. \quad (4)$$

Here, D represents a given dataset, D_j represents the j -th subset of D and A represents a specific attribute. Moreover, p_i is the proportion of class i , which belongs to dataset D (Mitchell, 1997).

The algorithm that achieved the highest classification accuracy rate out of the three (C&RT, CTree, J48) is presented in the following section. To evaluate the performance of each of the three models constructed using C&RT, CTree, and J48 algorithms, the source dataset was first randomly divided into a training dataset and a test dataset in an 80:20 ratio, as this ratio is the most commonly used (Géron, 2019). The training dataset was subjected to a ten-fold cross-validation method – split into ten equally sized subgroups or folds, and the model was trained and validated ten times, each time using a different fold for validation and the remaining nine folds for training (Hastie et al., 2009; Han et al., 2012). Finally, the model's performance was tested on a separate, unseen test dataset. The previously described procedure allows for better generalisation by allowing independent evaluation of the model on data it has not encountered during training or validation (Nisbet et al., 2009). The analysis was performed using R software version 4.2.3, the *rpart*, *partykit*, and *RWeka* packages were utilised to construct the decision trees, respectively (Hornik et al., 2023; Hothorn et al., 2023; Therneau et al., 2022).

4. Empirical data and analysis

A Google Forms questionnaire was used for the empirical study to gather data on Croatian consumers' shopping behaviour. The questionnaire was active from May to September 2022, and 350 respondents gave valid answers, forming the sample for this research (Table 1). Most of the sample are women (72.1%), 80% of the respondents fall within the 21-50 age range, and more than half have acquired a bachelor's or higher education degree. Most respondents are employed or self-employed (entrepreneurs), with 75.2% of the sample stating having up to 1,200 EUR of personal monthly income (PMI). Additionally, 64.1% of the respondents reside in larger cities.

Table 1: Sample characteristics

Sociodemographic characteristic (variable operationalisation)	Share (in %)
<i>Gender (GEN)</i>	
Male (0)	27.9
Female (1)	72.1
<i>Age group (AG)</i>	
<21 years (1)	8.9
21-30 years (2)	28.2
31-40 years (3)	24.4
41-50 years (4)	27.3
51-60 years (5)	6.9
>60 years (6)	4.3
<i>Work status (WS)</i>	
Unemployed (1)	17.5
Employed pupil/student (2)	17.5
Entrepreneur (3)	10.9
Employed (4)	50.3
Retired (5)	3.7
<i>Education level (EL)</i>	
Lower education (1)	3.4
High school education (2)	44.5
Bachelor education (3)	15.8
Master or higher education (4)	36.2
<i>Urbanisation level of residence (URB)</i>	
Municipality with <10,001 inhabitants (1)	19.5
Municipality/city with 10,001-20,000 inhabitants (2)	16.4
City with 20,001+ inhabitants (3)	64.1
<i>Personal monthly income (PMI)</i>	
0-400 EUR (1)	26.4
401-800 EUR (2)	24.1
801-1,200 EUR (3)	24.7
1,201-1,600 EUR (4)	13.2
1,601-2,000 EUR (5)	3.7
2,001+ EUR (6)	7.8

Source: Author's calculation

Consumers evaluated shopping mode-specific (in-store and online) determinants on a scalar valuation basis (binary; three- or five-point scale). A principal component analysis was conducted (Romano et al., 2014; Bucko et al., 2018) on the mode-specific determinants to find seven factors (Kaiser-Meyer-Olkin test KMO = 0.753, Bartlett's test of sphericity $p < 0.001$) cumulatively explaining 63.13% of the

total variability of the data. The seven determined factors of influence are online shopping stimulators (OSS), online shopping destimulators (OSD), impulsive shopping indicators (ISI), price- and product-related indicators (PPI), social incidence importance indicators (SIII), communication experience importance indicators (CEII), and habits- and time-related indicators (HTI). An overview of the factors, the share of variance explained by each factor, and their high loading variables, together with loading and mean values and their range, are presented in Table 2.

Table 2: PCA result factors overview

Factor	% of variance	Loading variables	Loading	Mean	Min.	Max.
<i>Online shopping destimulators (OSD)</i>	19.535	Possible fraud	0.813	2.443	1	5
		Not fulfilling expectations	0.807	2.402	1	5
		Long delivery time	0.781	2.379	1	5
		Lack of digital literacy	0.748	1.566	1	5
		Products different from advertised	0.720	2.448	1	5
<i>Online shopping stimulators (OSS)</i>	10.683	Available information	0.761	3.612	1	5
		Safety	0.654	3.563	1	5
		Easy access to reviews	0.639	3.287	1	5
		Better deals	0.639	3.615	1	5
		Saving time	0.637	3.945	1	5
<i>Impulsive shopping indicators (ISI)</i>	8.186	Buying unnecessary products	0.860	2.718	1	5
		Impulsiveness	0.860	2.592	1	5
<i>Price- and product-related indicators (PPI)</i>	7.398	Perceived price awareness	0.804	4.440	1	5
		Chasing high discounts	0.737	4.011	1	5
		Product research	0.543	3.572	1	5
<i>Social incidence importance indicators (SIII)</i>	6.132	Behaviour when encountering crowds	0.781	1.718	1	3
		Behaviour while shopping	0.745	1.305	1	2
<i>Communication experience importance indicators (CEII)</i>	6.036	Staff kindness	0.773	4.529	1	5
		Communication with people	0.699	2.471	1	5
<i>Habits- and time-related indicators (HTI)</i>	5.210	Shopping in stores because of routine or urgency	0.852	3.195	1	5

Source: Author's calculation

The constructed consumer’s preference indicator was used as the dependent variable, while sociodemographic characteristics and mode-specific influencing factors served as independent variables for decision-tree construction. The dependent variable CPI was expressed as a binary variable with two classes (1 and 2). Of the 350 respondents, 64.37% preferred in-store shopping (denoted as 1), while the rest (35.63%) preferred online shopping (denoted as 2). The results of each algorithm are shown in Table 3, providing information on the size of the tree, the number of leaves, and the values of correctly and incorrectly classified instances.

Table 3: Classification algorithm results

Algorithm used	Number of leaves	Size of the tree	Correctly Classified Instances	Incorrectly Classified Instances
<i>C&RT</i>	13	25	63.768%	36.232%
<i>CTree</i>	5	9	65.217%	34.783%
<i>J48</i>	38	57	91.304%	8.696%

Source: Author’s calculation

From the results, it can be observed that the J48 algorithm achieved the highest *classification accuracy rate* on the test dataset with 91.30% correctly classified instances. Detailed classification measures obtained on the test dataset for the decision tree created with the J48 algorithm are presented in Table 4. *Sensitivity* (*recall* or TPR – *true positive rate*) represents the ability of the model to positively classify a data record, while *specificity* (TNR – *true negative rate*) represents the ability to negatively classify a data record. *Precision* represents the proportion of positive predictions that are correct. To combine sensitivity and precision into one measure, we calculated the *F-score* (*F-measure*), a harmonic mean of sensitivity and precision. A high F-score (closer to 1) indicates the high accuracy of the model (Han et al., 2012). In addition, FPR and FNR represent *false positive rates* and *false negative rates*, respectively.

Table 4: Detailed classification measures calculated on the test dataset

Sensitivity	Specificity	Precision	FPR	FNR	F-score
0.911	0.917	0.953	0.083	0.089	0.932

Source: Author’s calculation

To further illustrate the performance of the model, a *table of confusion* or *confusion matrix* for the test dataset is also presented (Table 5). The confusion matrix is a two-dimensional matrix with one dimension indexed by an object’s true class and the other by the class supplied by the classifier. Larger values in the main diagonal and smaller values outside the diagonal represent good results (Han et al., 2012). Out of 45 respondents in the test dataset who prefer shopping in stores, a decision tree created using the J48 algorithm was able to classify 41 of them correctly. On the other hand, out of 24 respondents in the test dataset who prefer online shopping, 22 were correctly classified by the constructed decision tree.

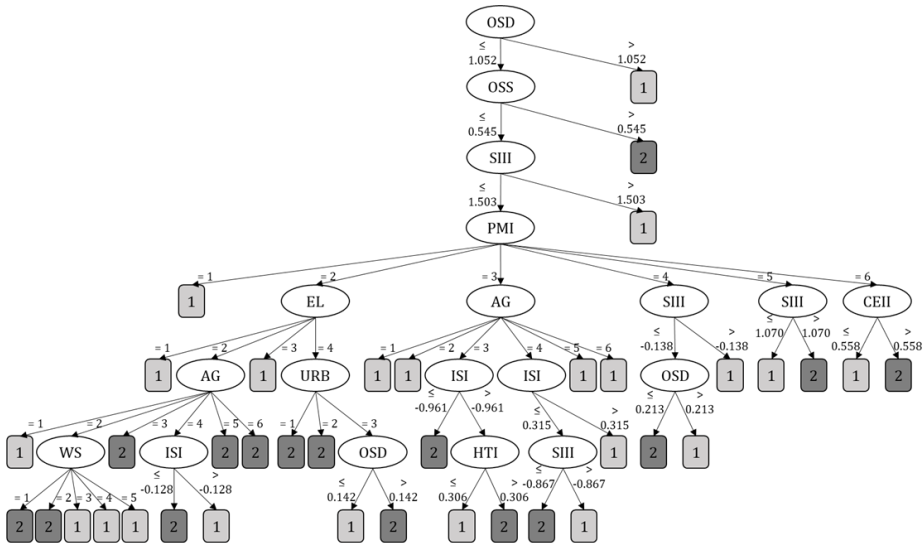
Table 5: Confusion matrix for the test dataset

Observed class	Predicted class	
	1	2
1	41	4
2	2	22

Source: Author’s calculation

The structure of the decision tree, constructed using the J48 algorithm, is presented in Figure 2.

Figure 2: General consumers’ preferences decision tree



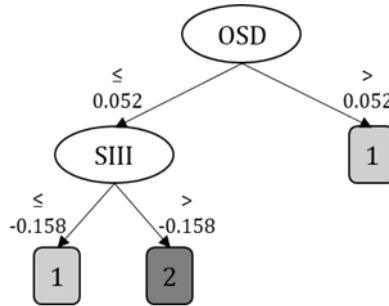
Source: Author’s construction

We observe that the first major influencing factor to the preference is online shopping destimulators, where consumers strictly choose in-store shopping if the perceived level is high. Otherwise, consumers make decisions impacted by online shopping stimulators. If this indicator was moderately high, consumers preferred to shop online, but if lower, the importance of social incidence was considered. Consumers who commonly perform their shopping activity relaxed will choose to do so in shopping stores, even crowded ones. Even more so, some consumers based their decision on the attendance of shops, with more overcrowded shops seen as preferable.

Sociodemographic factors such as personal monthly income, education level, and age group also showed importance. Consumers from the lowest income group (0-400 EUR of personal monthly income – PMI) shopped in stores. The succeeding group with 401-800 EUR PMI decided differently based on their education level, although most preferred to shop online. Only lower-educated consumers employed consumers with a high school education, or consumers aged 40 and above with a higher level of impulsive shopping indicators were shopping in stores. Higher educated consumers within the second PMI level group preferred to shop online unless they lived in cities with over 20,000 inhabitants and had a moderate level of perceived online shopping destimulators. Age-related preference differences were present amongst consumers with an 801-1,200 EUR PMI level. Both the group's youngest consumers (30 years or less) and the oldest (51 years or more) chose to shop in stores. Consumers aged 31-50 were affected by their impulsive shopping behaviour, buying impulsive or unnecessary products online more often. If the social incidence importance indicator was higher, consumers aged 41-50 chose in-store purchases rather than online. Consumers with 1,201-1,600 EUR and 1,601-2,000 EUR PMI levels were further heavily affected by the social incident importance indicator but with different end-result levels. A higher social incidence indicator led the 1,201-1,600 EUR PMI level consumers to in-store shopping, while the 1,601-2,000 EUR PMI level consumers to online shopping. Lastly, consumers with over 2,000 EUR PMI within the group based their decision on the communication experience importance indicator, where somewhat unexpectedly, a higher level of staff kindness importance and communication with people was indicative of preferring to shop online.

In order to further analyse consumers' behaviour, we divided the original dataset into two smaller groups by gender and created decision trees using the J48 algorithm (as this again yielded the highest classification accuracy rate), separately for each of the subgroups. The decision tree in Figure 3 shows how male consumers choose their shopping mode, while the decision tree in Figure 4 shows what factors influence female consumers' online or in-store shopping. The detailed classification measures and confusion matrices obtained on the test dataset for these decision trees can be seen in Table 6. As shown in this table, the decision tree based on male data in Figure 3 correctly classified 85.00% of the instances, while the decision tree based on female data in Figure 4 correctly classified 94.12% of the instances.

Figure 3: Male consumers' preferences decision tree



Source: Author's construction

As can be seen by the decision tree (Figure 3), men consider much fewer factors when deciding to shop online or in-store. The first factor of influence on men's consumer preferences was online shopping destimulators, where a higher level proved to steer men towards in-store purchases. If the online shopping destimulators' influence level is not too high, men will decide based on the social incidence importance indicator. Men will choose in-store shopping unless the indicator is too negative, meaning the physical stores are too crowded, and men tend to want to leave the shop hurriedly, turning men to online shopping.

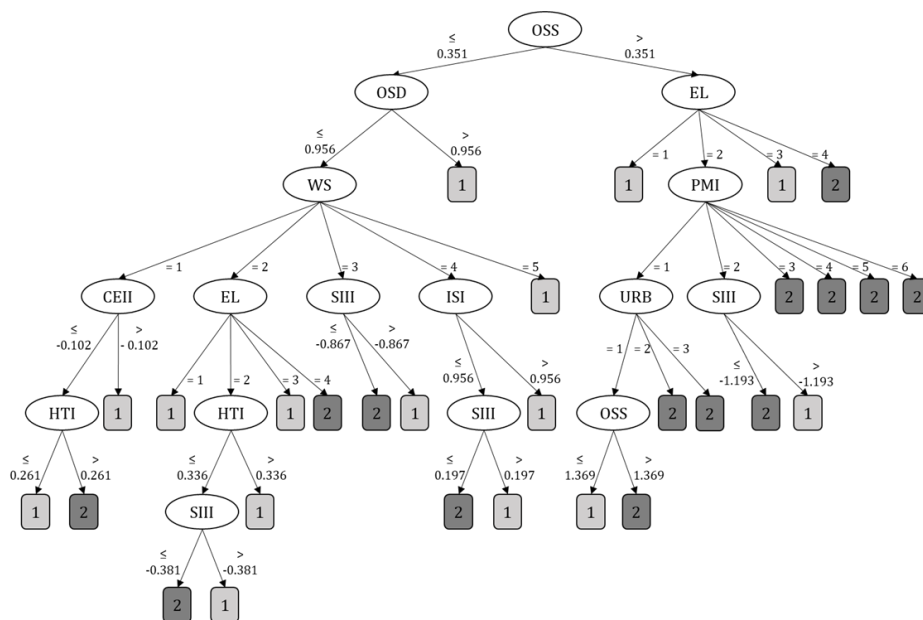
Table 6: Detailed classification measures and confusion matrices for the test dataset, male and female consumers' preferences decision tree

	Consumers		Confusion matrix		
	Male	Female	Predicted class	Observed class	
Number of leaves	3	29	<i>Male</i>	1	2
Size of the tree	5	45	1	13	0
Correctly Classified Instances	85.000%	94.118%	2	3	4
Incorrectly Classified Instances	15.000%	5.882%			
Sensitivity	1.000	0.969			
Precision	0.813	0.941			
Specificity	0.571	0.889	Predicted class	Observed class	
FPR	0.429	0.111	<i>Female</i>	1	2
FNR	0.000	0.030	1	32	1
F-score	0.897	0.955	2	2	16

Source: Author's calculation

Unlike men, women's consumer preferences are grounded firstly on online shopping stimulators (Figure 4). There is no level of influence of online shopping stimulators where women were categorically choosing online shopping. Instead, if the level rises to a moderate influence, the sociodemographic factors influence the final decision, such as education level, personal monthly income and urbanisation level of the residence. Lower educated women choose in-store shopping, and the most educated prefer online shopping. Women with a high school education decided differently based on their personal monthly income level. With up to 400 EUR of PMI, only the women living within smaller municipalities would shop in-store. Women with 401-800 EUR PMI level will choose more crowded stores, and women with 801 EUR and more PMI will prefer online shopping.

Figure 4: Female consumers' preferences decision tree



Source: Author's construction

If women's online shopping stimulator levels were lower, online shopping destimulators would determine their shopping preferences. If the level is moderately high, they will choose in-store shopping, but if lower than that, a wide range of factors affect their final decision. Sociodemographic factors like their work status and education level, or other mode-specific factors like the communication experience importance indicator, social incident importance indicator, impulsive shopping indicator and habits and time-related indicator proved to be of influence. The retired women preferred to shop in-store. The unemployed ones would make their decision

based on the communication experience importance indicator. If communication and staff kindness were important, unemployed women would prefer to shop in-store. Still, if not, they would choose in-store shopping solely because of habit or time restrictions. Female employed pupils or students were influenced by attained education level. Once again, the lower educated preferred in-store, while the most educated selected online shopping. High school graduates, if time-restricted and under the heavy habitual influence, were to choose in-store purchases but would swap to online shopping if the stores were too crowded. Other female employees were influenced by impulsive shopping indicators, buying more impulsively in stores and choosing more crowded stores. Based on the social incidence importance indicator, female entrepreneurs decided to shop once again in better-visited stores.

5. Results and discussion

One of the most important takeaways from our study is a better understanding of the two main groups of factors that act in different directions, similar to the motivators and hygiene factors presented by Herzberg et al. (2017). Online shopping stimulators (OSS) are factors that drive consumers to shop online, while online shopping destimulators (OSD) work in the opposite direction, i.e., when destimulators are strong, consumers tend to make more traditional in-store purchases. Understanding these factors is even more important because they have been found to influence the first nodes of decisions in our tree model. The most important differences in consumers' decision-making are found between the genders, aligning with the research of Kim et al. (2020), Yahya and Sugiyanto (2020), Hood et al. (2020), Moon et al. (2021) and Troung and Troung (2022). Men show simpler, straightforward behaviour patterns, as they are found to shop in stores when they are not convinced of the safety of various aspects of online shopping, i.e., when their OSD is high. Moreover, they also shop in physical stores when their confidence in online shopping is high unless they are crowded. The influences of a larger number of factors shape women's decisions. High levels of online shopping stimulators (OSS) will entice them to shop online. In contrast, high levels of online shopping destimulators (OSD) will make them more likely to shop in physical stores, similar to men. Other factors influencing women's decisions include their education level, work status, income level, and the importance of social incidence. A higher tendency to shop online was found among a subgroup of women with the highest level of education. In addition, female entrepreneurs showed a higher tendency to shop online. At the same time, unemployed and retired women had a strong preference for shopping in stores, coming in line with the findings of Frank and Peschel (2020), Garín-Muñoz et al. (2021), López Soler et al. (2021) and Smith et al. (2022), who find that employed consumers generally are more likely to make online purchases. Similarly, higher-income women were found to be more likely to shop online. The social incidence importance indicator

(SII) showed that women prefer to shop in stores when they are crowded. It can be argued that women with higher levels of education, women in the business world, and women with higher incomes are more familiar with technology, including online shopping, and are therefore more likely to shop online. The same demographic influences should also be important for men, though our research showed that they base their decision on fewer factors.

In addition to gender differences, there are other general findings from this research. One of these was that educated consumers are more likely to shop online, building on the findings from Van Droogenbroeck and Van Hove (2017), Dominici et al. (2021) and Troung and Troung (2022). All income groups were likely to shop in stores when comparing different income levels. However, as Hood et al. (2020) and Giannakopoulou et al. (2022) conclude, online shopping becomes more likely as income increases. Similarly, across the different age groups, all age groups tend to buy in-store, but this tendency is more pronounced among the oldest and youngest consumers. The results show that middle-aged groups are the most likely to shop online, as in the papers from Hood et al. (2020) and Moon et al. (2021). Also, as might be expected, consumers with an impulsive urge to shop, as well as consumers who place a high value on social incidence, are most likely to shop in stores. One factor analysed in this study that proved influential on decision-making in prior research (Yahya and Sugiyanto, 2020, AbdulHussein et al., 2020, Yousefi et al., 2023) was the residence's urbanisation degree. In our model, this factor moderately influences the decision-making of respondents living in areas with different population densities but only combined with purchasing specific product types.

6. Conclusion

Is the glass half full or half empty? can be used as an analogy to this paper's results. Are consumers more influenced by online shopping stimulators or online shopping destimulators? Based on the results of the J48 algorithm, which gave the highest classification accuracy rate, generally, online shopping destimulators are a more decisive influence on consumers' preferences, supporting a set hypothesis H2 on shopping mode specifics influencing shopping decisions. Interestingly, the first significant difference between female and male consumers can be observed immediately. When deciding on their preferred shopping mode, men first consider online shopping destimulators, while women act based on their online shopping stimulators' views. The second significant difference between female and male consumers' preferences is the number of influencing factors affecting the final choice, confirming the set hypothesis H3 on gender differences in shopping behaviour. Men consider substantially fewer factors than women while deciding on the shopping mode. It can also be concluded that mode-specific factors are first in the line of influence on consumers' preferences. The sociodemographic

characteristics of consumers also have a significant impact, verifying hypothesis H1 that sociodemographic subgroups act differently while shopping. Still, they appear secondary, most notable being consumers' work status, education level, and age, but other mode-specific shopping factors further influence different sociodemographic subgroups' consumer preferences. The presented new knowledge is beneficial to managers in the trading sector, as they can adapt their business to shifts in consumer behaviour post a weighty market disruption period, maximising the market potential of consumer niches. We need to emphasise that the research sample size and proportion of men and women partaking may limit the general inferences. Apart from the relative size of our sample, which limits the strength and scope of our findings, it would be beneficial for future research to include respondents from neighbouring countries with a higher percentage of consumers with the online shopping experience. This would allow us to determine whether differences in attitudes toward online shopping are due to respondents' demographics or geography. In addition, one of the limitations of this study is due to the questionnaire, as respondents who had no prior experience with online shopping were not asked to answer questions about their attitudes toward online shopping. If this were not the case, a better understanding of their dislike could be achieved. This limitation should also be considered in our future efforts to understand shopper decision-making better.

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Stabla odlučivanja ne lažu: Zanimljivosti o sklonostima hrvatskih online potrošača

Ana Marija Filipas¹, Nenad Vretenar², Ivan Prudky³

Sažetak

Razumijevanje preferencija potrošača uvijek je bilo važno kako za ekonomsku teoriju, tako i za operacijski menadžment, upravljanje lancem opskrbe, marketing i druge poslovne aktivnosti. Iako se preferencije u teorijskom modeliranju često smatraju stabilnima, to nije slučaj u donošenju odluka u stvarnom svijetu. Zbog toga je preferencije potrošača potrebno dobro razumjeti, a to posebno vrijedi u okolnostima kada dolazi do poremećaja na tržištu. Cilj ovog istraživanja bolje je razumijevanje preferencija potrošača u internet kupovini nakon što su tržišta bila pogođena pandemijom COVID-19. U tu svrhu, provedeno je anketno istraživanje među hrvatskim potrošačima s prethodnim iskustvom u internet kupovini. Upitnik je bio aktivan od svibnja do rujna 2022. godine, a ispunilo ga je 350 ispitanika. S ciljem ustanovljavanja utjecaja analiziranih čimbenika kupovine i demografskih karakteristika potrošača na ponašanje potrošača, korišteni su modeli stabla odlučivanja uz pomoć tri klasifikacijska algoritma. Od tri odabrana algoritma, algoritam J48 je na testnim podacima pokazao najveću stopu točnosti u klasifikaciji. Glavne komponente pokazatelja koji utječu na ponašanje potrošača u ovom istraživanju su stimulatori i destimulatori internet kupovine, a zatim i važnost društvene incidencije. Rezultati istraživanja upućuju na značajne razlike u potrošačkim navikama između muškaraca i žena, pri čemu muškarci koriste manje varijabli pri donošenju odluka. Osim toga, analiza donošenja odluka pokazala je razlike i prema nizu drugih demografskih čimbenika te razlike kod kupnje različitih grupa proizvoda.

Ključne riječi: teorija odlučivanja, preferencije potrošača, rudarenje podataka, stabla odlučivanja, pokazatelji ponašanja potrošača

JEL klasifikacija: C44, D12

¹ Asistent, Sveučilište u Rijeci, Ekonomski fakultet, Ivana Filipovića 4, 51 000 Rijeka, Hrvatska. Znanstveni interes: kvantitativna ekonomija, ekonometrija, statistika. Tel.: +385 51 355 162. E-mail: ana.marija.filipas@efri.hr.

² Izvanredni profesor, Sveučilište u Rijeci, Ekonomski fakultet, Ivana Filipovića 4, 51 000 Rijeka, Hrvatska. Znanstveni interes: teorija organizacije, operacijski menadžment, teorija odlučivanja. Tel.: +385 51 355 163. E-mail: nenad.vretenar@efri.hr.

³ Asistent, Sveučilište u Rijeci, Ekonomski fakultet, Ivana Filipovića 4, 51 000 Rijeka, Hrvatska. Znanstveni interes: kvantitativna ekonomija, teorija odlučivanja, ekonomika sporta. Tel.: +385 51 355 161. E-mail: ivan.prudky@efri.hr.

Moderating role of leader-member exchange in the effect of innovative work behavior on turnover intention*

Seçil Ulufer Kansoy¹

Abstract

This study aims to determine whether leader-member exchange has a role in the effect of innovative work behavior on turnover intention. Innovative work behavior refers to the tendency of employees to engage in innovative actions such as making suggestions, generating new ideas, and improving work processes. Turnover intention represents an employee's voluntary desire to turnover intention. Leader-member exchange refers to the factors such as leadership support, communication, and trust that influence employee commitment and performance within the organization. The hypotheses of the study were tested on 460 white-collar employees at companies. In the study, 3 scales were used: innovative work behavior scale, turnover intention scale, and leader-member exchange scale. The structural equation model was preferred for the study. As a result of the study, it was noted that innovative work behavior affected leader-member exchange positively and leader-member exchange had a low level of effect on innovative work behavior and turnover intention. Additionally, it was discovered that professional respect, as a sub-dimension of leader-member exchange, affected idea realization and idea generation directly and indirectly.

Keywords: innovative work behavior, leader-member exchange, turnover intention

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¹ Assistant Professor, Kırklareli University, Lüleburgaz Faculty of Aeronautics and Astronautics, Department of Aviation Management, Kırklareli, Türkiye. Scientific affiliation: labour economics, working behaviour. Phone: +90 288 214 54 13. E-mail: seciluluferkansoy@klu.edu.tr. ORCID: 0000-0002-5522-324X.

1. Introduction

This research aims to analyze the connection between turnover intention and innovative work behavior and to reveal the moderating effect of leader-member exchange on this connection. Considering that innovative work behavior aims to develop among business environments and adapt to periods of change, it is crucial for organizations. For the research conducted, the first hypothesis is: *Innovative work behavior positively affects leader-member exchange*. The second hypothesis is: *Leader-member exchange is a mediating variable between innovative work behavior and turnover intention*. The third hypothesis is: *Leader-member exchange negatively affects turnover intention*. The findings of this research show in a limited scope that leaders can reduce the level of turnover intentions by encouraging innovative work behavior. Besides, considering that factors such as leader-member exchange affect the perception of equality and justice in organizational relationships, the results of this study suggest the improvement of leader-member exchange may have a mitigating effect on turnover intention. The conceptual framework of this research focuses on innovative work behavior and leader-member exchange. Innovative work behavior is defined in a limited framework as new idea generation, innovation, and development of business processes by employees in the workplace. On the other hand, leader-member exchange refers to the interactions of leaders with their employees within the scope of the research. It was assumed that these interactions can occur when leaders guide, support, reward, criticize, etc. their employees. The main topic of this research is based on testing the role of leader-member exchange as a moderator in the effect of innovative work behavior on the turnover intention with structural equation modeling. According to this topic, the leader-member exchange can decrease the turnover intentions of the employees by increasing their participation in innovative work behavior. Hence, fostering robust leader-employee interactions is likely to engender heightened levels of innovative work behaviors among employees while concurrently reducing their turnover intention. In this context, the scales were used to measure innovative work behavior, turnover intention, and leader-member exchange. The innovative behavior scale is used to measure the innovative work behaviors of employees. The turnover intention scale, on the other hand, is used to measure the employees' dissatisfaction at work and turnover intentions. Leader-member exchange scale is used to measure the interactions of leaders with their employees. Understanding and managing the factors that influence employees' intention to remain employed is a significant contemporary issue for organizations (Allen et al., 2010). In particular, fostering innovative work behavior and supporting employees in this regard are closely associated with creating a sustainable work environment (Scott and Bruce, 1994). The findings of this research demonstrate that leader-member exchange can moderate the impact of innovative work behavior on turnover intention. This highlights that leader-member exchange is a current research area addressing an important issue for businesses (Erdogan and Bauer, 2010).

This study consists of 5 chapters. After the motivation given in the introduction part, the summary of the literature is included in the second part in parallel with the keywords. While the third section contains information about the methods used in the analysis, the fourth section consists of the results of the analysis. In the last section, there are conclusions and recommendations regarding the study.

2. Literature review

The literature on the moderating role of leader-member exchange in the relationship between innovative work behavior and turnover intention provides valuable insights into the dynamics of organizational behavior. Prior research has emphasized the significance of understanding and managing factors that influence employees' intention to remain employed. In this context, innovative work behavior has emerged as a critical factor for organizations seeking to create a sustainable work environment. Studies have highlighted the positive impact of encouraging and supporting employees' innovative work behavior on reducing turnover intention. Moreover, leader-member exchange, characterized by interactions between leaders and employees, has gained attention as a crucial contextual factor in this process. It is suggested that a high-quality leader-member exchange, characterized by trust, support, and fairness, can enhance the positive effects of innovative work behavior on reducing turnover intention. Therefore, investigating the moderating effect of leader-member exchange in this connection is of utmost importance for organizations aiming to foster employee engagement and retention.

2.1. Innovative work behavior theory

The concept of innovative work behavior is based on the concept of innovation and aims to adapt to periods of change both organizationally and individually in business environments and to develop. Since the 1970s, researchers have tried to understand the concept of innovation and technological processes by conducting many studies in this field, especially in industrialized countries (Link and Bozeman, 1991).

Innovative work behavior is defined as the act of creating new ideas, products and processes. De Jong and Den Hartog (2010) state that this concept includes not only idea generation but also the steps of the implementation of ideas. Innovation is an important factor that ensures success in organizations and as Kanter (1988) states, the innovation process consists of four steps as follows: generating the idea, establishing the necessary structure, implementing the application example, and disseminating the new products or methods within the organization. The creativity and different perspectives of the organizational employees are important in this process. Shanker et al. (2017) study draws from organizational climate theory

and focuses on the organizational climate for innovation as the main independent variable. It demonstrates that innovative work behavior mediates the correlation between organizational climate for innovation and organizational performance (Shanker et al., 2017). Bos-Nehles et al. (2017) emphasize the importance of innovative work behavior for organizations to achieve their goals of existence in changing environments and state that organizations can gain a competitive advantage by improving their processes. Muchiri et al. (2012) define innovative work behavior as the sum of all employee behaviors aimed at implementing new knowledge, ideas and practices within the organization. This study draws attention to the fact that it is important not only to adopt the innovative approach but also to put it into practice (Muchiri et al., 2012).

In this regard, it is safe to say that the studies by Muchiri et al. (2012) and Bos-Nehles et al. (2017) are complementary. The study conducted by Bos-Nehles et al. (2017) focuses on the importance of innovative work behavior for organizations, while the study by Muchiri et al. (2012) focuses on how to implement this behavior in the organization. On the one hand, Bos-Nehles et al. (2017) state that innovative work behavior helps organizations to achieve their goals to exist in changing environments, improve processes and gain competitive advantage. Woods et al. (2018), on the other hand, state that innovative work behavior is a unique organizational concept that will enable employees to use and encourage their creative and innovative potential. This study points out that innovative work behavior is the result of ways of introducing and presenting current and improved ways of doing things, enabling the implementation of ideas for better procedures, practices or products. Töre (2019) defines the content of innovative work behavior as the holistic structure of behaviors that follow technological developments, develop appropriate strategies, support idea-generation processes and provide opportunities to the individuals within the organization. The study of Akhavan et al. (2015) adopts an integrated theoretical view, considering socio-psychological situations such as the perception of diminished knowledge authority, the desire for reputation advancement, intrinsic satisfaction derived from assisting others, social network connections, and trust are identified as factors influencing knowledge-sharing behaviors (Akhavan et al., 2015). Moreover, the study of El-Kassar et al. (2022) focuses on knowledge hiding (KH) as a concept, exploring its antecedents and outcomes. It examines the role of human resources HR practices and employees' perceived organizational encouragement for fostering creativity as factors that influence KH, along with their subsequent impacts on employee creativity, behavior characterized by innovation, and performance in tasks (El-Kassar, et al., 2022).

2.2. Leader-member exchange theory

The first study on leader-member exchange is the vertical dyad linkage theory developed by Dansereau et al. (1973) and Bulut (2012). In the study by Dansereau et al. (1975) arguing that leader behaviors are individual-oriented rather than group-oriented, the main hypothesis suggests that leaders differ in the way they manage their followers (Dansereau et al., 1975). According to the hypothesis, leaders provide some followers (in-group) with whom they have developed close relationships with more negotiating latitude than other followers (out-group) (Arslantürk, 2008). In the first part of the theory, which is analyzed in four parts by the researchers, it is stated that the leaders develop different relationships with each follower and how the leaders treat their followers is discussed. The different relationships developed by the leader are analyzed in the second part. While how one staff group works with another staff group in order to get along with each other is discussed in the third part, the last part focuses on the regulation of dyadic relationships between bigger groups as well as dyadic relationships (Aytekin, 2016).

The vertical dyad linkage theory was renewed by Dansereau et al. (1975) as leader-member exchange theory in 1975 (Karcıoğlu and Kahya, 2011). In the leader-member exchange theory focusing on the mutual relations of the hierarchical dyad of leader and follower, the focal point lies in highlighting that leadership is not an inherent attribute possessed solely by an individual, but rather a relational construct wherein one person assumes the role of leading while others willingly consent to follow (Bauer and Graen, 1996).

In previous leadership studies, it is assumed that the leader treats all followers equally (Graen and Uhl-Bien, 1995). Nevertheless, it is stated that this assumption is incorrect and that leaders may exhibit different behaviors to different followers (Dansereau et al., 1973). On the other hand, Dansereau et al. (1975) state that leaders treat some of their subordinates in the role of a leader and others only in a manager role. This indicates that leaders exhibit different behaviors among their followers (Çekmecelioğlu and Ülker, 2014).

This theory claims that a leader establishes different connections with each member and interacts with each member differently. Leader-member exchange theory has brought a new dimension to leadership research and emphasized the leader's relationship with each member by differing from the traditional understanding of leadership approaches (Scandura et al., 1986; Martin et al., 2005). The studies conducted by Dansereau et al. (1975) and Graen and Schimann (1978) also supported the ideas of leader-member exchange theory (Dansereau et al., 1975; Graen and Schimann, 1978). These studies have shown that there are differences in leader-member exchange and that the characteristics of the relationship of leaders with members can determine leadership effectiveness. In another aspect, the studies by Sparrowe et al. (1997) and Hooper and Martin (2008) have indicated that the

concepts of resource exchange and emotional support suggested by the leader-member exchange theory can increase leadership effectiveness.

Leader-member exchange is affected by many factors, one of which is that leaders have limited time. Due to limited time, leaders are unable to be involved in quality interaction with each member and they attempt to include some members in the in-group by prioritizing them (Yu and Liang, 2004). Moreover, the working conditions of the organization can also affect the quality of interaction. Long-term working opportunities between leader and member can lead to high-quality interactions, whereas shorter interactions due to factors such as high staff turnover can reduce the quality of interactions (Morrow et al., 2005). Besides, the number of groups is another factor affecting the leader-member exchange. As the number of groups increases, it may become impossible for the leader to be involved in quality interaction with each member (Schyns et al., 2005).

Among the studies on the dimensions of leader-member exchange, Dienesch and Liden (1986) propose a three-dimensional model consisting of contribution, loyalty and emotional interaction components (Dienesch and Liden, 1986). Davis and Gardner (2004) have supported this three-dimensional model and added professional respect as an additional dimension to the model (Davis and Gardner, 2004). The four-dimensional structure (contribution, loyalty, affect, professional respect) proposed by Liden and Maslyn (1998) is widely accepted in leader-member exchange studies (Liden and Maslyn, 1998). Danesh and Huber (2022) seeks to describe the current state of leadership and leader-member exchange theory in dentistry, develop a new conceptual model of leader-member exchange specific to new dentists, and emphasize the significance of augmenting leadership development programs for this group (Danesh and Huber, 2022). The other paper of Varma et al. (2022) addresses the transformation of supervisor-subordinate relationships in the context of remote work, providing insights into the implications of this change and the need for HR development programs. It also suggests directions for future research in this area (Varma et al., 2022).

2.3. Turnover intention theory

Turnover intention theory attempts to determine turnover intentions of employees by considering factors such as job dissatisfaction, organizational commitment and alternative employment opportunities (Chiat and Panatik, 2019). In pioneering studies regarding the subject, Steers et al. (1979) suggest that turnover decisions depend on personal and work-related factors. Later, Bluedorn (1982) and Price (1977) have argued that turnover depends not only on individual factors but also on organizational and structural factors. According to Bluedorn (1982), organizational factors include factors such as internal pathways for advancement (e.g. technology, promotion and transfer opportunities) and emergent structures (e.g. creation and

conflicts). Perceptions of individuals on these factors lead to their emotional, cognitive and behavioral responses. Price (1977), on the other hand, argues that organizational commitment, satisfaction and attitude are the determining factors in turnover decisions. Apart from these arguments, other researchers have also examined the factors affecting turnover decisions. For instance, March and Simon (1958) argue that the turnover decision is based on cost and benefit calculations. Flowers and Hughes (1973) have found that factors such as organizational justice, equality and inhumane treatment affect turnover decision. Cho et al. (2009) show that perceived organizational support, perceived supervisor support and organizational commitment reduce turnover intention and only perceived organizational support positively affects the intention to stay. These results indicate a significant association between employees' workplace attitudes and behaviors and the levels of support provided by the employer, as well as their organizational commitment. The findings of this research align with the study conducted by Jun et al. (2006). Jun et al. (2006) examine the factors on job satisfaction and turnover intention of nurses and emphasize the importance of variables such as psychological empowerment (Larrabee et al., 2003). The findings of this study suggest that job dissatisfaction is the main predictor of turnover intention and psychological empowerment is a significant predictor of job satisfaction. In a study conducted by Heinen et al. (2013) with a wide range of participants, the turnover intention of nurses is associated with factors such as nurse-physician relationship, leadership, involvement in hospital-related matters, advanced age, femininity, full-time work and burnout. Based on the results of this study, burnout is consistently associated with the turnover intentions of nurses in Europe, while the weight of the sub-factors varies according to the socio-economic status of the countries (Heinen et al., 2013).

3. Methodology

The research was prepared in the form of online questionnaire via Google Forms and the participants filled in the online questionnaires. In this study, IBM SPSS AMOS 26.0 analysis program was used for structural equation modeling and path analysis. The fit indices was used to appropriate model selection in the path analysis. The short brief of the fit indices was introduced the sub-chapters.

3.1. Goodness-of-Fit Index (GFI)

The GFI statistic was introduced to overcome the problem that the Chi-Square statistic increases as the sample grows and is affected very little by the sample size. It is basically the result of the ratio of the model covariances and variances to the measured variance and covariance. In summary, it is a proportional comparison of what is real and what is modeled (Maiti and Mukherjee, 1991). GFI value varies

between 0 and 1. If $0.90 \leq GFI$, the model is considered to be in good fit (MacCallum and Hong, 1997; Bayram, 2010).

The GFI formula is included in Eq. 1 (Bayram, 2010).

$$GFI = 1 - \left(\frac{X_m^2}{X_b^2} \right) \quad (1)$$

– m ; tested model; b ; independent model.

3.2. Comparative Fit Index (CFI)

Initially, a threshold value of 0.90 was accepted, and later a value of 0.95 was determined as an indicator of goodness of fit (Bentler and Bonnet, 1980). Since it is the statistic least affected by sample size, it is used in almost all package programs (Fan et al., 1999).

The CFI formula is included in Eq. 2 (Bayram, 2010).

$$CFI = 1 - \frac{X_m^2 - sd_m}{X_b^2 - sd_b} \quad (2)$$

– m ; tested model, b ; independent model, sd ; degree of freedom.

3.3. Standardized root mean square residual (SRMR)

The standardized root mean square residual (SRMR) serves as the standardized effect size for assessing overall model misfit in covariance structure models. It provides an estimate of the average standardized residual covariance across the population (Maydeu-Olivares et al. 2018).

The GSRMR formula is included in Eq. 3 (Bayram, 2010).

$$SRMR = \sqrt{\frac{2}{p(p+1)} \sum_{i \leq j} \{ (s_{ij} - \sigma_{ij}(\theta)) \}^2 / s_{ii} s_{jj}} \quad (3)$$

$\sigma_{ij}(\theta)$; is th element of $\Sigma\theta(i,j)$.

3.4. Bayesian information criterion (BIC)

Bayesian information criterion (BIC) is commonly employed for model comparison in various statistical modeling domains such as multiple regression, generalized

linear models, and other related areas. The preferred model should exhibit a lower BIC value compared to both the saturated model and the independent model, while the saturated model should demonstrate a lower BIC value than the independent model (Bollen et al., 2014).

Hypotheses of the Study;

H1: Innovative work behavior positively affects leader-member exchange

This hypothesis posits that there is a positive relationship between employees' engagement in innovative work behavior and the quality of leader-member exchange within the organizational context. The underlying assumption is that when employees actively engage in generating new ideas, initiating and implementing innovative practices, it creates opportunities for positive interactions and exchanges with their leaders. Such interactions may involve leaders recognizing and valuing employees' innovative contributions, providing support and guidance, and fostering an environment of open communication and collaboration.

H2: Leader-member exchange is a mediating variable between innovative work behavior and turnover intention

This hypothesis proposes that the relationship between employees' engagement in innovative work behavior and their turnover intention is mediated by the quality of leader-member exchange. Understanding the mediating role of leader-member exchange can provide valuable insights for organizations to design interventions and strategies that promote positive leader-employee interactions, ultimately reducing turnover intention and enhancing employee retention.

H3: Leader-member exchange negatively affects turnover intention.

This hypothesis suggests that organizations that prioritize and invest in building positive leader-member exchange relationships are likely to observe lower turnover intention among their employees. By understanding the negative impact of poor leader-member exchange on turnover intention, organizations can focus on improving the quality of these relationships, fostering trust and support, and ultimately enhancing employee retention. It posits that when leaders establish positive and supportive relationships with their subordinates, characterized by trust, open communication, and fair treatment, employees tend to be more inclined to develop a sense of attachment and commitment to the organization.

4. Empirical data and results

This study was conducted on 460 white-collar employees in October-December 2021 in Turkey. 3 different scales were used for the research. The structural

equation model determined after the conducted analysis was used for the research. In the research, a questionnaire consisting of 17 statements developed by De Jong and Den Hartog and translated into Turkish by Kör (2015) used for Innovative Work Behavior. Another questionnaire used is the Turnover Intention Questionnaire developed by Cammann et al. (1979) in 1979 and consisting of 3 questions. This questionnaire was translated into Turkish by Gül et al. in 2008. The last questionnaire used in the study is the LMX questionnaire developed by Liden and Maslyn (1987) in 1998 and consisting of 12 questions. This questionnaire was translated into Turkish in 2010 by Baş et al.

4.1. Structural Equation Model

Table 1 presents the model fit criteria for the Structural Equation Model. The fit indices, including CMIN/DF, CFI, GFI, SRMR, and BIC, were used to evaluate the goodness of fit for three different models.

Table 1: Model Fit Criteria

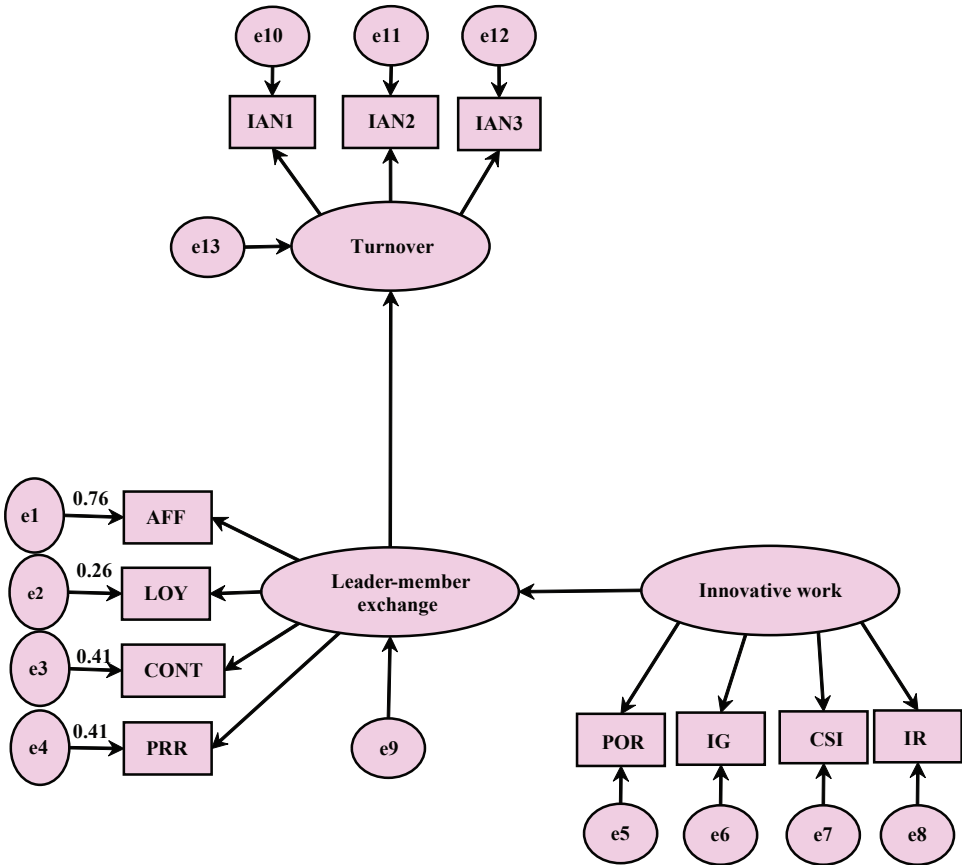
Model	CMIN/DF	CFI	GFI	SRMR	BIC
Default model	3.94	0.97	0.94	0.05	312.89
Saturated model					404.66
Independence model					3936.34

Note: Level of freedom: df, CMIN: Chi-Square

Source: Author's calculation

CMIN/DF values between 2 and 5 represent a reasonable model fit (Marsh and Hovecar, 1985). According to Table 1, the fit indices show that the model is a good fit. Therefore, our model was accepted.

Figure 1. Structural equality results



Source: Author's elaboration

Explanation of abbreviations:

- IAN1: Job satisfaction
- IAN2: Job stress
- IAN3: Organizational commitment
- AFF: Affect
- LOY: Loyalty
- CONT: Contribution
- PRR: Professional respect
- POR: Problem and/or opportunity recognition
- IG: Idea generation
- CSI: Creating support for idea
- IR: Idea realization

Figure 1 shows that the factor loadings of the latent variable of innovative work behavior range between 0.89 and 0.92, the factor loadings of the latent variable of leader-member exchange range between 0.51 and 0.92, and the standardized regression coefficients of the latent variable of turnover intention range between 0.70 and 0.90.

When the standardized regression coefficients are examined, innovative work behavior positively affects leader-member exchange as 0.079 and this exchange negatively affects turnover intention as -0.12. Standardized regression coefficients around 0.10 are defined as small effects, around 0.30 as medium effects and coefficients above 0.50 as large effects, and there are no sharp boundaries between these values. For example, there are no sharp boundaries between 0.49 and 0.50 (Korkmaz et al. 2015; Olcay et al., 2021). Accordingly, while the effect of innovative work behavior on leader-member exchange is large, the effect of leader-member exchange on turnover intention is small. Therefore, hypotheses h1, h2 and h3 are accepted.

4.2. Path analysis

The fit indices of three different models, namely the Default model, Saturated model, and Independence model, were evaluated using the criteria of CMIN/DF, CFI, GFI, SRMR, and BIC. These fit indices are commonly accepted statistical measures used to assess the good of fit of a model.

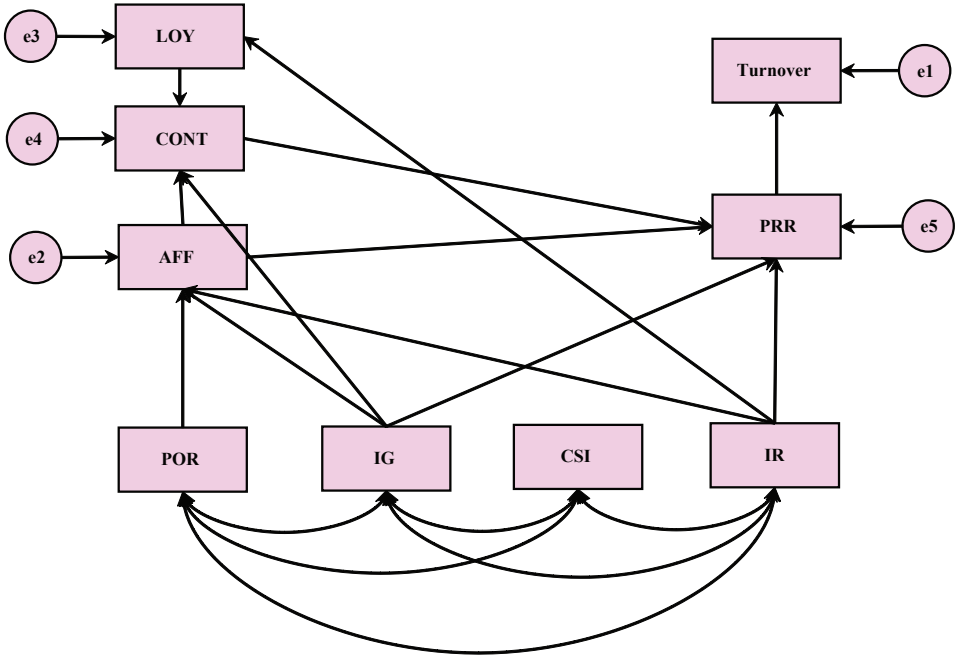
Table 2: Model Fit Criteria

Model	CMIN/DF	CFI	GFI	SRMR	BIC
Default model	3.33	0.99	0.97	0.04	225.64
Saturated model					275.90
Independence model					3245.93

Source: Author's calculation

According to Table 2, the fit indices show that the model is a good fit. Therefore, our model was accepted.

Figure 2: Path analysis results



Source: Author's elaboration

From the standardized regression coefficients, it was again determined that the correlation between problem and/or opportunity recognition and idea generation was 0.84; the correlation between creating support for the idea and idea realization was 0.87; and the correlation between problem and/or opportunity recognition and idea realization was 0.81. In short, it is observed that there is a correlation between the sub-dimensions of innovative work behavior. From the sub-dimensions of leader-member exchange, it is asserted the standardized regression coefficient positively influences affect, loyalty and contribution as 0.27 and 0.41, respectively. Affect influences professional respect both through contribution and directly. In brief, when the sub-dimensions of leader-member exchange are examined, it is observed that there is a regression effect directly or indirectly on professional respect. It is a sub-dimension of leader-member exchange, is directly and indirectly influenced by idea realization and idea generation. When the standardized regression coefficients are examined, Professional respect alone negatively influences turnover intention as -0.12. The model explains 0.1% of the total change in the turnover intention variable.

5. Results and discussion

When the factor loadings are examined as a result of the analysis, it is observed that innovative business behavior is related to problem and/or opportunity recognition, idea generation, creating support for the idea and idea realization. Analyses show that innovative work behavior positively affects leader-member exchange. The first hypothesis is supported in this study. Nevertheless, it is observed that to this exchange negatively affects turnover. Studies supporting the hypothesis that innovative work behavior positively affects leader-member exchange indicate that leaders' encouragement and support of employees' innovative work behaviors strengthen the leader-member relationship. These studies emphasize the association between leader-member exchange and innovative work behavior, highlighting that creating an environment where leaders value, support, and encourage employees fosters increased participation in innovative work behaviors, thus enhancing leader-member exchange. In this context, the effective utilization of leadership skills by leaders to promote innovative work behaviors serves as an important means to strengthen leader-member exchange and achieve positive outcomes within organizations. Second hypothesis stating that leader-member exchange acts as a mediating variable between innovative work behavior and turnover intention has received considerable support in the academic literature. Multiple research studies have provided evidence that the strength of the bond between leaders and employees plays a crucial role in the relationship between innovative work behavior and turnover intention. By fostering a positive exchange relationship, leaders can create an environment where employees feel valued, supported, and encouraged to engage in innovative work behaviors. This, in turn, leads to reduced turnover intention among employees. The mediating role of leader-member exchange highlights the significance of strong and supportive leadership in facilitating the positive effects of innovative work behavior on organizational outcomes, such as reduced turnover intention. Third hypothesis is supported and it is observed that innovative work behavior has a large effect on leader-member exchange, while the effect of this exchange on turnover is low. Leader-member exchange negatively affects turnover intention hypothesis has received considerable support in the academic literature. Several studies have demonstrated that the quality of the relationship between leaders and employees has an important effect in influencing turnover intention. When leader-member exchange is positive, characterized by trust, support, and effective communication, employees are more likely to develop a sense of loyalty, job satisfaction, and commitment to the organization, which in turn reduces their intention to leave the organization. These studies highlight the importance of fostering strong and supportive leader-member relationships as a means of mitigating turnover intention and promoting employee retention. On the other hand, studies that have found weak or negative leader-member exchange relationships have reported higher levels of turnover intention among employees. These findings underscore the significance of cultivating positive and supportive

leader-member interactions to reduce turnover intention and enhance organizational stability. The analyses indicate that problem and/or opportunity recognition affects idea generation, creating support for the idea; creating support for the idea affects idea realization, and problem and/or opportunity recognition affects idea realization. In short, it is observed that the sub-dimensions of innovative work behavior are interrelated. On the other hand, contribution, affect and loyalty are influenced. Affect influences professional respect both directly and indirectly. In short, when the sub-dimensions of leader-member exchange are analyzed, it is detected that there is a direct or indirect regressive effect on professional respect. As a sub-dimension of leader-member exchange, professional respect, directly and indirectly, affects idea realization and idea generation.

6. Conclusion

This study has examined whether there is a role of leader-member exchange in the effect of innovative work behavior on the turnover intention of white-collar employees. In the literature review of studies on topics such as innovative work behavior, leader-member exchange, and turnover intention, it is asserted that there are methodological weaknesses such as sample selection, data collection methods, and analysis techniques. Alternately, studies examining the moderating effect of leader-member exchange on turnover intention cannot provide a sufficient theoretical basis to explain the connection between innovative work behavior and turnover intention. It should also be recognized that this research is limited to the province of Istanbul. The restriction of the research solely to Istanbul imposes certain constraints. Firstly, it can affect the representativeness of the sample. Istanbul is a large city with a diverse population, encompassing different cultures, sectors, and demographic characteristics. Therefore, caution should be exercised when generalizing the findings of the study. Additionally, Istanbul is influenced by various cultures, and conducting the study solely in this city may not fully reflect the impact of cultural differences. Exploring the role of cultural variations in the connections among leader-member exchange, innovative work behavior, and turnover intention can be better understood through studies conducted in different regions and countries. The local characteristics of Istanbul can directly influence the study's findings. Therefore, when generalizing the results to other regions or cultures, careful consideration should be given, and support from studies conducted in different regions should be sought. The research was conducted at a specific point in time. In this case, the dynamics of the connections among leader-member exchange, innovative work behavior, and turnover intention over time might be overlooked. Future research can address this limitation by employing longitudinal designs or panel data analysis to assess the dynamic changes.

In the future, research could be conducted to examine in more detail the interaction between different elements (such as support, communication, trust, justice, etc.) in leader-member exchange and their impact on innovative work behavior and turnover intention. For instance, the effects of a leader's perception of justice on employees' innovative work behavior and how these relationships moderate turnover intention could be explored. Additionally, the relationships between the same concepts can be investigated across different sectors or work contexts. Examining this study under the influence of culture would it be important. When examined from a leadership perspective, research could explore how interventions related to leadership education and development affect the relationships between leader-member exchange, innovative work behavior, and turnover intention. Such studies can help us understand the skills and strategies that leaders can utilize to strengthen leader-member exchange and its impact on innovative work behavior. Future studies can also examine the regulatory role of other contextual factors (such as organizational culture, leadership style, team dynamics, etc.) that influence leader-member exchange on innovative work behavior and turnover intention. These investigations can contribute to a more comprehensive assessment of leader-member exchange and provide a broader framework for understanding its effects. Therefore, it is recommended to conduct more detailed studies in different locations, for different occupational groups and with different sample sizes.

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Moderatorska uloga razmjene među članovima vodstva u smislu inovativnog poslovnog ponašanja u svrhu prihoda od prometa

*Seçil Ulufer Kansoy*¹

Sažetak

Cilj je ove studije utvrditi ima li razmjena među članovima vodstva ulogu u učinku inovativnog poslovnog ponašanja na namjeru fluktuacije. Inovativno ponašanje u radu upućuje na tendenciju zaposlenika da se uključe u inovativne mjere kao što su davanje prijedloga, stvaranje novih ideja i poboljšanje radnih procesa. Namjera fluktuacije predstavlja dobrovoljnu želju zaposlenika da ostvari приход. Razmjena između voditelja i članova odnosi se na čimbenike kao što su podrška vodstva, komunikacija i povjerenje koji utječu na predanost zaposlenika i uspješnost unutar organizacije. Hipoteze studije testirane su na 460 službenika u tvrtkama. U istraživanju su korištene 3 skale: skala inovativnog radnog ponašanja, skala namjere fluktuacije i skala razmjene članova vodstva. Model strukturne jednadžbe bio je poželjan za studiju. Kao rezultat studije, primijećeno je da je inovativno ponašanje na radnom mjestu pozitivno utjecalo na razmjenu među članovima vodstva, ali samo razmjena među članovima vodstva imala je nisku razinu učinka na inovativno ponašanje rada i namjeru prometa. Osim toga, otkriveno je da je profesionalno poštovanje, kao poddimenzija razmjene čelnika, izravno i neizravno utjecalo na realizaciju ideja i generiranje ideja.

Ključne riječi: *inovativno ponašanje u radu, razmjena među članovima vodstva, namjera fluktuacije*

JEL klasifikacija: *M10, M12, M19*

¹ *Docent, Kırklareli University, Lüleburgaz Faculty of Aeronautics and Astronautics, Department of Aviation Management, Kırklareli, Turska. Znanstveni interes: ekonomika rada, radno ponašanje. Tel.: +90 288 214 54 13. E-mail: seciluluferkansoy@klu.edu.tr. ORCID: 0000-0002-5522-324X.*

The effects of restaurant green practices on customer intention to purchase eco-friendly products: Evidence from Vietnam*

Mai Ngoc Khuong¹, Do Hanh Nhan², Nguyen Thi Minh Phuong³

Abstract

This research aims to identify how green practices affect customer intention to purchase green products via customers' emotional attachment. Using the PLS-SEM to analyze 358 restaurant guests to find customer intention to purchase green products is a fundamental constituent of a restaurant's success. The results reveal that the application of recycling and composting, energy and water management activities have a positive significant impact on customer intention to purchase green products and pro-environmental emotional attachment, and the application of organic food-green products and materials have a significant impact on emotional attachment, but not trigger on customer intention to purchase green products. Meanwhile, the application of eco-friendly supplies did not affect emotional attachment and customer intention to purchase. Pro-environmental emotional attachment is a key mediator of the customer intention model. The results provided both knowledge and theory of green practices by adding customers' emotional attachment into the theory of planned behavior to understand customer behavior toward green restaurants. It proposes managerial recommendations and building strategies for the long term to increase customer intention to purchase green products in the restaurant industry.

Keywords: green practices, green restaurants, emotional attachment

JEL classification: Z3, L8, L83

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¹ Lecturer, School of Business, International University, Vietnam National University, Ho Chi Minh City, Vietnam. Scientific affiliation: organizational behavior, entrepreneurship, leadership, tourism. E-mail: mnkhuong@hcmiu.edu.vn. ORCID: 0000-0002-0527-3046.

² Student of Business Administration, International University, Vietnam National University, Ho Chi Minh City, Vietnam. Scientific affiliation: organizational behavior, hospitality management, and corporate social responsibility. E-mail: kynz.hanhnhnhan@gmail.com.

³ Lecturer, Tourism Department at Hong Bang International University, 215 Dien Bien Phu, Ward 15, Binh Thanh District, Ho Chi Minh City, Vietnam. Scientific affiliation: tourism, management. Phone: +849 336 715 97. E-mail: phuongntm2@hiu.vn. ORCID: 0000-0002-4668-3850.

1. Introduction

Tourism industry has become the fastest growth and diversification to meet customers' demand. Nevertheless, the influence of the fast growth lead to unsustainable consumption practices, this action have endangered ecosystems and lack of the resources (i.e., food, water, energy etc.) (Trang et al., 2019). It also leads to increase global issues (i.e., climate change, global warming, pollution). As a result, tourism sectors (accommodation, restaurants etc.,) focus on developing services/products and facilities and management processes with the aim of minimizing negative environmental effects. Monthly average income per capita in HCM City in Vietnam from 2010 to 2021 were ranged from 2.74 to 6.76 million Vietnamese dong per month (Statista, 2023). Thank to growing personal incomes and increase social awareness. As a result, green consumption begins to gain traction among customers in developing economies, green practices are applied and promoted widely in the tourism industry (Trang et al., 2019). Following the National Green Growth Strategy 2011-2020 with a Vision to 2050, the Vietnamese government executes a variety of programs that aims to green existing economic institutions and activities, the government encourage tourism industry apply new methods to develop sustainable tourism. Therefore, Vietnam's government promotes eco-friendly methods and build a program that calls *Green Lotus* to assess to development in tourism industry to protect the environment and natural resources. Vietnamese enterprises in tourism industry have invested heavily in new technology and equipment according to global standards as well as towards green initiatives and clean production requirements (Minister of Industry and Trade of Vietnam, 2021). The restaurant sector can develop sustainability, when they can benefit from applying environmentally friendly practices (hereafters referred to as green practices, going green, or green initiatives), the restaurants implement green initiatives, so it increases costs to invest on new methods of green practices in the first stage, however, it also saves in operating costs. Moreover, the restaurants are limited knowledge on customer behaviour whether the customers accept the prices when the restaurants increase prices, willingness to pay more for applying green practices, it seems to lack a study (DiPietro et al., 2013-a; Dutta et al., 2008) to identify what factors of green practices elicit customer intention to purchase green products in a green restaurant in HCM City in Vietnam context. Now a growing numbers of Vietnamese are concerned about the environment and are eager to engage in green practices. Thus, lessening restaurant operations' environmental impact while still serving customer needs becomes key drivers for *going green* of the restaurants to protect customers health and environment. Many studies present that when organizations apply green practices that reduce costs and increase financial savings, fulfill interests of stakeholders and organizational governance (Namkung and Jang, 2013; Park et al., 2020). With a greater emphasis on sustainability, restaurant may attract more visitors who are willingness to pay for services that align with their values and beliefs (Kang et al., 2012; Namkung and Jang, 2013; Schubert et al., 2010).

However, the topic has not been widely studied, with only a handful of research that examines dining intention and the importance of green practices in food and beverage industry context available, some studies just focus on the concept of lodging, retail industry, and brand value of organizations (Jang et al., 2015; Kim and Hall, 2020; Moise and Gil-saura, 2020; Shapoval et al., 2018), not much research examining factors affecting customers' willingness to pay when using green products, previous studies just build their conceptual framework health consciousness, environmental consciousness, or brand consciousness (Namkung and Jang, 2017; Zhang and Kim, 2013). In addition, they did not mention restaurant customers' emotional response to these practices, which is considered to be an important factor belonging to an individual's psychology (Jang et al., 2015), a deeper examination of the impacts of each green practice on behavioral intention like customers' willingness to pay more for green products is necessary (Yu et al., 2017). DiPietro et al. (2013-a) also explored the consumers' perceptions of green practices in quick service restaurants and intent to consume green products more often, they suggested that further research need to identify green practices to determine behaviour of guests and to find out the influence of which factors of green practices affect direct customer intention to purchase eco-friendly products via customers' emotional attachment to the restaurant. Similarly, Jeong and Jang (2010) explored the effects of restaurant green practices on a green image and customers' behavioural intentions, the results confirmed the mediating variable of green ecological image restaurants lead to customers' behaviour intentions to purchase green products based on items *recyclable take-out containers, recycling waste, and energy efficient lighting* are the most significant. Moreover, Jang et al. (2015) also identified elements of green practices affect direct and indirect green store loyalty and green product loyalty through consumers' emotional attachment. As Schubert et al. (2010) stated that still lacks of research to explore the relationship between use of green practices and consumer attitudes and understand the behaviour of customer *Do the guests show their intention to purchase more eco-friendly products/services when the restaurants apply green practices?*. In recent study, Mai et al. (2023) have explored green attributes and three mediation of customer behaviour to understand how the customer willingness to consume restaurants' services with 1095 samples. The results found that going green have a positive direct effect on satisfaction, and attitudes, but green practices, except of eco-friendliness did not have an effect on customers' emotional attachment. Moreover, the results proved the customers' satisfaction, attitudes, and emotional attachment were mediation between going green and customers' willingness to consume, however, the weak point of this study, they have not found an insight of customer emotion and attachment to increase customer intention. Therefore, based on the previous studies, their results are a spring board for our research in restaurant industry to continue develop and confirm theoretical and practical importance in Vietnam context. To fill this research gap, the research objectives of this study attempt to find evidence that factors of green practices have influenced on customer

intention to purchase eco-friendly products via customers' emotional attachment, and explore the important relationships among these factors. Therefore, this study attempts to answer the research question (RQ) as below:

RQ1: To what extent do green practices in restaurants affect customer intention to purchase green products?

RQ2: To what extent do green practices in restaurants affect customer pro-environmental emotional attachment to green products?

RQ3: Do customer pro-environmental emotional attachment elicit customer intention to purchase more green products in green practice restaurants?

RQ4: To what extent do customer pro-environmental emotional attachment mediate the relationship between green practices and customer intention to purchase more green products?

The purpose of this study to identify how green practices in restaurants affect customer intention to purchase eco-friendly products via the role of mediating variable of customer emotional attachment. Because it lacks research on green practices in restaurant industry and has not yet conducted an empirical study in HCM City in Vietnam. Moreover, the aim of this study to identify the customer behaviour through to explore customer intention to purchase more green products based on what factors. Based on the previous studies (Jang et al., 2015; Schubert et al., 2010; Jeong and Jang, 2010) their results were in inconclusive empirical findings and they just build the measurement items and have not conducted an empirical study (DiPietro et al., 2013-a; Ray Wang, 2012), due to the limitation of the research to identify a conceptual framework of green practices, customer intention to purchase green products, customer pro-environmental emotional attachment factor to understand an insight into customer intention in decision-making to purchase or not, as well as this study extended the theory of planned behaviour (Ajzen, 1985; DiPietro et al., 2013-b). As DiPietro et al. (2013-a) just explored the consumer's perspectives on green practices to understand customer intention to purchase green products, and these scholars just developed measurement scales of these factors (DiPietro et al., 2013-a; Ray Wang, 2012; Jang et al., 2015; Schubert et al., 2010; Jeong and Jang, 2010), so it needs to conduct an empirical study in the restaurant context. Therefore, this study attempted to fill this research gap and explore the relationships among green practices and customer intention to purchase eco-friendly products in the restaurants, and identify a mediation variable of customers' emotional attachment to the restaurant to understand the customer behavior in service field. Furthermore, the purpose of this study provides an empirical evidence in Vietnam context because of the dimensions to measure green practices, Customer intention to purchase green products, and customer pro-environmental emotional attachment were carried out in western

countries, it lacks research in the restaurant in Vietnam context, specific in Ho Chi Minh City. From discussion above, that raises the research question of whether green practices in restaurants affect customer intention to purchase green products, and customer pro-environmental emotional attachment to the restaurants when the restaurants apply green practices. To evaluate the relationships among these factors, the authors propose the main hypothesis that green practices applications in restaurants (1) application of recycling and composting management (H_1), application of energy and water management (H_2), application of eco-friendly supplies (H_3), application of organic food-green products and materials (H_4) have a positive effect on Customer intention to purchase green products. Green practices applications in restaurants; (2) application of recycling and composting management (H_5), application of energy and water management (H_6), application of eco-friendly supplies (H_7), application of organic food-green products and materials (H_8) have a positive effect on customer pro-environmental emotional attachment to the restaurants. (3) Customer pro-environmental emotional attachment to the restaurants have a positive effect on Customer intention to purchase green products (H_9). Green practices applications in restaurants (4) application of recycling and composting management (H_{10a}), application of energy and water management (H_{10b}), application of eco-friendly supplies (H_{10c}), application of organic food-green products and materials (H_{10d}) indirect affect Customer intention to purchase green products through Customer pro-environmental emotional attachment to the restaurants.

This study contributes a comprehensive framework and provides a broader understanding of how factors of green practices was conducted an empirical evidence in Vietnam context because all the dimensions to measure green practices, customer intention to purchase green products, and emotional attachment were conducted study in western countries. The managers of restaurant may use our results in build strategy to develop of applying green practices in their restaurants. We just escape from the COVID-19 pandemic, so people focus on protecting health and *going green* has become a hot trend and change demand of customers. The rest of this paper presents the theoretical grounding of green practices and customers' patronage intention model. Next part presents the hypotheses and conceptual framework. Then, elaborating research methodology and research design, presenting data analysis and findings. Finally, presenting contribution, implications, and limitations for the further research.

2. Literature review

Throughout the years, many theories were developed to explain human behavioural intention, pro-environmental consumer, and individual's social behaviour is based on reason. Several researchers presented many widely used the theory TPB model,

it reflects that individuals' decisions about behaviour are carefully considered to purchase products/services based on emotion and attachment, expectancy-value of the eco-friendly products/services that were explored in the literature (DiPietro et al., 2013-a; Yarimoglu and Gunay, 2019; Mai et al., 2023; Kim and Ha, 2022), customer intention to purchase green products (DiPietro et al., 2013-b; Ray Wang, 2012; Jang et al., 2015; Schubert et al., 2010; Jeong and Jang, 2010). The TPB provides important assumptions and contributions in many study to explore the human behaviour (Ajzen, 1985; 1991; DiPietro et al., 2013-b; Yarimoglu and Gunay, 2019). Kim and Ha, 2022).

2.1. Theory Planned Behavior (TPB)

The TPB was developed by Ajzen (1991) to understand human behaviors, it includes attitudes and subjective norms and perceived control that lead to predict the customers' behavioral intentions. TPB presents the customers' intentions as the main antecedent of behavior and their willing to carry out the anticipated behavior. Moreover, in this study by Yarimoglu and Gunay (2019) customers' intention was viewed as customers' willingness to choose green hotels, and the results showed that environmentally friendly activities directly affect customers' intentions to visit a green hotel in Turkish, and the results also predicted the effects of visit intentions on willingness to pay. Yarimoglu and Gunay (2019) have built a conceptual framework to extend a TPB by adding customer satisfaction and loyalty to predict customers' intentions to visit green hotels in Turkish and explore the effects of visit intentions on willingness to pay (DiPietro et al., 2013-b), satisfaction, and loyalty. In China, Wang et al. (2018) have conducted an empirical study to explore the consumers' intention to visit green hotels by extending TPB with adding a perceived consumer effectiveness antecedence and environmental concern factor. TPB is a wide theory used to understand human behavior, it reflects pro-environmental behavior, environmental concern such as energy and water saving, recycling and composing, eco-friendly supplies and green purchasing, application of organic food-green products and materials (Wang et al., 2018; DiPietro et al., 2013-a; Jang et al., 2015; Ray Wang, 2012; Schubert et al., 2010; Yusof et al., 2017; Jeong and Jang, 2010). Many studies have extended the TPB by adding new variables to address an usefulness of the TPB model, however, the criteria to add a new variable that must be reasonable to explain a range of human behaviors (DiPietro et al., 2013-a; Jang et al., 2015; Wang et al., 2018; Yarimoglu and Gunay, 2019; Nimri et al., 2020). Kim and Ha (2022) have investigated customer psychological perceptions about green consciousness in the green hotels in Seoul by applying an extended TPB, these scholars stated that to make the TPB more reliable, so the researchers should add more variables to extend the TPB, because the results'superiority has been acknowledged and offered a better prediction of customer behavior in predicting behavior of green hotel customers. Moreover, previous studies have succeeded to

apply the TPB for predicting environmental consciousness and customer behavior, it was used to explore the tourists' intention to return the eco-friendly destinations (Ahmad et al., 2020), green behavior of customers in a hotel (Ting et al., 2019), and willingness to pay premium price for green hotels that came from green consciousness (Kim and Han., 2010). Based on discussion above, this study is consider the helpfulness of TPB to understand the consumers' behaviors in green restaurants, this research used TPB is an anchor to build a research framework by adding customers' emotional attachment to green restaurants (Yuksel et al., 2010; Jang et al., 2015; Wu et al., 2019; Mai et al., 2023).

2.2. Green practices applications in restaurants

A green restaurant is one that makes *going green* a priority in its operations. Green practices were incorporated into their environmental operational strategy, which included increasing resource efficiency in manufacturing, communicating the company's environmental commitment through green marketing campaigns, pricing green products within an acceptable range, and reducing pollution throughout the supply chain (Dutta et al., 2008; Sun-Hwa et al., 2017). Green standards in developed countries have already evolved into complicated systems with various criteria to fulfill. This trend prompts the restaurant industry to invest significant resources in developing green strategies, as well as encouraging professional restaurateurs to form green institutions such as the Green Restaurant Association (GRA) and Green Table Network. Listed research mostly review the definition of green practices proposed by GRA (Jang et al., 2015; Jeong et al., 2014; Kim and Hall, 2020; Namkung and Jang, 2017; Wang, 2012), including 7 detailed environmental focuses on energy and water efficiency; application of recycling and composting management activities; purchase of sustainable food/eco-friendly products, local and organic ingredients; pollution avoidance; use of non-toxic and chemical products; and sustainable furnishings. Another practice, transparency and education have been added recently (Green Restaurant Association, 2021).

Besides using the formal guideline provided by GRA to determine green practices, scholars also self-proposed their own definitions (Park et al., 2020) who classified green practices based on specific types of action, such as application of recycling and composting management activities, using energy and water efficiency solutions, while Choi and Parsa (2007), Kwok and Huang (2019), Namkung and Jang (2013) classified green practices based on customer concerns, such as health and environmental practices. The emphasis varies according to the scholars' objectives, whether previous studies desire to explore the understanding impacts of green practices on the customers' perspectives in general or deepen in proposing the specific green guidelines, so that the restaurants can make an informed business decision about green initiatives and apply it. With the goal of determining which green practices influence customers' psychology (emotional attachment to the

restaurant) and dining intention in the green restaurants, this study used four dimensions of green practices provided by Jeong and Jang (2010) to formulate the conceptual framework, including application of recycling and composting management activities, application of energy and water management activities, application of eco-friendly supplies, and application of organic food-green products and materials (Mai et al., 2023).

2.2.1. The application of recycling and composting management

In food and beverage industry are encouraged to attain zero-waste and optimize waste production by applying of recycling and composting management activities. As part of green initiative, the restaurants apply recycle all recyclable materials, for instance, the restaurants implement a composition of food waste, recycle food waste to contribute to the improvement of soil quality (Wang, 2012), and minimize the tourism industries' negative effect on the environment (Kim and Ha, 2022). Thus, the focus of the restaurants is as follows: recycle waste, recycle and reuse paper, cardboard, plastic, glass, and aluminum, linen napkins reuse and recycle, table clothes reuse and recycle, recycling bins, use low-pressure shower and washbowl facilities, replaceable table clothes supplies, light sensors, and natural ventilation, conduct food waste composting programs, purchase products made from recycled or rapidly renewable materials (Jang et al., 2015; Ray Wang., 2012; Schubert et al., 2010; Yusof et al., 2017; Jeong and Jang, 2010). In Malaysia, Yusof et al. (2017) predicted the positive relationship between green practices (environmental activities, reuse towels, recycling program) in non-green hotels and customer satisfaction and loyalty. In addition, the results showed that customer satisfaction is a key mediation factor between green practice (environmental activities, reuse towels, recycling program, waste separation, recycling) and customer loyalty to hotels. Moreover, in this study by Yarimoglu and Gunay (2019) found that environmentally friendly activities/green practices (ditching disposables, having guest reuse linens, considering composting) directly affect customers' intentions to visit a green hotel in Turkish, and the results also predicted the effects of visit intentions on willingness to pay. In Vietnam, to be certified as a green restaurant under the Green Lotus label scheme, a restaurant must achieve the criteria to protect environment and natural resources, therefore, the restaurants apply new technology and use renewable energy efficiently to reduce negative impacts on the environment (VNAT, 2015). Alternatively, the ERST recommends restaurants to provide kitchen containers to simplify waste segregation and sorting process (ERST, 2020). In addition to creating values for the restaurant, application of recycling and composting management activities also contribute to Vietnamese government's waste management strategy, which includes reducing, reusing, and recycling garbage via composting and anaerobic digestion (Sang-Arun, 2011; Mai et al., 2023).

2.2.2. The application of energy and water management

In food and beverage industry, the restaurants consume large energy and water, thereby, they must use the application of energy and water management activities and facilities to limit the primary source of carbon dioxide emissions danger to environment. Moreover, Kim and Ha (2022) predicted successfully green practices affect customer behavior (willingness to pay premium price, consume intention, revisit intention) based on the TPB. In addition, willingness to sacrifice for the environment were defined the relationship with green consciousness and green behavior, the terms of environmental practices or green practices were defined as a contribution to economy by implementing a saving water and energy, reducing waste. The organizations apply green initiatives to protect the earth and people and attempt to minimize the hotel industries' negative effect on the environment (Kim and Ha, 2022). Thus, the focus of these restaurants to achieve optimum operations and reduce the carbon footprint are as follows: use energy-efficient HVAC (heating, light sensors, natural ventilation, and air conditioning) (Kim and Ha, 2022), use flow restrictions on faucets, and water-less urinals and lighting systems, and install energy-monitoring systems to keep track of total energy consumed (Tan et al., 2018), replace incandescent light bulbs with longer lasting CFL light bulbs or LED, keep the entrance door closed or use a double entrance door (Jang et al., 2015; Wang, 2012; Schubert et al., 2010; Yusof et al., 2017; Jeong and Jang, 2010). In Malaysia, Yusof et al. (2017) predicted the positive relationship between green practices (water saving technology, energy efficient lighting, programmable thermostats, refillable amenity dispensers, maintenance for equipment regularly, air filtration) in non-green hotels and customer satisfaction and loyalty. In addition, the results showed that customer satisfaction is a key mediation factor between green practice (water saving technology, energy efficient lighting, programmable thermostats, refillable amenity dispensers, maintenance for equipment regularly, air filtration) and customer loyalty to hotels. Moreover, in this study by Yarimoglu and Gunay (2019) found that environmentally friendly activities/green practices (conserving energy, limiting water waste, installing eco-friendly filtered water dispensers; water conservation, energy efficiency and renewable energy) directly affect customers' intentions to visit a green hotel in Turkish, and the results also predicted the effects of visit intentions on willingness to pay. These measurement scales of application of energy and water management activities are the most important criterion for the restaurateurs and customers (Wang et al., 2013). Water conservation, like energy-efficient practices, is linked to facility use and building features, according to Lo et al. (2011), who recommended that the restaurants utilize a microbubble or traditional thawing equipment to conserve water, in line with agreement by Hu et al. (2013), who pointed out that the most significant criterion in water-focused practices are to optimize the water-saving facilities, which can consist of installing flow regulators, low-flow toilets, and waterless urinals in bathrooms (Jeong et al., 2014; Jeong and Jang, 2010; Mai et al., 2023).

Trang et al. (2019) have explored green hotel attributes and guests' intention generation to visit a green hotel, and the guests practice pro-environmental actions during they stayed in a hotel. The results found four antecedents of green hotel attributes, including energy efficiency, water efficiency, recycling policy and green characteristic with underlie 24 dimensions to measure these factors. The only customer benefit, energy efficiency, and green characteristic have a positive effect on pro-environmental value and attitude and these factors increase positively affect intention to practice environmentally friendly actions and visit a green hotel of guests. However, water efficiency, recycling policy, pro-environmental value did not affect pro-environmental attitude. The weak point of this study is that they did not identify relationship between green practices and guests' intention generation to visit a green hotel. Moreover, it did not analysis the mediation variables of pro-environmental value and attitude in the customer intention model.

2.2.3. The application of eco-friendly supplies

The application of eco-friendly supplies pertain to non-toxic and environmentally friendly products (Laroche et al., 2001) or activities (Wang, 2012). Thus, the focus of these restaurants is as follows: use the environmentally friendly cleaners to wash the dishes, and linen napkins, table clothes, and to clean the tables and floors, use the take-out containers that are biodegradable (paper) or recyclable instead of using Styrofoam (Jang et al., 2015; Jeong and Jang, 2010; Mai et al., 2023). Moreover, GRA encourages the restaurants to minimize waste by purchasing goods that produced from bio-based materials or recycled materials (GRA, 2021), in lieu of plastic utensils, the restaurants encourage the application of eco-friendly supplies with single-use eating wares (Chiu and Hsieh, 2016). However, these replacements incur costly expenditures, and it remains a hurdle for some restauranteurs (Chiu and Hsieh, 2016). Moreover, in this study by Yarimoglu and Gunay (2019) found that environmentally friendly activities/green practices (eco-friendly cleaning supplies) directly affect customers' intentions to visit a green hotel in Turkish, and the results also predicted the effects of visit intentions on willingness to pay. In developing countries, the restaurants focus on the criteria of Green Lotus label certification to apply green practices for proteting environment, and it reduces the disposable containers that is an one of the optional criteria, but it emphasizes the use of sustainable and non-toxic chemicals cleaners, labeled with a *Green Mark* (VNAT, 2013).

2.2.4. The application of organic food-green products and materials

Menu sustainability presents for organic foods, it reflects the application of organic food-green products and materials that benefit the environment' sustainable development, it is often associated with eco-friendly products and locally grown

produces (Kwok et al., 2016; Mai et al., 2023). Thus, the focus of these restaurants is as follows: use local ingredients, organic food/products on the menu, use fish and seafood harvested sustainably and free of harmful pollutants, the restaurants avoid genetically modified foods (Jang et al., 2015; Ray Wang., 2012; Schubert et al., 2010; Yusof et al., 2017; Jeong and Jang, 2010; Mai et al., 2023) who stated that menu sustainability present the application of organic food-green products and materials, it reflects the owners of the restaurants use locally grown foods to reduce transportation. And it emits fewer carbon emissions than imported foreign commodities, it effectively decreases carbon footprints and global warming (Jones et al., 2004). In Malaysia, Yusof et al. (2017) predicted a positive relationship between green practices (organic food) in non-green hotels and customer satisfaction and loyalty. In addition, the results showed that customer satisfaction is a key mediation factor between green practice (organic food) and customer loyalty to hotels. Moreover, in the study by Yarimoglu and Gunay (2019) found that environmentally friendly activities/green practices (serving local and organic food) directly affect customers' intentions to visit a green hotel in Turkish, and the results also predicted the effects of visit intentions on willingness to pay. Schubert et al. (2010) conducted t-tests of importance of green practice areas, consumers' attitudes, and behavioral intentions towards environmentally sustainable practices in restaurants, with 455 respondents in five casual dining restaurants, their study have gained an insight into consumers' attitudes, and willingness to pay more for green restaurant practices. However, they didn't find any relationships between green practices (reduce energy usage and waste; use biodegradable or recycled products; use organic products; serve locally grown food) and consumers' attitudes and behavioral intentions and willingness to pay more for green restaurant practices. Their study showed that the customers care of protecting the environment, and the customers would be willing to pay more to offset any additional costs related to green practices.

2.3. Green practices and customer intention to purchase eco-friendly products in green restaurants

Customers' ecological behavior intentions has been widely investigated thanks to the expanding research on customer behavior and the recent green management trend (Kang et al., 2012; Namkung and Jang, 2017). Due to the hesitation while purchasing green products, which often cost more than normal, customers' patronage intention is critical to be examined among different dimensions of eco-friendly behavioral intents. The term *patronage intention* or customer intention to purchase green products that has not been defined academically in consumer behavior research due to its simplicity in meanings. As a result, the author proposes customer intention to purchase green products in a green restaurant (DiPietro et al., 2013-a), or dining intention in short, it reflects the customers' desire to participate

in purchasing eco-friendly products and dining in the green restaurants (Jang et al., 2015; Shapoval et al., 2018). It is noticeable from the literature review that customers' intentions to patronize a green restaurant, this topic has gotten little attention to do a study to identify customers' willingness to pay more or purchase green products (Laroche et al., 2001; Tan and Yeap, 2012). Scholars often combined all behavioral stage aspects into one single variable, termed ecological behavioral intention such as customers' willingness to pay more for green products (DiPietro et al., 2013-a). However, despite the fact that the effects of green practices on customers' behavior represents a patronage intention of consumer who commit to purchase or revisit the green restaurants, this topic have not been well-studied, it has been a scarcity of research on customer patronage intention, as well as it lacks of the various empirical studies to determine the effects of each green practice on the variable of customer intention to purchase green products (Choi et al., 2009; Jeong and Jang, 2010). According to the literature, the following hypotheses were proposed:

H₁: Application of recycling and composting management activities have a positive influence on customer intention to purchase green products.

H₂: Application of energy and water management activities have a positive influence on customer intention to purchase green products.

H₃: Application of eco-friendly supplies have a positive influence on customer intention to purchase green products.

H₄: Application of organic food-green products and materials have a positive influence on customer intention to purchase green products.

2.4. Green practice restaurants and pro-environmental emotional attachment

In research marketing, Vlachos et al. (2010) has theoretically and conducted an empirical study, the results has proven that consumers do develop their emotions and their attachments to a particular brand of company, customers' pro-environmental emotional attachment was found to have a great impact on post-purchase behaviour, brand commitment. Other studies indicate that customers have a strong emotion and attachment to a brand or a store, the more emotional bond of customers when their needs were met, such as feelings of self-connection (Hwang and Kandampully, 2012), feel satisfied with a firm, a restaurant, positive feeling to dine in a restaurant (Wu et al., 2019) . This is also corroborated by Park et al. (2010) who confirm that customers have positive feelings that can create their attachment to a brand or a place due to the brand's fulfilment of the customers' specific needs and the brand reflects the customers' self-concepts, so the customers have a positive emotion and attachment to a restaurant that led to be elicited by business's green initiatives (Xie et al., 2015), and it increases a familiarity and continues for dining

in a restaurant, in which can create an attachment between the customer and the restaurants (Wu et al., 2019). When customers support green businesses that share a common value, they might have a deeper sense of connection and, as a result, become more emotionally attached to them. As evidenced by the attachment theory (Jang et al., 2015). When a service fulfills their social intimacy and personal needs notably to reflect their self-concepts, so the customers establish a significant influence on customers' pro-environmental emotional attachment to a restaurant (Hwang and Kandampully, 2012). Following this notion, when a service represents customers' beliefs by becoming green, they feel more connected to the service, so the emotional bonds of customers that respondents form with particular green practices of the restaurant (Yuksel et al., 2010; Jang et al., 2015; Wu et al., 2019). Jang et al. (2015) have examined the impacts of green practices on customers' pro-environmental emotional attachment to the restaurant, however, the finding is constrained in the cafe context, and it did not adequately reflect other settings in the restaurant industry, which might led to a bias if other studies employ the latter practice. To fill the research gap, this research looked into the following hypotheses to understand how each green practices have influenced on customers' pro-environmental emotional attachment to the restaurant. Therefore, it is reasonable to assume that green practices could enhance the customers' pro-environmental emotional attachment to the restaurant by adopting and implementing green practices. From the discussion above, the following hypotheses were proposed:

H₅: Application of recycling and composting management activities have a positive influence on customers' pro-environmental emotional attachment to the restaurant.

H₆: Application of energy and water management activities have a positive influence on customers' pro-environmental emotional attachment to the restaurant.

H₇: Application of eco-friendly supplies have a positive influence on customers' pro-environmental emotional attachment to the restaurant.

H₈: Application of organic food-green products and materials have a positive influence on customers' pro-environmental emotional attachment to the restaurant.

2.5. Customers' pro-environmental emotional attachment to the restaurant and customer intention to purchase green products

According to self-expansion theory, one can have an inbuilt incentive to absorb the values of the subject into their self-concept. This means, the deeper the emotional connection, the more these subjects represent the individual-self and the more they are significant to one's life goals and personal concerns. In a business context, the

more a customer is inclined to commit to a company, the more likely they make financial *sacrifices* (Park et al., 2010). The novel relationship between customers' pro-environmental emotional attachment to the restaurant and willingness to pay has not investigated. Because the consumer behavior is reflected a predictor of behavioral intention in many studies, customers' pro-environmental emotional attachment to the restaurant have an impact on customer loyalty, revisit and word-of-mouth, and customers' intention towards green restaurant (Jang et al., 2015; Moise et al., 2019; Zhang and Kim, 2013). For the customer behaviour in patronizing to purchase eco-friendly products of the restaurant, Thomson et al. (2005) found customers' pro-environmental emotional attachment to the restaurant can predict willingness to pay a premium price but not mentioned its association with willingness to dine at the restaurant. Thus, from discussion above, it is reasonable to draw a hypothesis for predicting the effect of customers' pro-environmental emotional attachment to the restaurant on customers' intention in a customer intention to purchase eco-friendly products have not examined in the context of green restaurants in HCM City:

H₉: Customers' pro-environmental emotional attachment to the restaurant has a positive influence of customer intention to purchase green products.

2.6. Mediating role of customers' pro-environmental emotional attachment to the restaurant

As the objective of this study was to address a gap in the research by attempting to determine the indirect effect of green practices on customer intention to purchase green products via customers' pro-environmental emotional attachment towards green practices that have not studied yet before (DiPietro et al., 2013-a; Ray Wang, 2012; Yusof et al., 2017; Schubert et al., 2010; Jeong and Jang, 2010). Unlike earlier mentioned factors, we place the factor of customer' pro-environmental emotional attachment as the mediating variable to explore the indirect effect between green practices and customer intention to purchase green products, the novel relationship between customer' pro-environmental emotional attachment and customer intention to purchase green products has not yet to be well-investigated. Despite its prominence as a predictor of behavioural intention in consumer behaviour research, pro-environmental emotional attachment has only been shown to have an impact direct on customer intention to purchase green products, revisiting and word-of-mouth intention towards green restaurant (Jang et al., 2015; Zhang and Kim, 2013). Moreover, Yuksel et al. (2010) have proved successfully a positive relationship between attachment factor and tourists satisfaction in holiday experiences, customer's pro-environmental emotional attachment and destination loyalty of tourists, they point out the consumers can develop their pro-environmental emotional attachment to a place, because the destination can fulfill guests' specific goals, needs activities, its symbolic meaning, therefore, customer's

pro-environmental emotional attachment is an important antecedent to measure consumers satisfaction and customer intention to purchase green products that based on dimensions such as place attachment and place bonding lead to evoke strong emotions that have influence of a person's behavior, intention to purchase (Yuksel et al., 2010) and defined attachment can affect the guests what they feel, see, think, these elements of attachment increased knowledge about a place, emotional connection with place and lead to improve customer intention to purchase green products (Yuksel et al., 2010). Past studies viewed customers' pro-environmental emotional attachment factor was an outcome variable to predict the activity involvement and place characteristics of tourists as well as an antecedent variable to predict consumer loyalty, customer satisfaction (Yuksel et al., 2010). Therefore, this study supposes a new hypothesis to test the effect of these relationships, this study examine indirect correlations between green practices and customer loyalty via consumers' pro-environmental emotional attachment, the following hypothesis was proposed:

H_{10a}: Customer intention to purchase green products are indirectly affected by application of recycling and composting management through the mediating role of customers' pro-environmental emotional attachment.

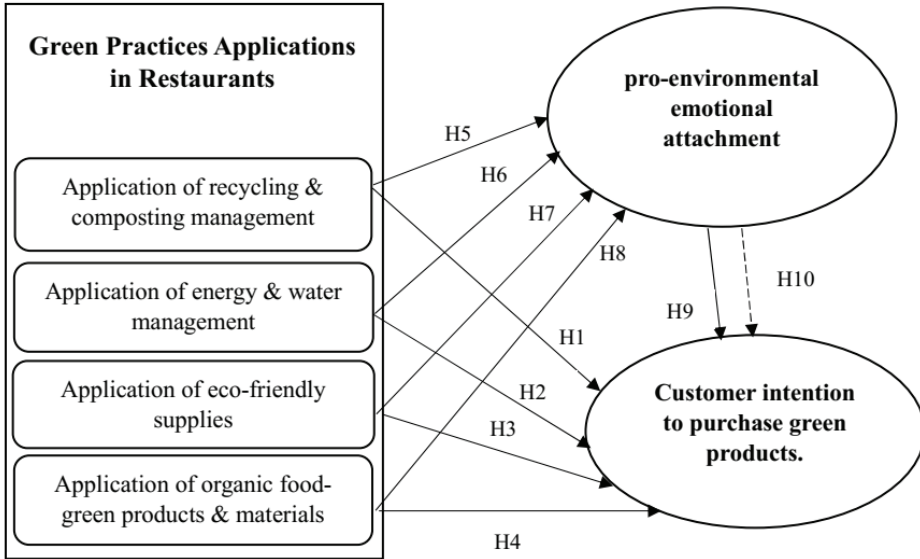
H_{10b}: Customer intention to purchase green products are indirectly affected by application of energy and water management through the mediating role of customers' pro-environmental emotional attachment.

H_{10c}: Customer intention to purchase green products are indirectly affected by application of eco-friendly supplies through the mediating role of customers' pro-environmental emotional attachment.

H_{10d}: Customer intention to purchase green products are indirectly affected by application of organic food-green products and materials through the mediating role of customers' pro-environmental emotional attachment.

Based on the literature review, the researchers proposed the conceptual framework of the study, is proposed for empirical validation (Figure 1).

Figure 1: Proposed Research Model



Source: Author's elaboration

3. Methodology

As the questionnaire is used as a data collection tool in this section the questionnaire design with measurements used is explained. Followed with sample size and data collection process, as well as target population description. At the end, data analysis methods are presented.

3.1. Questionnaire design and data collection

3.1.1. Measurements and survey instrument

A questionnaire was built based on existing literature reviews and items were adapted from previous studies with factors: four items to measure customer intention to purchase green products were adapted from DiPietro et al. (2013-a), Jang et al. (2015), and Shapoval et al. (2018), nine items to measure customers' pro-environmental emotional attachment (Yuksel et al., 2010; Jang et al., 2015), factors of green practices consist of five items to measure application of recycling and composting management activities; seven items to measure application of energy and water management activities; three items to measure application of eco-

friendly supplies; four items to measure application of organic food-green products and materials (Jang et al., 2015; Ray Wang, 2012; Schubert et al., 2010; Yusof et al., 2017; Jeong and Jang, 2010). To ensure the content validity based on the literature review and items used in prior studies, a drafted questionnaire was built and get viewpoints of two experts of manager restaurants and two academic lecturers in food and beverage field to review and evaluate the items and get feedback to revise the questionnaire if it needs to change some errors like phrase, words, difficult understand the terminology, then the questionnaire was modified, and we conducted a pretests with three guests who were having lunch in restaurants to re-evaluate the importance of all the measurement scales of these factors. A questionnaire was the main instrument of data collection for this study. This research was assessed all measurement scales on an instrument *5-point Likert-scale*, equivalent to *strongly disagree, disagree, neutral, agree, and strongly agree respectively*, using a self-administered questionnaire (Eby et al., 2013) sent to informant. A questionnaire included two sets of questions and was divided into two main parts. The first parts measured the respondents' evaluation about factors of green practices, then, the respondents rated their level of agreement with statements pertaining to a customers' pro-environmental emotional attachment to a restaurant, and customer intention to purchase green products. The second part was designed to generate descriptive information about the respondents. It included gender, age, the level of education, occupation, average income, frequency of dining at restaurants, and frequency of choosing to dine at green practice restaurants, all of which affects customer perception and satisfaction with green practice restaurants. All the items of the constructs were adapted from extant studies to augment content validity (see Table 1).

3.1.2. Sample size and data collection

To obtain a heterogeneous sample and get the generalizations and collect different perceptions of consumers, so we collected data in diverse group of guests' restaurants to reach research objectives. This research was designed as an exploratory and confirmatory study to test a causal relationship to examine consumer behavior about green practices in the restaurants in HCM City, Vietnam, HCM City is known for being the convergence place of many long-standing culinary cultures, the busiest and most developed cuisine area in Vietnam, and it has therefore been selected as a test market for testing consumer behavior about green practices. In HCM City has 307 restaurants (vietnamtourism, 2022), we selected 12 restaurants in the sample to survey the restaurant customers based on the hotel green restaurants that were got certificate green lotus or an eco-label of Vietnam's government (vietnamtourism, 2015), then we also selected 12 restaurants based on rating from tourists on Tripadvisor (2022), Topbrands (2022), justfly.vn and Digiticket (2022). Moreover, the respondents participated in this study

should meet certain criteria. First, we selected guests who were having dinner in the restaurants while they are waiting to serve. Second, we split guests in three segments, we selected two five stars food and beverage restaurants, and they agreed to participate, four casual dining restaurants were selected because these restaurants are frequented by the most diverse group of customers, and finally six fine dining restaurants were selected because they are frequented by the most business tourists and rich people, therefore 12 restaurants were selected in this study because of the frequented by the most green consumers. Third, all these guests voluntary to participate in this study. Finally, the restaurant guests who are aged from 18 years or older were selected to answer the questionnaire. These restaurants support us to deliver a survey questionnaire directly to their guests we conducted a survey from Wednesday to Sunday during the day time and evening hours, a hard copy questionnaire was administered to the guests and took approximately eight minutes to complete. Regard to sample size of empirical data collection in this study, some scholars suggested that a minimum subjects to item ratio of at least 5:1 in EFA (Hair et al., 2011). The conceptual framework in this study go with 6 variables includes 32 items, so the minimum number of respondents for this study was at least 192 cases (32x6), however, the more respondents are the better to increase the reliability of data collection (Hair et al., 2011).

3.1.3. The target population

The population of this study focuses on customers of restaurants and often dine in green practice restaurants in Ho Chi Minh City (HCM City), customers aged between 18 and 70 years old. Due to the limit time, we used convenience sampling technique to collect data. The questionnaire was provided in both Vietnamese and English as the target population was Vietnamese and foreigners who are living in HCM City. A total of 400 questionnaires were administered to restaurant guests. The final sample included 358 completed questionnaires, and there were 42 cases that were not completed answering all questions, the total number of respondents of the survey in this research showed there were 30 foreigners, and 328 Vietnamese. The data has been collected directly by staff of restaurants and the researchers from February to September 2022.

3.2. Data analysis method

This study was designed as an exploratory and confirmatory research to identify the influence of green practices on Customer intention to purchase green products in the green practice restaurants through customers' pro-environmental emotional attachment. Multiple statistical techniques were employed in order to obtain more accurate results and better conclusions. For instance, the collected responses were coded and screened for errors before any analytical techniques were applied.

Statistical Package for the Social Science (SPSS) version 20.0 and Smart-PLS software with a version 3.0 to evaluate research model (Hair et al., 2011) for variance-based structural equation modelling (SEM) using the partial least squares (PLS) path modelling was used to run the data. SPSS was first used to screen the data and detect missing values and outliers, analyse descriptively, as well as test the distribution of the demographic data. PLS-SEM was then used to assess the correlations between latent variables in the conceptual model, PLS-SEM was selected because it is suitable for the study of complex constructs and both exploratory and confirmatory research, it demonstrated on maximizing the variance of endogenous latent variables interpreted by the exogenous variables in reverse to reflect the experimental covariance matrix (Prayag and Lee, 2019), and this research model was developed using many extant theories. As such, the prediction among latent variables in the model required PLS-SEM (Hair et al., 2011). The non-parametric bootstrapping was measured with 2000 replications (Hair et al., 2011).

The data obtained after running PLS-SEM was assessed in two steps to analysis the collected data (Hair et al., 2011). First step, the 358 valid data were tested for the reliability and validity of measurement scales of the outer model by using composite reliability (CR), average variance extracted (AVE), and Cronbach's alpha. At the second step, we focused on identifying the potential relationship amongst these constructs, the structural model assessed with the appropriate results of the measurements in this research model, as well as the significance and effects of path coefficients. Hair et al. (2019) stated that the PLS is used for prediction-oriented research, and it aims to maximize the explained variance of dependent variables, and it also can be used if less rigid theoretical backgrounds are available. Regard to the inner model explains the relationships between the exogenous variables of green practices (application of recycling and composting management activities, application of energy and water management activities, application of eco-friendly supplies, application of organic food-green products and materials) and endogenous latent variables (customers' pro-environmental emotional attachment, customer intention to purchase green products) along with the outer model explains the relationships among the latent variables and their observed indicators and was used to test the research hypotheses by evaluating the inner model (β) path coefficient sizes and significance. Using the non-parametric bootstrapping method (Hair et al., 2011).

4. Empirical data and analysis

This section covers analysis of the participant's profile and presents measurement model results. Also, to test the posited hypotheses, assessment of the structural model through testing multi-collinearity, predictive power of structural model and predictive relevance are presented. At the end of the section mediating analysis is presented and explained.

4.1. Profile of participants

From the results of the descriptive analysis, it provides the demographic profile of 358 the respondents from 12 restaurants in HCM City in Vietnam. Most respondents were female (62.6%) who are intention to purchase green products in the restaurants, while the male accounted for 37.4%. Most of the respondents were between the ages of 18 to 70, and the largest group aged between 18 and 25 years (65.1%), the second large group aged between 26 and 30 years (20.1%), the third large group aged between 31 and 40 years (10.9%), finally, aged between 41 and 70 years (3.9%). Most restaurant customers are working age i.e., Generation Z who spend more on their daily needs. A large of the respondents had obtained a bachelor's degree (45%) and higher/graduate degrees (40%) and had obtained college experience (14.5%). In terms of occupation, most respondents were college students (51.1%). This was followed staff by 36.3 percent who worked full-time, and 12.6% with higher positions in a company such as manager, vice manager, director, vice director. In terms of the respondents' monthly income, roughly 36.6 percent of the respondents had low to middle level incomes (<11 million Vietnam Dong), while 32.4 percent of the respondents earned high incomes (>11 million Vietnam Dong). The remaining 31 percent of the respondents earned less than five million Vietnam Dong per month. In terms of eating habits, respondents were asked about their level of frequent dining at a green restaurant. About half (52.8%) of the respondents did not routinely dine in a green restaurant, while 26.5 percent of the respondents had dined in a green restaurant at least once a week. The remaining 20.7 percent of the respondents reported dining in a green restaurant at least twice a week.

4.2. Measurement model results

First stage, we have assessed the convergent validity and consistency reliability for each indicator and utilized (CR) composite reliability and (AVEs) average variance extracted to examine it. Composite reliability (CR) was applied to estimate internal reliability (Netemeyer et al., 2003) and average variance extracted (AVE) was to assess convergent validity (Fornell and Larcker, 1981). The minimum value for composite reliability was at least 0.7 and for average variance extracted was from 0.5 (Fornell and Larcker, 1981; Hair, et al., 2014). Table 1 describes the results of composite reliability of all the constructs. In Table 1 presents CR ranged from 0.811 to 0.940, in line with Hair et al. (2011) suggested that CR should be 0.6 is accepted. The AVEs ranged from 0.522 to 0.741 for each factor in line with Hair et al. (2019) pointed out that the AVEs should be 0.5 or higher is acceptable, this result indicated that all constructs reflect the model of high levels of internal consistency reliability and the convergent validity. The primary method assessed internal consistency and reliability, was Cronbach's Alpha. Cronbach's Alpha values are greater than 0.7 that consider to be appropriate reliability of the measured constructs Hair et al. (2019),

in this study Cronbach's Alpha ranged from 0.712 to 0.926. Hair et al. (2011) pointed out that the factor loading did not exceed 0.60 that should be excluded, in our study there are some indicators were excluded such as RC1, EW1, EW2, EW3, EA7 because these indicators of application of recycling and composting management activities, application of energy and water management activities have factor loadings are less than 0.60 (see Table 1).

Table 1: Summary of dependent variables and independent variables with measurement model evaluation

Constructs and Indicators	Factor Loading
Customer intention to purchase green products: WiCo (Cronbach's Alpha = 0.751, CR = 0.843, AVE = 0.574)	
<i>WiCo1: I believe that restaurant should use local products for their menu whenever possible.</i>	0.805
<i>WiCo2: I prefer to patronize intention with businesses that are environmentally friendly</i>	0.674
<i>WiCo3: I prefer to purchase services from organizations that practice green initiatives</i>	0.819
<i>WiCo4: I am willingness to pay up to 5 percent more for environmentally safe services.</i>	0.724
Customers' pro-environmental emotional attachment: EA (Cronbach's Alpha = 0.926, CR = 0.940, AVE = 0.664)	
<i>EA1: I feel this green restaurant is a part of me.</i>	0.804
<i>EA2: I identify strongly with this green restaurant.</i>	0.848
<i>EA3: Visiting this green restaurant says a lot about who I am.</i>	0.833
<i>EA4: I am very attached to this green restaurant.</i>	0.855
<i>EA5: I feel a strong sense of belonging to this green restaurant.</i>	0.881
<i>EA6: This green restaurant means a lot to me.</i>	0.859
<i>EA8: At times that I eat out at other restaurants and feel uncomfortable because of their unfriendliness with the environment, these green practice restaurants come to mind.</i>	0.697
<i>EA9: If someone praised these eco-friendly restaurants, I would feel pleased.</i>	0.804
Green Practices Applications in Restaurants:	
Application of recycling and composting management activities: RC (Cronbach's Alpha = 0.712, CR = 0.811, AVE = 0.522)	
<i>RC2: Provide recycling bin in store</i>	0.622
<i>RC3: Conduct food waste composting programs</i>	0.630
<i>RC4: Purchase products made from recycled or rapidly renewable materials</i>	0.837

Constructs and Indicators	Factor Loading
<i>RC5: Reuse materials from other construction sites or buildings that have closed</i>	0.777
Application of energy and water management: EW (Cronbach's Alpha = 0.743, CR = 0.838, AVE = 0.565)	
<i>EW4: Replace exit lights with LED's</i>	0.730
<i>EW5: Use motion detectors for lights in the restroom</i>	0.715
<i>EW6: Use of a system which monitors and controls comfortable temperatures efficiently with the HVAC (Heating, Ventilating and Air Conditioning) system</i>	0.812
<i>EW7: Keep the entrance door closed or use a double entrance door</i>	0.747
Application of eco-friendly supplies: ES (Cronbach's Alpha = 0.825, CR = 0.896, AVE = 0.741)	
<i>ES1: Use of environmentally friendly cleaners for dishes, and linen.</i>	0.873
<i>ES2: Use of environmentally friendly cleaners for tables and floors.</i>	0.905
<i>ES3: Use of take-out containers that are biodegradable (paper) or recyclable instead of using Styrofoam.</i>	0.801
Application of organic food-green products and materials: MS (Cronbach's Alpha = 0.748, CR = 0.840, AVE = 0.567)	
<i>MS1: Offer local ingredients on the menu.</i>	0.752
<i>MS2: Offer organic food on the menu.</i>	0.748
<i>MS3: Offer fish and seafood harvested sustainably and free of harmful pollutants.</i>	0.787
<i>MS4: Avoid genetically modified foods.</i>	0.724

Notes: CR: composite reliability; AVE: average variance extracted.

Source: Author's calculation

After indicator's reliability and convergent validity were confirmed, the discriminant validity was assessed, in this study employed the ratio by Fornell and Larcker (1981) to found the square root of AVEs, each latent variable should be greater than the correlations among the construct, and it can be used to establish discriminant validity in case the square root of AVE values are bigger than other correlation values among the latent variables (Hair et al., 2019). Other latent variables were well established the discriminant validity. As Hair et al. (2011) pointed out that an indicator's loadings that should be higher than all of its cross loadings, the Fornell-Larcker criterion demonstrates that each latent variable shares more variance with its own indicators than the other latent variables in the conceptual model. Therefore, each variable's square root value of AVE should be greater than its highest correlation compared with the other constructs. Furthermore, the item loadings of a construct should be greater than the loadings of

other constructs. Table 2 presents the results of discriminant validity was supported all constructs, it ranged from 0.723 to 0.861, which indicated that the identified components fit the Fornell-Larcker criteria (Fornell and Larcker, 1981; Hair et al., 2019).

Table 2: Discriminant validity of Fornell and Larcker criteria results

	(1)	(2)	(3)	(4)	(5)	(6)
(1) Application of eco-friendly supplies	0.861					
(2) Customers' pro-environmental emotional attachment	0.266	0.815				
(3) Application of energy and water management	0.522	0.375	0.752			
(4) Application of organic food-green products and materials	0.574	0.376	0.483	0.753		
(5) Application of recycling and composting management	0.571	0.432	0.550	0.564	0.723	
(6) Customer intention to purchase green products	0.369	0.662	0.455	0.445	0.532	0.758

Source: Author's calculation

4.3. Assessment of the structural model results

4.3.1. Testing multi-collinearity

Before assessing the structural model, we evaluated multi-collinearity among variables to prevent misleading regression results. When there are inter-correlations across predictor variables in a model, the value of the endogenous variables cannot predict independently, so the variance inflation factor (VIF) was used to check the multi-collinearity problems. All VIF's results are all below the cutoff value of 5, indicating that there are no collinearity issues across predictor constructs (Hair et al., 2021). According to Hair, et al. (2010) proposed the acceptable criterion for VIF smaller than 4; otherwise, If VIF values bigger than 5 that indicated that multi-collinearity would exist problems in predictor variables, collinearity problems (Hair, et al., 2017; Jintanee Ru-Zhue et al., 2022). From the collinearity statistics in our study, VIF values range from 1.306 to 1.961, which indicated that multi-collinearity is not a problem in this data. The measure outcomes of conceptual framework have been agreeable. After that, the explanation of the target endogenous variables (customers' pro-environmental emotional attachment, customer intention to purchase green products) variance were exploited to investigate the adequate of the predictive model.

4.3.2. Testing predictive power of structural model

Next, the model fit was evaluated by examining the predictive power of the structural model was estimated the R^2 weight of endogenous constructs were valued. The R^2 value is between 0 and 1, with greater values exhibiting a higher explanatory power. As a guideline of Peng and Lai (2012) suggested that the thresholds of R^2 values at 0.75, 0.50, and 0.25 can be assessed as substantial, moderate, and weak predictive accuracy (Hair et al., 2011; Jintanee Ru-Zhue et al., 2022). Following this, our results point out that the coefficient of determination (R^2) was 0.234 for customers' pro-environmental emotional attachment, it indicated that 23.4% of the variation in customers' pro-environmental emotional attachment was weak predictive accuracy by application of eco-friendly supplies, application of energy and water management activities, application of organic food-green products and materials, application of recycling and composting management activities. Following, the R^2 weight of customer intention to purchase green products were 0.529 that indicated that 52.9% of the variation in customer intention to purchase green products were moderately predicted accuracy by customers' pro-environmental emotional attachment, application of eco-friendly supplies, application of energy and water management activities, application of organic food-green products and materials, application of recycling and composting management activities. In this study the results of R^2 are substantial and moderate respectively with suggestion by previous scholars (Jintanee Ru-Zhue et al., 2022; Hair et al., 2011; Peng and Lai, 2012).

4.3.3. Testing predictive relevance

Following we used Blindfolding to measure predictive relevance. The instrument to evaluate the inner model. The value of Q^2 is bigger than zero Hair et al. (2011), so the exogenous constructs were predicted relevance for the endogenous variables are acceptable model fit. In this study, the average cross-validated redundancy achieved 0.142 for customers' pro-environmental emotional attachment, 0.280 for customer intention to purchase green products, which were higher than zero. Therefore, there was a high predictive relevance for customers' pro-environmental emotional attachment, customer intention to purchase green products to exhibit adequate model fit Hair et al. (2011). Therefore, there was predictive relevance for customers' pro-environmental emotional attachment, customer intention to purchase green products in the research model. Effect size (f^2) is quantified by changes in the R^2 when a particular construct is removed from the model. This determines if the removed construct significantly impacts the endogenous constructs. As a rule of thumb, f^2 values of 0.02, 0.15, and 0.35 are the small, medium, and large effects of an exogenous construct, respectively, while f^2 values below 0.02 represent no effect. application of recycling and composting management activities ($f^2 = 0.056$) and customers' pro-environmental

emotional attachment ($f^2 = 0.730$) had the highest f^2 values and change in R^2 of customers' pro-environmental emotional attachment and customer intention to purchase green products, respectively, a structural model fitted reasonably to the data in this research model. Additionally, except for the application of eco-friendly supplies, all the predictors affected customers' pro-environmental emotional attachment. Conversely, two of the five predictors, i.e., customers' pro-environmental emotional attachment and application of recycling and composting management activities affected customer intention to purchase green products in green practice restaurants. After running the PLS model, non-parametric bootstrapping (Wetzels et al., 2009) was utilized to examine the significance of the path coefficients. Table 3 illustrates that all the paths were significant except for three hypotheses H_3 , H_4 , H_7 . Figure 2 present the results of test hypotheses, this research based on *non-parametric bootstrapping* with 2000 replications to test the structural model and at the level of confidence interval 95% (Hair et al., 2011; 2019; Jintanee Ru-Zhue et al., 2022).

Table 3: Summary Results of Path Coefficients – Direct effects

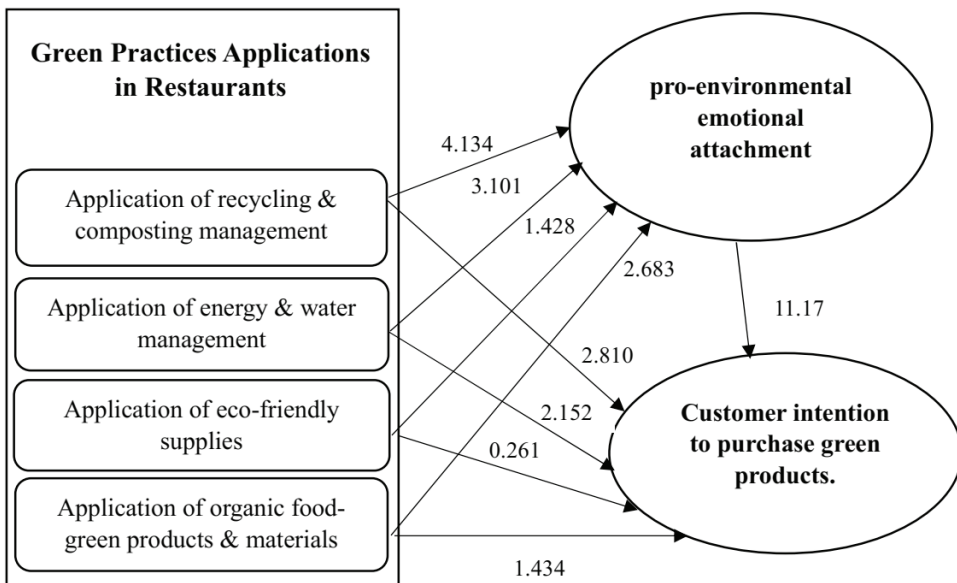
Hypotheses	Direct Effects	β	T-value	P-value	Decision
H_1	Application of recycling and composting management → Customer intention to purchase green products	0.197	2.810	0.005	Supported
H_2	Application of energy and water management → Customer intention to purchase green products	0.111	2.152	0.032	Supported
H_3	Application of eco-friendly supplies → Customer intention to purchase green products	0.015	0.261	0.794	Rejected
H_4	Application of organic food-green products and materials → Customer intention to purchase green products	0.080	1.434	0.152	Rejected
H_5	Application of recycling and composting management → Customers' pro-environmental emotional attachment	0.287	4.134	0.000	Supported
H_6	Application of energy and water management → customers' pro-environmental emotional attachment	0.180	3.101	0.002	Supported

Hypotheses	Direct Effects	β	T-value	P-value	Decision
H ₇	Application of eco-friendly supplies → Customers' pro-environmental emotional attachment	-0.098	1.428	0.153	Rejected
H ₈	Application of organic food-green products and materials → Customers' pro-environmental emotional attachment	0.183	2.683	0.007	Supported
H ₉	Customers' pro-environmental emotional attachment → Customer intention to purchase green products	0.504	11.173	0.000	Supported

Source: Author's calculation

Given that the explanatory power and out-of-sample predictive power are confirmed, the assessment of statistical significance and relevance of the path coefficients is performed. Table 3 illustrated the path-coefficients' results. Figure 2 shows the structural model, which has resulted from the PLS analysis.

Figure 2: Results of Structural Equation Model



Source: Author's elaboration

The first research question *To what extent do green practices in restaurants affect customer intention to purchase green products?* the results show that there are two factors of application of recycling and composting management activities ($\beta = 0.197$; $p = 0.005$; $t = 2.810$) have positive relationship with customer intention to purchase green products, following is application of energy and water management activities with a low effects of customer intention to purchase green products ($\beta = 0.111$; $p = 0.032$; $t = 2.152$). Therefore, H_1 and H_2 are completely supported. Except of application of eco-friendly supplies and application of organic food-green products and materials did not directly affect customer intention to purchase green products, so H_3 and H_4 were rejected since they did not have statistical significance (p -value > 0.05). The rejection of these hypotheses implied a disconfirmation of application of eco-friendly supplies, application of organic food-green products and materials did not affect customer intention to purchase green products in green restaurants.

The second research question *To what extent do green practices in restaurants affect customers' pro-environmental emotional attachment to green products?* the result shows that three of four factors of green practices, including application of energy and water management activities, application of organic food-green products and materials, application of recycling and composting management activities have significantly and directly impact on customers' pro-environmental emotional attachment with 5 percent significance. Recycling and Composting is the most influenced on customers' pro-environmental emotional attachment with ($\beta = 0.287$; $t = 4.134$; $p = 0.000$), ranking second is application of organic food-green products and materials have directly influenced on customers' pro-environmental emotional attachment with ($\beta = 0.183$; $t = 2.683$; $p = 0.007$), following is the application of energy and water management has directly influenced on customers' pro-environmental emotional attachment with ($\beta = 0.180$; $t = 3.101$; $p = 0.002$). Consequently, the hypothesis H_5 , H_6 , and H_8 were totally supported, while hypothesis H_7 was rejected, meaning that application of eco-friendly supplies has no bearing on fostering customers' pro-environmental emotional attachment.

The third research question *Do customers' pro-environmental emotional attachment elicit customer intention to purchase green products in green practice restaurants?* the results showed that customers' pro-environmental emotional attachment and customer intention to purchase green products in a restaurant implement green practices was discovered and yield a remarkable significant with ($\beta = 0.504$; $t = 11.173$; $p = 0.000$). Therefore, the H_9 was completely supported. This meant that if a customer had a strong pro-environmental emotional attachment to the green practices of the restaurant, he or she would more likely assign their willingness to pay more to that restaurant over others.

4.3.4. Mediating Analysis

Additionally, to answer the research question 4 *To what extent do customers’ pro-environmental emotional attachment mediate the relationship between green practices and customer intention to purchase green products?* the mediating analysis results were presented in Table 4, the results illustrated that customers’ pro-environmental emotional attachment completely mediated the correlation between green practices and customer intention to purchase green products, including: application of recycling and composting management activities ($\beta = 0.144$) most strongly affected customer intention to purchase green products followed by application of organic food-green products and materials ($\beta = 0.092$) and application of energy and water management activities ($\beta = 0.091$). Therefore, these hypothesis H_{10} (H_{10a} , H_{10b} , H_{10d}) were totally supported. However, application of eco-friendly supplies did not have indirect impact on customer intention to purchase green products through the mediation of customers’ pro-environmental emotional attachment, the H_{10c} was rejected.

Table 4: Summary Results of Indirect Effects

Hypotheses	Indirect Effects	β	T-value	P-value	Decision
H_{10a}	Application of recycling and composting management → customers’ pro-environmental emotional attachment → Customer intention to purchase green products	0.144	3.764	0.000	Supported
H_{10b}	Application of energy and water management → customers’ pro-environmental emotional attachment → Customer intention to purchase green products	0.091	3.034	0.002	Supported
H_{10c}	Application of eco-friendly supplies → customers’ pro-environmental emotional attachment → Customer intention to purchase green products	-0.049	1.391	0.164	Rejected
H_{10d}	Application of organic food-green products and materials → customers’ pro-environmental emotional attachment → Customer intention to purchase green products	0.092	2.564	0.010	Supported

Source: Author’s calculation

5. Results and Discussions

To elicit customer intention to purchase green products, in the first objectives, this study found a strong relationship between green practices of application of recycling and composting management activities and customer intention to purchase green products, that confirmed the measurement scales were built by (DiPietro et al., 2013-a) are in line with previous studies (Jang et al., 2015; Shapoval et al., 2018; Laroche et al., 2001; Tan and Yeap, 2012). Another important finding is that the customers evaluate the green practices of application of energy and water management activities revealed a second strong significant relationship with customer intention to purchase green products, which confirmed the theories were built from (DiPietro et al., 2013-a; Dutta et al., 2008; Ray Wang 2012), are in line with Jang et al. (2015). What is curious about this result is that there is no relationship between green practices of application of eco-friendly supplies; application of organic food-green products and materials and customer intention to purchase green products, because the restaurant customers didn't evaluate these factors are the most critical elements affect their behavior intention to purchase the green products, and it is consistent with Schubert et al. (2010) conducted t-tests of importance of green practice areas, their study have gained an insight into consumers' attitudes, and willingness to pay more for green restaurant practices. However, they didn't find any relationships between green practices (reduce energy usage and waste; use biodegradable or recycled products; use organic products; serve locally grown food) and behavioral intentions and willingness to pay more for green restaurant practices. However, it is in contrary to previous studies (Choi et al., 2009; Jeong and Jang, 2010; Jang et al., 2015; Shapoval et al., 2018; Yusof et al., 2017; Yarimoglu and Gunay, 2019). Yarimoglu and Gunay (2019) found that environmentally friendly activities/green practices (eco-friendly cleaning supplies), serving local and organic food directly affect customers' intentions to visit a green hotel in Turkish, and the results also predicted the effects of visit intentions on willingness to pay. The study has proven that the application of recycling and composting management activities; application of energy and water management supported the restaurants to achieve customer intention to purchase more eco-friendly products/services directly. However, the awareness of customers towards application of eco-friendly supplies and application of organic food-green products and materials cannot be taken heavily as far as restaurant industry is concerned to understand whether customer intention to purchase green products, the customers did not support application of eco-friendly supplies and application of organic food-green products and materials as an antecedent of green practices. Additionally, the customers/Vietnamese may plant organic gardens at home to cater to their meals, because Vietnam is a cultural architecture, so they can respond favorably to the opportunity of being served themselves with fresh, locally/ home grown, organic food, and create an eco-friendly scene when they grow trees, plants to serves as their organic foods in their gardens. Therefore, the customers here did not evaluate

the application of organic food-green products and materials are an important factor to affect them to pay more for eco-friendly products.

On the question two to identify the relationship between green practices and customers' pro-environmental emotional attachment, this study found that the highest important factors of green practices are application of recycling and composting management activities affect customers' pro-environmental emotional attachment toward green restaurants, this result was confirmed the theories were built from previous studies (Vlachos et al. 2010; Jang et al., 2015; Xie et al., 2015). Another finding showed the second important factor is application of organic food-green products and materials are associated with customers' pro-environmental emotional attachment, are in line with (Jang et al., 2015; Ray Wang, 2012; Schubert et al., 2010). The third important factor is application of energy and water management activities affect customers' pro-environmental emotional attachment toward the green restaurant of the customers, this finding was confirmed the theories from DiPietro et al. (2013-a); Ray Wang (2012); this result also reported by Jang et al. (2015); Schubert et al. (2010); Jeong and Jang (2010). One unexpected finding was that the customers did not evaluate the significance of application of eco-friendly supplies affect customers' pro-environmental emotional attachment toward green restaurants, this finding was contrary with previous studies (Jang et al., 2015; Hwang and Kandampully, 2012; Yuksel et al., 2010), because the awareness of customers towards application of eco-friendly supplies cannot be taken heavily as far as restaurant industry is concerned to understand customers emotion and attachment to the restaurants, the customers did not support application of eco-friendly supplies as an antecedent of green practices that did not increase their emotion and attachment.

On the research question three whether customers pro-environmental emotional attachment elicit the customer intention to purchase green products in green practice restaurants, this study found that customers evaluate the significance of customers' pro-environmental emotional attachment toward green restaurants lead to enhance the customers' willingness to purchase more green products and services, this finding was consisted with previous studies (Jang et al., 2015; Hwang and Kandampully, 2012; Yuksel et al., 2010). Similarly, Jang et al. (2015) also identified elements of green practices affect direct and indirect green store loyalty and green product loyalty through customers' pro-environmental emotional attachment. The results indicated that the awareness of customers towards customers' pro-environmental emotional attachment can be taken heavily as far as restaurant industry is concerned to understand customer intention to purchase green products in green practice restaurants, in this study showed that the customers do support customers' pro-environmental emotional attachment to a green restaurant. Customers' pro-environmental emotional attachment is as an antecedent of customer intention to purchase green products that did increase their emotion and attachment lead to pay more and consume more.

Lastly, research question four, to identify the role of mediating variable of customers' emotional attachment mediate the relationship between green practices and customer intention to purchase green products. Three of four factors, including application of organic food-green products and materials, application of energy and water management activities, application of recycling and composting management activities affect indirect customer intention to purchase green products via customers' pro-environmental emotional attachment, in line with previous studies (Yuksel et al., 2010; Jang et al., 2015). As such, of all the independent variables, application of organic food-green products and materials, application of energy and water management activities, application of recycling and composting management activities were found to play a significant role in forecasting both customers' pro-environmental emotional attachment to a green practice restaurant and customer intention to purchase eco-friendly products. Therefore, if a restaurant shows their customers see the restaurants use an application of recycling and composting management activity system, the customer is more likely to fall in the restaurant and customer intention to purchase green products. The application of organic food-green products and materials and application of energy and water management activities were significant variables when considering the mediating role of customers' pro-environmental emotional attachment and the level of customer intention to purchase green products. This result suggests that there is not direct effect of application of organic food-green products and materials on customer behavioral intention to purchase green products, however, there is a relationships' indirect relationship between application of organic food-green products and materials and customer intention to purchase green products through customers' pro-environmental emotional attachment construct, the results are better explained the restaurant customers' behavior about green purchasing products. The result indicated that respondents were highly concerned about food safety and the application of energy and water management activities in the restaurants. Therefore, if the green practice restaurants focus on efficiently managing energy and water usage and use sustainable food sources, they are more likely to impress their customers and create a good impression. Then, if the customers develop a strong customers' pro-environmental emotional attachment, they show their commitment to the restaurant and customer intention to purchase green products. The study also showed that the positive awareness of customers towards green practices has influence on customer intention to purchase green products indirectly through customers' pro-environmental emotional attachment. However, the awareness of customers towards application of eco-friendly supplies cannot be taken heavily as far as restaurant industry is concerned to understand indirectly whether customer intention to purchase green products through customers' pro-environmental emotional attachment, the customers did not support customers' pro-environmental emotional attachment play as a mediation variable to explore a cause effect of application of eco-friendly supplies and customer intention to purchase green products.

5.1. Theoretical contributions

The first contribution of this study found the impacts of green practices on customer intention to purchase eco-friendly products, based on the path analysis revealed that restaurant's green practices had a direct influence on customers' willingness to pay more, the results have confirmed the measurement scales that were developed by DiPietro et al. (2013-a) because the restaurants use the application of recycling and composting, energy and water management activities to achieve financial benefits, reduce environmental costs and meet eco-friendly consumers' demand, attain competitive advantages in restaurant industry, this result complies with the findings of Dutta et al. (2008), Jeong and Jang (2010), and Namkung and Jang (2013).

The second contribution of this study found the impacts of green practices on customers' pro-environmental emotional attachment had proved that three factors of green practices (application of energy and water management activities, application of organic food-green products and materials, application of recycling and composting management activities) contribute to the formation of customers' pro-environmental emotional attachment to a green restaurant (Yuksel et al., 2010; Jang et al., 2015). In similar vein, proposed by Jang et al. (2015) that the strengthened their report on the significance of this relationship because the effects of restaurants' green practices on customers' emotional response are still rarely examined until now, so our study has filled the gap based on Jang et al. (2015) suggestion and our study reached this objective, and it also supports the confirmation on the impacts of place identity on place attachment provided by (Jang et al., 2015).

The third contributions of this study found the empirical results that showed that customers' pro-environmental emotional attachment had a positive effect on the customer intention to purchase eco-friendly products/ services in the green restaurants, so the results have confirmed the measurement scales from previous studies (the customer feel this green restaurant is a part of me, the customer identify strongly with this green restaurant, the customers visit this green restaurant says a lot about who they are, the customers feel very attached to this green restaurant, the customers feel a strong sense of belonging to this green restaurant, this green restaurant means a lot to them, the customer eat out at other restaurants and feel uncomfortable because of their unfriendliness with the environment, these green practice restaurants come to mind, if someone praised these eco-friendly restaurants, the customer would feel pleased (Jang et al., 2015; Hwang and Kandampully, 2012; Yuksel et al., 2010).

The four contributions of this study found the indirect impacts of green practices on customer intention to purchase eco-friendly products via customers' pro-environmental emotional attachment, this is the first study to find the role mediation variable of customers' pro-environmental emotional attachment between green

practices and customer intention to purchase eco-friendly products/ services that were endorsed in Vietnam context, so the results have confirmed the measurement scales from previous studies (DiPietro et al, 2013-a; Jang et al., 2015; Shapoval et al., 2018). This result yielded the assertion that customers' pro-environmental emotional attachment to an object or services are associated with a financial investment that is willing to pay up to 5 percent or more for protecting environment and safe services (DiPietro et al, 2013-b). The customers also believe in restaurant, where the restaurants use local products, so the customers patronize intention with these businesses and environmentally, therefore, the customers purchase eco-friendly products or the services from organizations that implement green initiatives.

5.2. Practical implications

As the level of green consciousness increases among customers in HCM City and around the world, restaurants should focus more on green operation strategies to have a competitive advantage. This study provides several methods of eliciting customer intention to purchase more eco-friendly products as well as to increase the customer intention to purchase more eco-friendly products in restaurant market. In practice, the restaurants should invest more finance to application of recycling and composting, energy and water management activities, this study did not found the significant of menu sustainability and eco-friendly supplies, therefore, the restaurants should focus more on these factors to increase the customer customer intention to purchase more, the restaurants were also encouraged to attain application of eco-friendly supplies to establish customers' pro-environmental emotional attachment to the services of restaurants. The restaurants consider using suppliers of foods to offer organic foods to customers, such as the restaurants purchase local products and organic food to carry out commitment a sustainability menu. Moreover, the government should support finance and reduce tax for these green restaurants. In addition, the managers should cooperate with suppliers who must invest technology and use green practices to produce in organic foods that increase to protect sustainability environment and foster customers' pro-environmental emotional attachment with the friendly services and indirectly trigger their willingness to dine at the green restaurants.

Furthermore, the government should issue the green certificate for the restaurants that applied green practices and are strongly encouraged the restaurant and hospitality industry to apply green practices such as recycle and compost since it influences customers' pro-environmental emotional attachment toward the services of restaurants as well as the customers' patronizing decisions to choose the green restaurants, the other factors of green practices affect customers' willingness are application of recycling and composting management activities, so the managers of restaurants should provide recycling bins in the restaurant, conduct a food

waste program, purchase products manufactured from recycled or fast renewable materials, and reuse the materials from other construction sites. Therefore, the managers of restaurants should create effective application of recycling and composting management activities, use sustainably sourced ingredients, and implement application of energy and water management activities.

This study supports the idea that, not only in developed countries but in Vietnam as well, customers are greatly concerned with these three factors and recognize that they are factors to develop business sustainability. This could take time and multiple tries as application of recycling and composting management activities are not something that everyone is enthusiastic to adopt due to the complexities involved and the application of recycling and composting management activities in Vietnam is incomplete. Besides the application of recycling and composting management activities, other factors are also important to maintain and improve the business of restaurants are the execution of energy-and-water efficient solutions that can bring fruitful results to restaurant's operations by enhancing customers' pro-environmental emotional attachment and willingness to dine at the restaurants.

Based on demographic analyses, this study found that female customers accounted for 62.6%, who are intention to purchase green products in the restaurants. Moreover, the restaurant customers are young group between 18 to 25 years old, the young customers accounted for 65.1% to be willingness to purchase the green products and support green practices in the restaurants to protect environment as well as willingness to return to dine at the green restaurant because of its environmental functions, and when they visit this green restaurant, so the manager of restaurants and marketers should focus on this group and invest finance to advertise the services of restaurant to this young group. Furthermore, the managers of restaurants should consider using equipment that provides seating where takes advantage of bright sunlit dining areas could also impress environmentally conscious customers. When customers are more informed of a restaurant's green practices and their positive impact on the surrounding environment, they will be more likely to form an customers' pro-environmental emotional attachment and increase customer intention to return these restaurants.

6. Conclusions

This study has reached the research objectives to identify what factors of green practices affect customer intention to purchase green products via customers' pro-environmental emotional attachment to a restaurant. The current work contributed to the extant literature by verifying previous results and confirming the measurement scales in restaurants in Vietnam context adopted from the previous studies. Moreover, this research contributed to extending the TPB by adding

customers' pro-environmental emotional attachment into the TPB to explore the customers' behavior and intention to purchase green products.

Firstly, the results yield a positive significant statistical relationship between green practices (application of recycling and composting management activities, application of energy and water management) and customer intention to purchase green products, the study proved the adoption of the application of recycling and composting management activities are the most significantly impacting practices on customers' patronage intention at a green restaurant, these measurement scales are the most important indicators of green practices drive customer behavioral intentions at a coffee shop, it also confirmed the application of recycling and composting management activities in restaurants HCM City context, the items are using recyclable take-out containers and implementing recycling program are positive significant in this study. The restaurants apply the saving water and energy efficiency and joining recycling programs that lead to affect more on customers' behavioral intention to purchase green products. As a result, the green initiatives in green restaurants have a positive impact on customer intention to purchase eco-friendlier products or services in the restaurant industry. The results proved that green practices, including the application of recycling and composting, energy, and water management activities are an antecedent of customer intention to purchase green products. Secondly, the contribution of this study found the impacts of green practices on customers' pro-environmental emotional attachment had proved that three factors of green practices (application of energy and water management activities, application of organic food-green products and materials, application of recycling and composting management activities) contribute to the formation of customers' pro-environmental emotional attachment to a green restaurant and customers' pro-environmental emotional attachment, respectively. It also overcomes the limitation of previous studies by testing green practices that directly affect customers' emotions and attachment to green restaurants, which confirmed three factors are important and antecedents of customer emotional attachments that contribute to the formation of customers' pro-environmental emotional attachment to green restaurants. The results proved that green practices, including the application of energy and water management activities, the application of organic food-green products and materials, application of recycling and composting management activities are an antecedent of customers' pro-environmental emotional attachment. In addition, this study proved customers' pro-environmental emotional attachment plays a dependent variable to investigate the causes of green practices.

Thirdly, customers' pro-environmental emotional attachment increases their intention to purchase eco-friendly products. Therefore, restaurant marketers need to promote communicating essential information to customers and the market regarding green values to potential customers. We recommend that the restaurants

reinforce their message to customers to lead them to bond their emotions and attachment by presenting the advantages, benefits, and results of protecting the environment through user-friendly programs so that the customers may recognize the green activities of the restaurants behind the operation of green restaurants.

Fourthly, this study found the indirect impacts of green practices on customer intention to purchase eco-friendly products via customers' pro-environmental emotional attachment, the results yielded three factors of green practices, including the application of organic food-green products and materials, application of energy and water management activities, application of recycling and composting management activities have a positive indirect effect on customer intention to purchase eco-friendly products through the mediation of customers' pro-environmental emotional attachment to the green practice restaurants. The results proved that customers' pro-environmental emotional attachment is a key mediation between green practices (application of energy and water management activities, application of organic food-green products and materials, application of recycling and composting management activities) and customer intention to purchase green products. And the results also proved that customers' pro-environmental emotional attachment plays an independent variable, mediation, and dependent variable in our study in HCM City in Vietnam context. This study fills the previous research gap that limitations did not apply to examine customers' pro-environmental emotional attachment play different roles in the research model at the same time.

Our study has achieved successful research objectives. However, it still has some limitations. Firstly, further research should explore various segments of restaurant guests such as nationality. The current study has neither found the influence of the application of eco-friendly supplies, application of organic food-green products and materials nor customer intention to purchase green products. Furthermore, there is no relationship between the application of eco-friendly supplies and customers' pro-environmental emotional attachment. Therefore, further research should investigate to test it in other fields. Secondly, the adopted green practices from previous studies that applied these measurement scales in the green hotels and coffee stores conducted in Western countries, we used these constructs to confirm their theories in a developing country such as Vietnam. Thus, the results have limitations that cannot explain customer behavioral intention related to green practices, customers' pro-environmental emotional attachment, and customer intention to purchase green products. Having been verified on a different group of customers with high environmental consciousness, it may lead to getting a weak point in the HCM City context in our research. Thirdly, since this study provided a novel conceptual framework by extending TPB, further research should verify its veracity and add more factors in the research model such as green consciousness, familiarity, satisfaction, and motivational factors that should be better results than we used customers' pro-environmental emotional attachment in this study. Future research

should use these variables that may broaden knowledge of customers' perceptions of green practices and their relationship to patronage intention and apply other methodologies to explore the concepts of green practices like qualitative method, or mixed methods. To ensure the largest possible sample with the least amount of administration, we used a non-probability convenience sampling technique was used to collect data. However, this method of sampling technique has some limitations, like the ability to draw the target sample is not representative of the population. In the future research should be based on a probability sample when the researcher carried out an exploratory study that uses random sampling.

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Učinci zelene prakse restorana na namjeru kupca da kupe ekološki prihvatljive proizvode: Dokazi iz Vijetnama

Mai Ngoc Khuong¹, Do Hanh Nhan², Nguyen Thi Minh Phuong³

Sažetak

Cilj je ovog istraživanja utvrditi način na koji zelene prakse utječu na namjeru kupca da kupi ekološke proizvode putem emocionalne povezanosti kupaca. Korištenje PLS-SEM-a za analizu gostiju iz 358 restorana kako bi se utvrdila namjera kupca da kupi ekološke proizvode temeljni je dio uspjeha restorana. Rezultati istraživanja upućuju na to da primjena recikliranja i kompostiranja, aktivnosti gospodarenja energijom i vodama imaju pozitivan utjecaj na namjeru kupca da kupi zelene proizvode i pro-ekološku emocionalnu privrženost te da primjena organske hrane –zelenih proizvoda i materijala na ekološku proizvodnju imaju značajan utjecaj na emocionalnu privrženost, ali ne i na namjeru kupca da kupi zelene proizvode. U međuvremenu, primjena ekološki prihvatljivih zaliha nije utjecala na emocionalnu privrženost i namjeru kupca za kupnjom. Emocionalna vezanost za zaštitu okoliša ključni je posrednik modela namjere kupaca. Rezultati su osigurali i znanje i teoriju zelene prakse dodajući emocionalnu privrženost kupaca teoriji o planiranom ponašanju kako bi se razumjelo ponašanje kupaca prema zelenim restoranima. Predlažu se menadžerske preporuke i strategije izgradnje za dugoročno povećanje namjere kupca da kupi zelene proizvode u ugostiteljstvu.

Ključne riječi: zelene prakse, zeleni restorani, emocionalna vezanost

JEL klasifikacija: Z3, L8, L83

¹ Docent, School of Business, International University, Vietnam National University, Ho Chi Minh City, Vijetnam. Znanstveni interes: organizacijsko ponašanje, poduzetništvo, vodstvo, turizam. E-mail: mnkhuong@hcmiu.edu.vn. ORCID: 0000-0002-0527-3046.

² Student poslovne administracije, International University, Vietnam National University, Ho Chi Minh City, Vijetnam. Znanstveni interes: organizacijsko ponašanje, ugostiteljski menadžment i društvena odgovornost poduzeća. E-mail: kynz.hanhnhan@gmail.com.

³ Docent, Tourism Department at Hong Bang International University, 215 Dien Bien Phu, Ward 15, Binh Thanh District, Ho Chi Minh City, Vijetnam. Znanstveni interes: turistički menadžment. Tel.: +849 336 715 97. E-mail: phuongntm2@hiu.vn. ORCID: 0000-0002-4668-3850.

Segmentation of football fans based on evangelistic behaviour: Empirical evidence from Croatia*

Mario Pepur¹, Goran Dedić², Bepo Žura³

Abstract

Professional football is a big business in which understanding fans is a precondition for the long-term commercial success of clubs. The focus of this paper is on the segmentation of football fans based on their behaviour and on determining the differences among the identified segments. The research is cross-sectional, and the data was collected through an online survey of 370 fans, sampled using a non-probability, convenience sample. For segmentation purposes, the eFangelism scale – consisting of four basic forms of evangelistic behaviour: advertising, advocating, assimilating, and antagonizing, was used. Data were analysed using hierarchical and non-hierarchical cluster analysis, ANOVA, and posthoc Tukey test. The results of this study confirm the applicability of the concept of sports fan evangelism (eFangelism). Four clusters of football fans are identified based on evangelistic behaviours. This study provides concise profiles for each of the clusters and shows differences between the characteristics of their members. The findings from this study can be of use to sports marketers – namely, elements of marketing strategy can and should be adjusted for idiosyncrasies of various segments identified through the study.

Keywords: sports market, evangelistic behaviour, eFangelism, segmentation

JEL classification: C38, D12, M31, Z29

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¹ Associate professor, University of Split, Faculty of Economics, Business and Tourism, Cvite Fiskovića 5, 21000 Split, Croatia. Scientific affiliation: sports marketing, financial services marketing. Phone: +385-21-430737. E-mail: mpepur@efst.hr.

² Assistant professor, University of Split, Faculty of Economics, Business and Tourism, Cvite Fiskovića 5, 21000 Split, Croatia. Scientific affiliation: services marketing and digital marketing. Phone: +385-21-430663. E-mail: goran@efst.hr.

³ Marketing associate, Taekwondo club Marjan, Šimićeva 9/e, 21000 Split, Croatia. Scientific affiliation: sports marketing. Phone: +385-92-1463949. E-mail: bepo.zura@gmail.com.

1. Introduction

Football is widely recognized as the most popular sport in the world (Giulianotti and Robertson, 2012), with the highest market share and profit in the global sports market. According to Torrens University Australia (2020), the entire sports industry was estimated at 500 billion USD. Half of this turnover was generated by spectator sports which in turn were dominated by football with a market share of 43%.

Fans are one of the most important stakeholder groups in today's sports industry since they support clubs and spread positive information and rumors about the club they support. Management of football clubs aims to strengthen the psychological bond between the fans and the club and create permanent relationships with them by ensuring the commitment of every fan. Therefore, the concepts of club image, brand evangelism, and club identification are considered to be of critical importance for the future of professional sports club management (Altin et al., 2020). According to service logic, brands are owned by customers (Harrigan et al., 2020). To facilitate value co-creation, which lies at the foundation of such a perspective, a rapid transition from a transactional to a relational journey approach in brand rapport with consumers is taking place (Nandy and Sondhi, 2022). One of the important mechanisms stemming from the relationship between brands and customers is evangelic behaviour, i.e. brand evangelism.

This paper focuses on brand evangelism in sports and its applicability as a basis for segmentation. The purpose of this paper is to, through replication of Park et al. (2021) study, validate the efanagement scale as a segmentation framework in the football context. Additionally, through a comparison of the study outcomes in the *new* (South Korea) and *traditional* (EU, Croatia) football markets, indicative insights into behaviour dynamics across different markets will be provided. More precisely, this research aims to determine if segmentation outcomes between significantly different markets (in terms of tradition and attitude towards football fandom) differ, and to what extent. The working hypothesis of this study is that the efanagement scale will prove to be a stable and actionable tool for segmentation purposes and that resulting segments will vary depending on the characteristics of the markets under study.

The study is structured as follows: following the introduction, the literature review is provided and followed by the methodology segment of the study in the third section. Empirical data and analysis are contents of the fourth section with discussion and conclusions presented in the fifth and sixth sections, respectively.

2. Literature review

Defined as active behavioural and vocal support for the brand, brand evangelism includes actions such as purchasing (brand) products, spreading positive brand recommendations, and directing others towards the brand by disparaging competing brands (Beccera and Badrinarayanan, 2013). Brand evangelism implies a strong relationship between consumers and the brand, manifested through the spread of positive word of mouth (henceforth WOM) (Doss, 2014; Riivits-Arkonsuo et al., 2015) and a fervent effort to convince or persuade others to associate with the brand (Matzler et al., 2007). Brand evangelism evokes consumers' affection and admiration for the brand (Riorini and Widayat, 2015) and their commitment through active purchase or purchase intention. Evangelists show a strong psychological and emotional commitment to the brand, with their behaviour including (Dwyer et al. 2015; Riivits-Arkonsuo et al., 2015):

- promoting through communicating positive information, ideas and feelings about a particular brand – either through traditional word of mouth (WOM) or electronic channels (eWOM),
- co-creating the overall brand image by actively engaging in discussions about brand attributes with other consumers,
- purchasing products from a favourite brand,
- influencing the behaviour of other consumers,
- performing the function of an unpaid spokesperson for the brand,
- opposing/disparaging competing brands.

The generally accepted multidimensional approach to brand evangelism dominates research (Beccera and Badrinarayanan, 2013; Mvondo et al., 2022) and is based on three dimensions: brand purchase intention, positive brand referrals, and oppositional brand referrals. However, Harrigan et al. (2020) claim that, in the service sector, evangelism is a construct with two dimensions: brand defence and brand advocacy, arising as a result of co-creation. While Sharma et al. (2021) highlighted the role of brand evangelism in actively endorsing and defending brands, Harrigan et al. (2020) stress that brand defence and brand advocacy must first be earned with consumers. There has to be a reason to evangelise brand and – as Panda et al. (2020: 4) note, evangelism marketing “aims to make buyers believe in the brand so much they are compelled to tell others about it”. Evangelism is the result of the strong emotional relationship of a brand with a customer (Sohaib et al., 2022), consumer-brand relationship “evolves and changes over a series of interactions” (Fournier, 1998: 344) with brands anthropomorphized by consumers. Fournier stresses that “the premise that consumer actions affect relationship form and dynamics is easily accepted” (Fournier, 1998: 344). Creating an inspiring

brand experience encourages the customer to share their enthusiasm with others (Meiners et al., 2010) – passionate consumers evangelize (Matzler et al., 2007), with evangelic behaviour varying from one consumer to another.

Kang et al. (2020) highlight the growing interest within the scientific community in investigating the consumer-brand relationship as well as its relevance for and impact on brand value. In today's digital environment, the power of this relationship lies in the ability of consumers to spread information quickly and widely, consequently influencing the behaviour of other consumers. Hutter et al. (2013) suggest that social media enhances consumers' brand awareness and their involvement in WOM, stimulates future purchase intentions and provides numerous opportunities for promotional activities. Social media has revolutionized communication between companies and consumers, as well as communication between consumers, facilitating evangelists' access to others and ability to share information about brands they support (Doss, 2014). Indeed, Sharma et al. (2021) emphasize the importance of social media-based brand communities for promoting brand evangelistic behaviour.

In the context of consumer-brand relationships, brand evangelism is an important mechanism (Nobi et al., 2021) which has been studied in numerous areas such as media (Latonero and Shklovski, 2011), politics (Gay, 2000), banking (Riorini and Widayat, 2015), hospitality industry (Mvondo et al., 2022), IT activities (Cestare and Ray, 2019), e-shops (Zhu and Park, 2022), the higher education (Amani, 2022), management (Malhotra et al., 2015), sports (Gholami and Kalateh, 2020), green brand evangelism in hospitality (Sohaib et al., 2022), etc.

Efangelism is a new concept in marketing literature, derived from the concept of brand evangelization. In the seminal study, which introduced the concept and measurement instrument, efangelism was defined as "behaviour predicated by one's relationship with a team brand and activated through the fervent dissemination of team-related beliefs and team-centered interactions" (Dwyer et al., 2015: 646). Four dimensions of evangelism have been conceptualised as advertising, advocacy, antagonizing, and assimilating. Advertising is defined as behaviour including "publicizing of team affiliation on automobiles, at work, online, or through gifts to others." (Dwyer et al., 2015: 649). The advocacy dimension refers to the "internalization and advocacy of team superiority to others, including strangers" (Dwyer et al. 2015: 649). The antagonizing dimension refers to "provocative behavior with family and/or friends who are not fans of one's favorite team" (Dwyer et al., 2015: 649). Finally, the dimension of assimilation represents "outgoing group assimilation, including game day behaviour related to special get-togethers, communication, and apparel choice." (Dwyer et al., 2015: 649).

Subsequent studies implementing the efangelism concept include a sport evangelism demographics study (Yuksekbilgili, 2018), efangelism-based segmentation of sports

fans (Park et al., 2021), investigation of sports team evangelism behaviours among students (Gelen et al., 2022), investigation of the relationship between the level of evangelization and purchase intentions (Yüzgenç et al, 2022) and study on the interaction of fanaticism and evangelism in football (Karafil and Akgül, 2022).

As noted previously, today's omnipresence and availability of communication technologies have contributed to the strengthening of bonds between fans and the club and increased the importance of fan evangelism in sports. Evangelistic behaviour of the fans is manifested through the enthusiastic dissemination of the beliefs related to the supported clubs during interactions with others (Dwyer et al., 2015). Organized fan groups are the best example of such behaviours. They operate on the principle of attending home and away matches in an organized manner, buying and wearing club insignia, donating money, etc. Additionally, they engage in antagonistic behaviours towards rival clubs (e.g. spreading negative messages and information about them).

Although sports are linked with an individual's sense of passion (Yuksekbilgili, 2018), professional football is also a big business. By improving their understanding of both fan behaviour and their psychological characteristics, clubs can improve their relations with fans and thereby improve the commercial side of their business. Evangelism is thus important from an economic point of view because evangelistic fans voluntarily and actively participate in the activities of promoting products and services offered by sports clubs (Altin et al., 2020). They act as voluntary spokespersons for the brand, and their efforts can reach the point of *preaching* in an attempt to *convert* others (Angraini, 2018).

Fans differ in many ways, and it is not easy to segment the sports market and generalize the results. Various segmentation studies classify sports fans based on different attributes such as gender (Yuksekbilgili, 2018), attitudinal and/or behavioural loyalty (Altin et al., 2020), family income (Küçükbiş and Yurtsizoğlu, 2019) and level of education (Yaşar and Turğut, 2019). However, these studies attempt to segment sports fans based on their socio-demographic characteristics and loyalties, rather than on their observable behaviours. Park et al. (2021) were the first to notice this research gap in marketing literature and were the first to segment football fans based on their evangelistic behaviour using Funk and James' (2001) psychological continuum model (PCM) as a conceptual framework. Park et al. (2021) base their research on the assumption that fans go through different PCM hierarchical stages of involvement with their club (awareness, attraction, attachment, and allegiance). Furthermore, they view this relationship as not a static one, but rather as continuous and dependent on time and context. Such a view of fans' psychological attachment to a sports team was first identified by de Groot and Robinson (2008) in their investigation of the individual's journey from initial attraction to eventual allegiance to the team. Doyle et al. (2013) empirically tested the involvement-based PCM segmentation procedure on sports spectators. Their

findings suggest that the PCM is an appropriate framework to investigate fan development and an excellent segmentation tool, capable of helping marketers to better understand their heterogeneous fan bases and to make the right marketing decisions.

Park et al. (2021) segmented the market and identified three clusters of fans: Evangelists, Mild supporters, and Stationary fans. Evangelists represent the club's "most enthusiastic and passionate fans" (Park et al., 2021:11) who provide the greatest support to their club and are active in all forms of evangelistic behaviour. When considered within the PCM framework, evangelists are at the stage of allegiance, reflecting their full attachment to a sports team. Unlike evangelists, mild supporters are at the PCM stage of attachment, in which the team is gradually integrated into the individual's self-concept. Finally, stationary fans are passive fans who periodically visit sports events and are at the PCM stage of attraction in which the individual starts forming a positive attitude towards the team. While findings from Park et al. (2021) pave the way to understanding the behavioural consequences of consumers' evolution as fans, they also open some important questions. Namely, due to differences that are present between the consumption behaviours of sports fans in Asia and Europe, the question of applicability and replicability of findings from Asian contexts emerges. As Rowe and Gilmour (2010) note, sports fans' loyalties in Asia are flexible and dependent on factors such as team success, media coverage, celebrity endorsement, etc. Such fandom is very different from fandom in *traditional* football markets (primarily in European countries) where tribalistic attachment to place, origin, and club shapes fandom and fan behaviour. Additionally, as indicated by Doyle et al. (2013), psychological connections between fans and sports objects have temporal dynamics, changing and evolving. Thus, it would be reasonable to presume that higher levels of fans' psychological connection with the sports object (team) will be absent or at least less prominent among fans in *new* football markets (in this case – The South Korean market). Based on the preceding discussion, the following research questions have been defined:

RQ1: Does efanagement scale consistently provide actionable insights in terms of segmentation of fans?

RQ2: To what extent are findings related to segmentation of fans universal or particular to certain social environment and sports context? As previously indicated, to address this question, findings from Park et al. (2021) will be compared with the findings based on empirical research of a *traditional* football market – namely, Croatian.

Beyond simply replicating findings from Park et al. (2021), answers to these questions could have significant implications for management of fan communities across the globe, as well as on transferability of sports marketing practices.

3. Research methodology

To the best of the author's knowledge, this is the first study replicating Park et al. (2021) in a country (Croatia) where football can be categorised as a *traditional* sport. By combining PCM and eFangelism in the context of a market with a long football tradition, and comparing findings from Park et al. (2021) the authors aim to investigate the parallel evolution of involvement and corresponding behaviours among football fans in a *traditional* market and identify similarities and differences across *traditional* and *new* markets.

Primary data were collected cross-sectionally, using a non-probability sample of adult fans of a professional football club during January 2022. For the research, a questionnaire was distributed using the Qualtrics XM platform. Respondents were recruited via forum pages and social networks (mainly through open and closed football club fan Facebook groups). A total of 392 respondents filled out the questionnaire, and – after screening for interrupted questionnaires and missing data, 370 of them were included in the final sample.

The questionnaire consisted of close-ended questions, organised into two segments – general socio-demographic questions and the segment consisting of elements adopted from measurement scales related to constructs under study. In the first part of the questionnaire, questions concerning the general characteristics of the respondents such as gender, age, level of education, personal and household income, companion, and average spending in the stadium were included. The second part of the questionnaire consisted of the eFangelizm scale (Dwyer et al., 2015) adopted for the context of the study (in terms of club references). The scale consists of 14 items measuring four previously discussed dimensions: advertising, advocacy, assimilation and antagonism. For fan satisfaction, the scale developed by Lee et al. (2000) consisting of 5 items was used. All items were measured on a 5-point Likert scale.

The data were analysed using SPSS 24.0 and AMOS packages to determine the clusters of fans of the professional football club, their level of satisfaction, and the differences existing between them.

4. Empirical data and analysis

The sample consisted of self-identified fans of a professional Croatian football club. Out of a total of 370 respondents, 286 (77.3%) were men, and 84 (22.7%) were women. The largest number of respondents (136; 36.8%) belong to the age group between 25 and 34 years. Furthermore, 66 (17.8%) respondents were from the 18-24 age group, 94 (25.4%) from the 35-44 age group, 57 (15.4%) from the 45-55 age group, and 14 (3.8%) from 55-64 years old age group. The largest number of

respondents, (174; 47%) were married, 2 (0.5%) were widowed, 112 (30.3%) were single, and 71 (19.2%) respondents were in a relationship. The group with marital status *separated* had 11 (3%) respondents.

In terms of income, the largest number of respondents (134; 36.2%) have an average personal income of more than 1,000 EUR. The remaining personal income ranges are distributed as follows: 40 (10.8%) fall in the 400-600 range, 57 (15.4%) have less than 400, 79 (21.4%) have 601-800, while 60 (16.2%) have an average personal income in the range of 801-1,000 (all ranges expressed in EUR). In terms of total household income, the largest number of respondents – 184 (49.7%) have a total household income of more than 1,600 EUR. The remaining household income ranges are distributed as follows: 34 (9.2%) have less than 800, 51 (13.8%) have 800-1,100, and 101 (27.3%) have 1,101-1,600 (all ranges are expressed in EUR).

Regarding employment status, the majority of respondents – 257 (69.5%) were employed. The remaining respondents were retired (9; 2.4%), students (72; 19.5%), or unemployed (32; 8.6%). As for education, the majority of respondents (142; 38.4%) completed secondary school, and 6 (1.6%) completed primary school. 107 (28.9%) completed undergraduate studies, while 100 (27%) completed graduate studies. A total of 15 (4.1%) respondents completed postgraduate studies.

Regarding the attendance of football matches, the majority of respondents indicated going to matches with close friends (69.9%) or family members (16.2%). Organized attendance with other fans or fan groups was indicated by 9.3% of respondents, and 4.6% go completely alone.

In terms of purchases during the match, the majority of respondents either buy nothing at the stadium (14.9%) or buy very little (36.8%). Those who do make purchases spend 10-15 EUR (31.5%) or more (8.9% spend from 15.01-20 EUR and 7.9% more than 20 EUR).

Cluster analysis was conducted in two phases. In the first phase, a hierarchical cluster analysis was performed followed by the non-hierarchical cluster analysis in the second phase. Hierarchical clustering methods are initially used to determine the number of clusters to expect. Ward's clustering method (minimum variance) was used, as it provides the most accurate estimate of the number of clusters that are equal in size. Agglomeration hierarchical algorithms are fairly simple and their solutions can be intuitively read from the dendrogram, however, the interpretation of the results is subjective (Ungaro, 2016). The result of the hierarchical cluster analysis revealed four clusters of fans, support for which can be found in previous research, with similar sizes and minimal variances within the clusters.

In the second phase, a non-hierarchical cluster analysis was performed using the K-means algorithm (eng. centroid-based clustering) on four predefined clusters. This procedure resulted in assigning the fans to predefined clusters (see Table 1).

Additionally, discriminant analysis (see Table 2) was performed to determine the extent to which the model, based on the dimensions of eFangelism, is able to predict the actual membership in the cluster. For that purpose, the results and the validity of the clustering procedure were tested. Three statistically significant canonical discriminant functions were used in the analysis, with resulting canonical correlation values: 0.919; 0.757, and 0.361. The eigenvalues of the first two discriminant functions are 5.429 and 1.345 and combined they explain 97.8% of the variance of the research model.

The results of Wilks' lambda, which were used to test the discriminant functions, were statistically significant, and the first two values were close to 0. By looking at the classification matrix, it was determined that with 97.6% of the fans, the effectiveness of the functions was confirmed. Finally, it can be concluded that the four sub-dimensions of eFanangelism (advertise, advocate, antagonize, assimilate) do act as strong predictors and that the model is accurate, statistically significant, and capable of predicting cluster membership.

Table 1: ANOVA – four dimensions of eFangelism and classification of the fans using non-hierarchical cluster method (K – means)

	Cluster				F	Tukey test
	1. eFANgelist (99)	2. eFANgelist pacifist (125)	3. Mild supporters (67)	4. Stationary fans (79)		
Advertise	4.45 (0.56)	3.85(0.75)	2.09(0.63)	1.53(0.67)	388.152*	1>2>3>4
Advocate	4.66(0.48)	4.18(0.72)	3.41(0.93)	2.05(0.91)	200.163*	1>2>3>4
Assimilate	4.49(0.56)	3.94(0.81)	3.35(0.69)	1.85(0.72)	221.273*	1>2>3>4
Antagonize	3.80(0.88)	1.52(0.59)	3.23(0.97)	1.63(0.82)	200.701*	1>3>2,4

Source: Author's calculation

As shown in Table 1, the first cluster (eFAngelists) contains 99 respondents and has the highest mean values for all four factors (dimensions) of eFangelism – advertising (M=4.45; SD=0.56), advocacy (M=4.66; SD=0.48), assimilation (M=4.49; SD=0.56) and antagonizing (M=3.80; SD=0.88). Second cluster (pacifists) consists of 125 active fans who do not express antagonism towards rival clubs. Their mean values for advertising (M=3.85; SD=0.75), advocacy (M=4.18; SD=0.72), assimilation (M=3.94; SD=0.81) are fairly high, while mean value of antagonizing (M=1.52; SD=0.59) was the lowest across all clusters. Mild supporters (67) report moderate values with all four evangelism factors, with the value for advertising (M=2.09; SD=0.63) being lowest, and relatively equal means for

advocacy ($M=3.41$; $SD=0.93$), assimilation ($M=3.35$; $SD=0.69$) and antagonizing ($M=3.23$; $SD=0.97$). Finally, stationary fans (79 of them) display relatively low mean values for advertising ($M=1.53$; $SD=0.67$), advocacy ($M=2.05$; $SD=0.91$), assimilation ($M=1.85$; $SD=0.72$) and antagonizing ($M=1.63$; $SD=0.82$).

Table 2: Results from the discriminant function analysis

Discrimination function	Eigenvalue	Variance (%)	Canonical correlation	Wilks' λ	X^2	Sig.
1	5.429 ^a	78.4	0.919	0.058	1041.130	.000
2	1.345 ^a	19.4	0.757	0.371	361.914	.000
3	0.149 ^a	2.2	0.361	0.870	50.846	.000

Source: Author's calculation

In order to determine if there is a difference between the identified clusters, analysis of variance (One-way ANOVA) was undertaken along with a posthoc Tukey test for each of the four eFangelism dimensions. Based on the results of variance analysis ($F=388.152$; $p<0.01$) and posthoc Tukey test, there is a statistically significant difference among average values for advertising dimension between clusters. Furthermore, variance analysis ($F=200.163$, $p<0.01$; $F=221.273$, $p<0.01$) and posthoc Tukey test indicate differences between four identified clusters for advocacy and assimilation dimensions. In terms of the antagonising dimension, the results ($F=200.701$, $p<0.01$) show a statistically significant difference among some of the average values for this dimension between clusters. However, a post hoc comparison of Tukey's test shows no significant differences in average values for these dimensions for pacifist and stationary fan clusters. It can be concluded that the results shown in Table 1 undoubtedly show statistically significant differences ($p<0.001$) between the majority of average values of eFangelism dimensions for the four cluster solution. Post-hoc comparisons using Tukey's test show significant differences between mean values for eFangelism dimensions across four clusters, with the only exception being valued for antagonizing dimension, for which mean values are not significantly different for clusters 2 and 4.

In order to identify the attributes of each cluster as well as to measure the satisfaction of cluster members, an analysis of variance (ANOVA) was performed (see Table 3). The results show no statistically significant differences between identified clusters in terms of member's age, marital status, and modality of match attendance (i.e. companion type or lack thereof). Gender and personal income are attributes on which there are significant differences between the four clusters identified in this research. Values of average household income and consumption during the match (within the stadium) were borderline significant (i.e. they were

insignificant at $p=0.05$ but significant at $p=0.1$), hence it would be reasonable to conclude that clusters in fact differ on those characteristics.

Table 3: Demographic characteristics of the clusters identified

		Cluster			
		eFangelists	Pacifists	Mild supporters	Stationary fans
Gender $X^2=11.495$ df=3 p=0.009	Male	78 (78.8%)	106 (84.8%)	51 (76.1%)	51 (64.6%)
	Female	21 (21.2%)	19 (15.2%)	16 (23.9%)	28 (35.4%)
Age $X^2=16.469$ df=15 p=0.352	<18	2 (2%)	1 (0.8%)	/	/
	18-24	17 (17.2%)	22 (17.6%)	12 (17.9%)	15 (19%)
	25-34	30 (30.3%)	46 (36.8%)	32 (47.8%)	28 (35.4%)
	35-44	31 (31.3%)	30 (24%)	14 (20.9%)	19 (24.1%)
	45-54	16 (16.2%)	17 (13.6%)	9 (13.4%)	15 (19%)
	55-64	3 (3%)	9 (7.2%)	/	2 (2.5%)
Marital status $X^2=10.304$ df=12 p=0.589	Single	30 (30.3%)	34 (27.2%)	23 (34.3%)	25 (31.6%)
	In a relationship	17 (17.2%)	24 (19.2%)	15 (22.4%)	15 (19%)
	Married	47 (47.5%)	64 (51.2%)	25 (37.3%)	38 (48.1%)
	Divorced	4 (4%)	3 (2.4%)	4 (6%)	/
	Widow(ed)	1 (1.3%)	/	/	1 (1.3%)
Personal income (EUR) $X^2=21.977$ df=12 p=0.038	<400	7 (7.1%)	18 (14.4%)	10 (14.9%)	22 (27.8%)
	400-600	15 (15.2%)	14 (11.2%)	6 (9%)	5 (6.3%)
	601-800	22 (22.2%)	21 (16.8%)	16 (23.9%)	20 (25.3%)
	801-1000	19 (19.2%)	21 (16.8%)	12 (17.9%)	8 (10.1%)
	1000<	36 (36.4%)	51 (40.8%)	23 (34.3%)	24 (30.4%)
Household income (EUR) $X^2=16.173$ df=9 p=0.063	<800	8 (8.1%)	9 (7.2%)	5 (7.5%)	12 (15.2%)
	800-1.100	16 (16.2%)	18 (14.4%)	10 (14.9%)	7 (8.9%)
	1.101-1.600	38 (38.4%)	29 (23.2%)	16 (23.9%)	18 (22.8%)
	1.600<	37 (37.4%)	69 (55.2%)	36 (53.7%)	42 (53.2%)
Companion $X^2=7.956$ df=9 p=0.539	Alone	3 (3.3%)	6 (5%)	2 (3.7%)	3 (8.6%)
	Family	15 (16.3%)	25 (20.7%)	4 (7.4%)	5 (14.3%)
	Friends	66 (71.7%)	78 (64.5%)	44 (81.5%)	23 (65.7%)
	Other Fans	8 (8.7%)	12 (9.9%)	4 (7.4%)	4 (11.4%)
Average spending in the stadium (EUR) $X^2=20.370$ df=12 p=0.060	No purchase	7 (7.6%)	22 (18.2%)	8 (18.2%)	8 (22.9%)
	<10	28 (30.4%)	46 (38%)	23 (42.6%)	14 (40%)
	10-15	33 (35.9%)	40 (33.1%)	15 (27.8%)	7 (20%)
	15.01-20	10 (10.9%)	9 (7.4%)	4 (7.4%)	4 (11.4%)
	>20	14 (15.2%)	4 (3.3%)	4 (7.4%)	2 (5.7%)

Source: Author's calculation

When examining the characteristics of each cluster – eFangelsists enjoy the company of other fans and rarely go alone to matches (only 3.3% of them). They have relatively higher average household income (54.6% are in the range from 800 to 1,600 EUR) and 62% of them spend more than 10 EUR each time they attend a match. eFangelsists pacifists are characterized by very positive attitudes and behaviour as they do not express antagonism towards rival clubs (lowest medium value $M=1.52$). In this group 40.8% have personal income higher than 1,000 EUR, however, 56.2% of them spend less than 10 EUR when attending match day. Compared to other clusters, women are less represented in this group (15.2%). Also, the largest percentage of respondents from this group (20.7%) attend matches with members of their family. Among mild supporters, 65% are younger than 35 years of age, with relatively fewer married individuals (37.3%).

They attend matches mainly with friends (81.5%), have relatively modest personal income (47.8% have less than 800 EUR), and 60.8% do not make purchases or spend very little when visiting the stadium. Similarly to mild supporters, stationary fans have modest incomes with personal (59.4 %) and household (15.2 %) incomes of less than 800 EUR. At the same time, this group is the *weakest* consumers when talking about spending on stadiums during match day (62.9% spend less than 10 EUR or nothing at all). They are mainly attending matches due to persuasion and with close friends, and – compared to other clusters, have the largest proportion of female members (35%).

Table 4: One-way ANOVA results for satisfaction

	Cluster				F	Tukey test
	1. eFANgelists	2. eFANgelists pacifists	3. Mild supporters	4. Stationary fans		
Satisfaction	4.30 (0.86)	4.27 (0.58)	4.09 (0.60)	3.69 (0.98)	6.992*	1,2,3>4

Source: author’s calculation

Results presented in Table 4 show that there is a statistically significant difference ($F=6.992$; $p<0.001$) between some of the average values of fan satisfaction for the observed four clusters. Despite the test results, the actual difference in the average values between the clusters is quite small. A post-hoc comparison using Tukey’s test reveals that only the average value of fan satisfaction in the fourth cluster (stationary fans) significantly differs from the values for the remaining three clusters while the average values of fan satisfaction for the first three clusters do not differ significantly.

5. Results and discussion

The analysis revealed four clusters of fans: efangelists, efangelist pacifists, mild supporters, and stationary fans – a finding differing from the study conducted in South Korea (Park et al., 2021), in which only three clusters were identified. Analysis of the resulting clusters revealed different characteristics and behaviours among fans. With the conceptual framework of this study being based on PCM, those differences can be interpreted according to different levels of involvement of fans with supported teams. Efangelist and efangelist pacifists are at the PCM stage of allegiance – they are highly involved in various forms of evangelistic behaviours except for antagonising behaviours among pacifists, as they hardly show any desire to harm or/and derogate rival fans or teams. Mild supporters are at the PCM stage of attachment, they are mostly younger people, with great fan potential, who show that they are currently moderately involved in evangelistic behaviours. Stationary fans are at the PCM stage of attraction, showing low levels of involvement in all four types of evangelistic behaviours, while ultimately still being fans of the club. In summary, these findings indicate that fans with different levels of involvement show different patterns of evangelistic behaviours. Consequently, evangelists and pacifist evangelists are most important for the club as – with their passionate behaviour and commitment to the club, they can encourage other clusters of fans as well as potential fans to connect more with the club and participate more in the club's activities. They are financially independent, which facilitates their evangelizing behaviour. The results show that efangelists in Croatia, similarly to South Korean fans, tend to spend more money at the stadium and socialize more with other fans. Their passion should be continuously developed and their loyalty to the club used since they represent an effective marketing force. Pacifist evangelists are a segment not recognised in the Korean study. They represent fans who exhibit positive behaviours and attend matches with their family members. However, although they have relatively high incomes, on average they spend very little at the stadium. It is indicative that they are not satisfied with the quality and/or quantity of match day hospitality offers at the stadium, making that an aspect of service at the stadium which needs to be improved. Compared to evangelist fans, mild supporters and occasional stationary fans have lower incomes. Also, they – most often, visit the stadium alone or with close friends. Interestingly, mild supporters, in addition to being great advocates for their team, have a strong desire to harm and trash-talk the opponent. This finding resonates with findings from South Korea, where the Mild supporter cluster also had relatively high values for antagonising behaviours, albeit lower than the one in Croatia.

In contrast to findings from South Korea, where the cluster of stationary fans primarily consists of students, stationary fans in the Republic of Croatia are usually older (the majority is 25+ years old) passive fans who rarely go to stadiums. When they do go, it's mostly due to persuasion from their friends, family, or partners.

Most often, these are *derby match* fans who are not satisfied with the quality of league football and players or individuals to whom football does not provide a sufficient amount of entertainment and who do not want to spend their free time in poorly maintained stadiums.

Analysing the demographic characteristics of the clusters, no statistically significant differences regarding the age and marital status of fans depending on the patterns of their evangelistic behaviour were found. However, in both studies, there is a statistically significant difference related to consumption in and around the stadium during the match day. While the differences are marginally significant they are nevertheless observable, with fans who reported higher personal and household incomes spending significantly more in and around the stadium. The finding of significant statistical differences between clusters based on their gender structure contradicts the findings from the previous study. The difference is likely an indicator of the fact that football as a sport is significantly more popular among women in South Korea than it is in Croatia (EU). This realization can be a guide for marketers in football to focus their efforts more on developing marketing programs through which they will animate, activate and involve the female part of the population in activities related to the daily functioning of clubs and/or the development of different sports.

As already noted, contrary to the Park et al. (2021) findings, statistically significant differences in average personal and household income have been confirmed between clusters. Income is a prerequisite for fans' evangelistic behaviour, such as attending matches, buying annual subscriptions or memberships, or buying club merchandise. Considering the fact that the average standard of living in South Korea is significantly higher than in Croatia, the difference in the research results is not surprising. However, it is indicative that – with equal opportunities for evangelistic behaviour, Croatian fans reserve a higher portion of total income for football fandom-related expenditures. A very distinct difference between this and the South Korean study, has to do with the type of the company (or lack thereof) fans attend matches with. Namely, when Croatian fans are concerned, no significant differences were identified between clusters in this regard. Finally, when talking about fan satisfaction, the differences between the clusters – while statistically significant, in reality, were quite small and show that the satisfaction differs substantially (and is lower) only for the cluster of stationary fans.

6. Conclusions

The aim of this study was to validate the evangelism scale as a segmentation framework in the football context and to compare segmentation outcomes between *new* and *traditional* football markets. For that purpose, this study applies

the efangelism-framework-based segmentation of fans in the context of the Croatian football league. Being the first empirical study of this kind conducted in a market with a long tradition of football fandom, the findings offer strong support for the use of efangelism (framework and scale) as a robust tool providing interpretable and actionable results in terms of fan segmentation and in understanding fans' outward behaviours. Additionally, used in conjunction with the results from the original study, findings from this research provide insights into the dynamics of fan behaviour across different markets which warrant further research. Namely, the results show discrepancies in the number and types of resulting segments with four distinct groups of consumers surfacing in the Croatian case – one more than the original study, thus confirming our working hypothesis. While it would be erroneous to draw any finite conclusions regarding such findings, they are certainly indicative of differences across markets, raising questions about potential driving factors behind them and opening routes for further investigation. Significant underlying differences in the psychological connection between fans and sports teams, reflected in the findings of this study, with Croatian fans displaying higher levels of such connections, imply a need for a different approach to marketing and managing relations with fan communities. In an environment where football is constantly becoming more globalised and ever-increasingly commodified, the findings of this study can have wider implications, serving as an important reminder about the differences between *new* and *traditional* football markets. These differences call for different approaches in developing marketing strategies, with *new* markets being more open to promotional activities while *old* markets show more personal engagement of fans in their relationships with football clubs, and requiring an adjusted approach in terms of promotional activities in order not to alienate most passionate fans.

The results of this study should be viewed in the context of its limitations. Although the sample size is substantial, the non-probability, purposive nature of the sample resulted in a limited ability to encompass a full variety of fan characteristics. Furthermore, although the survey was anonymous, the potential for both social desirability in some of the answers and self-selection bias must be recognised. The additional limitation lies in the fact that only one club and only one sport (football) were included in the research. Therefore, the results are very specific, referring only to a limited group of football fans, and not to the general population. The research is cross-sectional, so the results might be influenced by the current results of the club, which also should be pointed out as one of the potential limitations. A longitudinal study of efangelism dynamics would be most welcome as fan behaviours change over time. As noted in the introductory discussion, segmentation studies in sports have generally focused on the socio-demographic characteristics of fans rather than on their observable behaviours, limiting the ability to compare and critically evaluate findings from this study in the wider context of segmentation research. Thus, future research should provide additional empirical testing of both

the applicability of efanatism scale in this context as well as the structure of resulting segments. Determinants of the observed differences should be additionally studied in order to improve understanding of the underlying mechanics driving fan behaviour. Some potential routes of investigation could include the study of differences between markets in general as well as the extent to which idiosyncrasies of a particular team's role in a community determine fan behaviours. Accordingly, conducting longitudinal research in several different countries could aid in investigating the influence of cultural differences on the evangelizing behaviour of fans. Furthermore, it is suggested to conduct research on a larger number of fans of several different clubs from the territory of the Republic of Croatia, as well as on clubs from different sports, in order to identify similarities and differences in evangelic behaviours across clubs and sports. Provided that the sample is representative, fans of different teams in the same football league might exhibit differently structured clusters, depending on a number of determinants (e.g. club history, image, historical and actual results). It would be interesting to investigate the level of evangelism among fans of a specific sport (e.g. football) or sports in general and compare it with the level of team evangelism. In conclusion, it can be argued that the fans can be the biggest strength as well as the biggest weakness of sports clubs. Only through understanding and investing in fans can clubs achieve long-term mutual satisfaction, which can lay a foundation for their professional success.

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Segmentacija nogometnih navijača temeljem evangelizacijskog ponašanja: Empirijski dokazi iz Hrvatske

Mario Pepur¹, Goran Dedić², Bepo Žura³

Sažetak

Profesionalni je nogomet područje poslovanja u kojem razumijevanje navijača predstavlja preduvjet dugoročnog komercijalnog uspjeha klubova. Fokus ovog rada je na segmentaciji nogometnih navijača temeljem njihovog ponašanja i utvrđivanju razlika među identificiranim segmentima. Istraživanje je provedeno jednokratno, a podaci su prikupljeni online anketom koja je obuhvatila 370 ispitanika, uzorkovanih korištenjem namjernog prigodnog uzorka. Za potrebe segmentacije korištena je ljestvica eFangelizma – koja kategorizira evangelizacijska ponašanja u četiri temeljna oblika: promoviranje, zagovaranje, asimilacija i antagoniziranje. Podaci su analizirani pomoću hijerarhijske i ne-hijerarhijske klaster analize, ANOVA i post-hoc Tukey testa. Rezultati potvrđuju primjenjivost koncepta navijačke evangelizacije (eFangelizma). Identificirane su četiri segmenta nogometnih navijača temeljem evangelizacijskih ponašanja. Dani su sažeti profili svakog od klastera i raspravljene razlike među njima. Nalazi ove studije mogu biti korisni praktičarima u domeni marketinga sporta. Naime, nalazi pružaju okvir za prilagodbu elemenata marketinške strategije posebnostima različitih segmenata identificiranih kroz studiju.

Gljučne riječi: sportsko tržište, evangelističko ponašanje potrošača, eFangelizam, segmentacija

JEL klasifikacija: C38, D12, M31, Z29

¹ Izvanredni profesor, Sveučilište u Splitu, Ekonomski fakultet, Cvite Fiskovića 5, 21000 Split, Hrvatska. Znanstveni interes: sportski marketing, marketing financijskih usluga. Tel.: +385-21-430737. E-mail: mpepur@efst.hr.

² Docent, Sveučilište u Splitu, Ekonomski fakultet, Cvite Fiskovića 5, 21000 Split, Hrvatska. Znanstveni interes: marketing usluga, digitalni marketing. Tel.: +385-21-430663. E-mail: goran@efst.hr.

³ Marketing referent, Taekwondo klub Marjan, Šimićeva 9/e, 21000 Split, Hrvatska. Znanstveni interes: sportski marketing. Tel.: +385-92-1463949. E-mail: bepo.zura@gmail.com.

The impossible trinity of developing countries – the Greek example*

Marko Đogo¹, Dragan Gligorić², Miloš Grujić³, Boško Mekinjić⁴

Abstract

The mobility of factors of production from the very beginnings of the theory of the optimal currency area (OCA) stands out as one of the primary mechanisms for achieving a balance of payments, i.e. sustainability of the monetary union (Mundell criterion). However, there is a significant qualitative difference between the monetary union of countries with similar income levels and the one with different development stages. Namely, in the first case, labor mobility, as a rule, has short-term economic effects, while it has a longer-term (more negative) impact – especially on the long-run aggregate supply (LRAS). Many Eastern European countries, which expressed a desire to become part of European integration and the monetary union after the communist ruin, experienced this. In a previous paper, the authors set the thesis about “Impossible Trinity of Developing Countries”. In this paper, the aspiration is to confirm the validity of this theory by analyzing Greece within the period 1999-2020, specifically observing the impact of three variables (fiscal policy, social development level, and level of economic

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¹ Associate Professor, University of East Sarajevo, Faculty of Economics, Alekse Šantića 3, 71420 East Sarajevo, Bosnia and Herzegovina. Scientific affiliation: international economy. Phone: +387 66 903 411. E-mail: marko.dogo@ekofis.ues.rs.ba, markodjogo@yahoo.com. ORCID: 0000-0001-6898-9968.

² Associate professor, University of Banja Luka, Faculty of Economics, Majke Jugovića 4, 78000 Banja Luka, Bosnia and Herzegovina. Scientific affiliation: international economics, applied econometrics, health economics. Phone: +387 51 430 043. Fax: +387 51 430 053. E-mail: dragan.gligoric@ef.unibl.org. ORCID: 0000-0002-7171-8699.

³ Assistant professor, The Independent University of Banja Luka in Banja Luka, Faculty of Economics, Veljka Mladenovića 12e, 78000 Banja Luka, Bosnia and Herzegovina. Scientific affiliation: business finance, economics. Phone: +387 51 456 600 Fax: +387 51 456 617. E-mail: milos.grujic@nubl.org; gruja84@gmail.com. ORCID: 0000-0001-5566-5921.

⁴ Assistant professor, University of Banja Luka, Faculty of Economics, Majke Jugovića 4, 78000 Banja Luka, Bosnia and Herzegovina. Scientific affiliation: business finance. Phone: +387 51 430 022. Fax: +387 51 228 488. E-mail: bosko.mekinjic@ef.unibl.org. ORCID: 0009-0000-7150-1775.

freedom) on the emigration of the population under conditions of monetary union and labor force mobility. The results obtained in this research indicate that the fiscal policy in the observed period was the most significant factor in explaining migration trends. The implications for developing countries that are currently entering (such as Croatia) or intend to enter the monetary union with more developed countries in the future are particularly significant.

Keywords: *impossible trinity, optimal currency area, migration, developing countries*

JEL classification: *F45, O15, O1*

1. Introduction

This paper is based on the experience that the best and globally most represented textbooks in International Economics, although extremely useful for students from developed countries, are unfortunately insufficiently adapted to the needs of students in developing countries. In particular, most of these textbooks have the standard textbook structure of the four domains studied within the International Economy: the theory of international trade – trade policy – a balance of payments and foreign exchange markets – the macroeconomics of the open economy. Within the latest part (macroeconomics of open economy, which we also call international finance), the standard content of the material is used to teach students how the price and income mechanisms of achieving external (balance of payments) balance work. Then they learn about the principles of compiling the IS-LM-BP (Mundell–Fleming) model. Finally, they apply the IS-LM-BP model to understand ways of achieving general equilibrium using monetary and fiscal policy instruments in different exchange rate regimes. Undoubtedly, this is extremely useful for students. However, it ignores the fact that the primary mechanism for achieving external equilibrium in DCs is often neither the price mechanism, the exchange rate policy, nor the income mechanism but the mobility of factors of production – particularly labor mobility (emigration). Besides, standard textbooks even mislead students of economics in DCs that after graduating, they will be ready to understand the reality, i.e. to understand the economic reality surrounding them. Unfortunately, this is not the case. Therefore, to adapt the material to the needs of students from DCs (particularly students from the Western Balkans⁵) we had to complete some standard theories from the international economy with lessons that explain the economic laws in these countries. Thus, in one of the previous papers (Đogo, 2022), we pointed out the existence of the *Chang curve* which contradicts

⁵ The term Western Balkans has been used by the European Union to designate countries in the Balkans that are not its members yet but are in different stages of accession. The first Western Balkans Summit was held in 2000 in Zagreb. The Western Balkans included Slovenia, Croatia, Bosnia and Herzegovina, Serbia and Montenegro, Macedonia, Albania, Romania and Bulgaria in the early 2000s. In the meantime, Slovenia (2004), Romania (2007), Bulgaria (2007) and Croatia (2013) have become EU members.

the common opinion that reducing the income gap between developing (from which citizens emigrate) and developed countries (to which developing countries citizens immigrate) automatically leads a reduction in the extent of emigration. Nevertheless, this paper deals with another standard textbook theory - *the theory of the impossible trinity*. In particular, all modern textbooks of International Economics usually cite the first version of the impossible trinity theory, presented by Mundell (1963) at the latest in 1963. The theory defines the impossibility of simultaneously conducting an independent monetary policy, exercising a fixed exchange rate, and allowing the free movement of capital. According to Boughton (2003), the concept was developed independently by Fleming and Mundell in different articles between 1960 and 1963. It should be noted that many economists, such as deem the *classical* theory of the impossible trinity as the most important achievement in international economics in general (Klein and Shambaugh, 2015). Less often, and mostly sporadically, textbooks mention the *new* or *alternative* impossible trinity, formalized in Beck and Prinz (2012), which states the impossibility of monetary unions to survive autonomous fiscal policies without a mechanism for recycling surpluses.

However, there was no explicit explanation of the trilemma developing countries currently face in any of the textbooks on the *International Economy* we came across. The trilemma represents the impossibility for developing countries to simultaneously be in a monetary union with developed countries while pursuing independent fiscal policy and the possibility of successful prevention of emigration. Hence, developing countries that adopt any monetary policy framework implying a fixed exchange rate, i.e. passive monetary policy (i.e. enter a monetary union, accept a currency board, official euroization, or even a classic fixed exchange rate regime), face the dilemma of either pursuing an expansive fiscal policy (thus keeping citizens in the country) or allowing mass emigration of the population. The only thing that would ease this trade-off is the possible generous inflow of foreign investment into the country. However, if there are no such inflows (or they are relatively low based on the percentage of Gross domestic product – GDP) and if the country faces fiscal constraints, the authorities face the dilemma of either allowing the departure of the workforce with implications for long-run aggregate supply (LRAS)⁶ or deciding to exit the monetary union. Structural reforms, which would prevent such a scenario, generally require more time to implement. In short, this is the experience of the *impossible trinity of developing countries*. However, such an experience has not yet been scientifically backed, which is why it would be justified to claim that the existence of the Impossible Trinity of DCs at this time is merely a hypothesis. Before we start proving the existence of this new impossible trinity,

⁶ The quiet observation of the permanent departure of labor leading to a shift to the left of the LRAS (reduction of the natural production rate) can also be considered an Eastern European variant of economic hysteresis.

we want to express our opinion on why economists from developed countries do not pay more attention to labor mobility as a mechanism (shock absorber) for achieving the sustainability of the monetary union. Namely, as noted by Feldstein (2011), Salvatore (2016), Basso et al. (2019), this mechanism works very poorly within The Economic and Monetary Union (EMU), Economic and Monetary Union (or at least among its most developed members). In other words, the population of the *old* European Union (EU) members is relatively static, which is at least partly related to language differences and the existence of nationalism. Encouraging migration within developed countries (for example, encouraging the French to leave France and move to Germany to reduce the French trade deficit) would have a negative political connotation, which is why few European economists decide to put this topic at the centre of their research. On the other hand, there is no need to raise this issue in the United States whatsoever. The population in the United States is very mobile and has no problem leaving one American state and moving to another to pursue a better job (Francisco and Giavazzi, 1993). Besides, there are significantly larger fiscal transfers in the United States⁷ which is why the United States as a monetary union operates with far fewer problems than EMU (Feldstein, 2015). Hence, economists from the United States have no need, and economists from the old EU members have no desire to explore this economic area. The only ones left are economists from developing countries who have the necessity and desire to deal with this topic.

With things like that, it is time to set our paper hypothesis. The hypothesis is:

Developing countries face a particular form of the impossible economic trinity. It implies the impossibility of simultaneously being in a monetary union with more developed countries, enabling complete freedom of labor movement, and conducting a restrictive fiscal policy, without these three leading to mass workforce emigration, which impacts the long-term development potentials of the country (embodied in LRAS).

The structure of our paper is as follows: after the introduction, in which we explain why we decided to do this research in the first place, we review the literature to find out whether and how many papers exist on the exact/similar topic. Following that is an explanation of the methodology and data sources used and given the presentation of the obtained results. In conclusion, we delivered a final opinion on whether the hypothesis was proven and presented our idea in which direction similar studies could move.

⁷ According to US Treasury (2023), federal spending of US Government in 2019 was equal to around 23% of the total gross domestic product (GDP) of USA. According to UK House of Commons (2021) EU spending in 2019 was equivalent to around 1% of national income across the EU's Member States.

2. Literature review

As already mentioned, we were the first to introduce the theory of the Impossible Trinity of developing countries in the paper (Đogo, 2022), and therefore, the literature on this new trilemma still does not exist. It also explains why this literature review is, unfortunately, modest. However, in this paper, we have pointed out that this new impossible trinity is closely related, more precisely that it arose from the integration of two Mundell theories (OCA and the impossible trinity theory) so that all the literature on these two Mundell theories (especially the theory of the impossible trinity) is actually relevant to this paper of ours. Regardless, we presented the literature related to the *classical* theory of the impossible trinity and the theory of OCA in our previous paper (and thus, forms a whole), so we will not present a comprehensive review of the literature concerning that field of research in this one. Only at the end of this literature review will we list some other sources we did not mention in the previous paper.

The basic premise of our work is that labor emigration has long-term negative macroeconomic consequences on the development of the country the workers leave. Yet, the opinion on this is not unanimous, which is why we give a brief overview of the literature dealing with this issue.

Hanson (2008) made a comprehensive review of the literature dealing with the economic consequences of labor migration from several aspects (microeconomic and macroeconomic) and both from the position of the countries the labor force leaves and the countries of their immigration. Thus, from this paper, we can notice that back in the mid-1970s, Bhagwati and Hamada (1974) pointed out that the problem for developing countries is that *the wrong individuals leave*, which harms the economic development of this group of countries. Even some recent studies, such as Chiquiar and Hanson (2005) and Docquier and Marfouk (2006), confirm that the more skilled a worker is, the more likely they are to emigrate to one of the more developed countries. Wong and Yip (1999) believe that the departure of the workforce has negative consequences for the long-term rate of economic growth, while Kerr et al. (2016) point out that the global movement of talent from developing to developed countries *tilts the deck even further*.

However, many more prominent economists regard emigration positively. At the same time, most of them linger for a short period in which emigration, according to the dominant opinion, has more positive than damaging effects, even in the countries from which workers leave.

The classic argument proving the existence of these positive (short-term) macroeconomic effects of emigration is the research that deals with remittances sent to developing countries by guest workers. Such works include Yang (2007), Acosta et al. (2007), and Acosta et al. (2008). Hanson (2010) believes that

emigration facilitates the macroeconomic adjustment of developing countries after having experienced some political or economic shock. Lucas (1988), Mountford (1997), Beine et al. (2001), Stark and Wang (2002) and Hanson (2010) consider that emigration can have net positive effects in the long run due to the increase in skills that emigrants acquire in developed countries and then transfer back to their home countries. Surveying as many as 127 countries in a 2006 repeat study, Beine et al. (2001) claimed to have found evidence of a widespread *benevolent brain drain* as a result of a *positive effect of skilled migration prospects on gross human capital formation*. Similar results came from Iranzo and Peri (2007), who also argued that migration benefits both the countries to which immigrants arrive and from which they leave. Mayr and Peri (2008) argue that temporary migration is widespread among migrants from Eastern European to Western European countries, including those who emigrate from Asia to the United States. This paper also claims that the *brain drain* causes *brain gain* since the perspective of migration encourages young people to go to school and use the acquired knowledge, if not in their own country, then at least in the country of immigration. Mishra in his study from 2007 examines empirically the effect of Mexican emigration to the United States on wages in Mexico using data from the Mexican and US censuses from 1970 to 2000. The main result of the paper is that emigration has a strong and positive effect on Mexican wages. There is also evidence of increasing wage inequality in Mexico due to emigration (Mishra, 2007).

A related group of papers are those arguing that emigration encourages entrepreneurship in developing countries and thus has a positive impact on the economic growth rate in the long run (Woodruff and Zenteno, 2007). A study by Docquier and Rapoport (2007) indicates the existence of the so-called *optimal migration rate*, which implies that deviation from this optimal rate, to higher but also lower, can have negative consequences for developing countries' growth.

As for the papers concerning the relationship between monetary, fiscal policy and emigration, our research, unfortunately, shows that it is almost impossible to find literature that deals with all three variables simultaneously.

In contrast, many works consider how entering the monetary union limits the fiscal policy autonomy, especially in the context of EU integration. Let us mention Galí and Monacelli (2005: 21) paper in which they prove that under the monetary union circumstances *the local fiscal authority is required to trade-off movements in inflation on the one hand with movements in the output and fiscal gap on the other*. According to Fatás and Mihov (2009), as a consequence of the Maastricht Treaty and the rules of the Stability and Growth Pact (SGP) there has been an increase in synchronization and coordination of fiscal policies within the EU even before the 2008 crisis. Galí and Perotti (2003), on the other hand, argue that the increase in synchronization and coordination of fiscal policies of EU member states has occurred as part of a broader trend in all developed countries to pursue

countercyclical fiscal policies. Hans-Werner (2018) claims that after the 2008 crisis, especially the debt crisis of the EU countries, the European Central Bank (ECB) entered the fiscal policy territory directly.

What can happen to small developing countries that enter into a monetary union with more developed countries and then try to compensate for the shortcomings of the common monetary policy dictated by larger countries through expansive fiscal policies is indicated by Leeper (2013: 2), who, among other things, states: *Outright default entails reneging on some portion of outstanding debt obligations and is the only type of default available to countries who do not control their own currency or who issue debt denominated in foreign currency. Members of the EMU fall into this category, as the ECB supervises their monetary policy dominated by countries not now experiencing sovereign debt problems. A higher probability of outright default reduces the value of outstanding government bonds and raises sovereign risk premia.*

Razin and Rosefield (2012: 125), who indicated the similarities between EMU and the gold standard, have claimed that: *The European Community members have put themselves in a monetary cage, akin to the gold standard, in which member states have surrendered control over their monetary and foreign exchange rate policies to the German dominated European Central Bank, without supplementary central fiscal, private banking and political union institutions.*

Bordo and James (2014: 4) have a similar opinion, deeming that the gold standard was less dangerous for member states than joining the EMU because *the gold standard was a contingent rule—in the case of an emergency like a major war or a serious financial crisis a country could temporarily devalue its currency. The EMU has no such safety value.*

Nevertheless, after the establishment of the European Stability Mechanism (ESM) and European Financial Stabilisation Mechanism (EFSF) programs, the situation has changed somewhat – EMU member states that encounter fiscal problems can count on some transfers from the EU level, as suggested by Gourinchas et al. (2020). However, these transfers are not automatic or unconditional, which is evident in the example of Greece. According to the findings of Gourinchas et al. (2020), Greece got the most transfers, i.e. as much as 43.7 percent of its output.

It is essential for our paper to mention the growing workforce mobility within the EMU. It was fueled by the debt crisis of some of its members, which began in 2010, as Aizenman (2015) and Jauer et al. (2014) point out.

However, as we have already mentioned, none mentions labor emigration. In fact, perhaps the only work we have encountered that at least partially takes into account all three of these variables fiscal policy, monetary policy (the existence of a monetary union), and emigration is that of House and Carpenter (2015).

Although this paper emphasizes fiscal policy, the authors rightly note that failure to incorporate the impact of capital and labor mobility results in a significant overestimate of future revenue. However, as we have already mentioned, none mentions labor emigration.

When it comes to works dealing with *false* impossible trinities, these papers have very little or nothing in common with the central issue (the relationship between the monetary policy of capital flows and the exchange rate regime) that Mundell and Fleming considered. Rodrik (2000) presented the thesis on the existence of a *political-economic trilemma*. According to him, the authorities can choose only two from three goals – democracy, national sovereignty, or globalization. Kaminsky et al. (2003) present three conditions (circumstances) that almost certainly cause the outbreak of the financial crisis in the country. Chari et al. (2021) points out that banks in India have used loosening of regulatory standards on capital adequacy in an attempt to curb the consequences of the expansion of Covid-19, to indicate the quality of bank placements better than it is, which has led to directing loans to worse clients (companies). Finally, there are works, like ours, which rely on the classic impossible trinity, adapting it to specific circumstances.

We want to add the following sources when considering additional sources that refer to the *classical* impossible trinity that we did not mention earlier.

In 1997, the term *trilemma* was brought to disseminated use within economics (Obstfeld and Taylor, 1998). Obstfeld and Rogoff (2002) argue that in an economy with integrated international financial markets, monetary policymakers can control their monetary instruments to achieve their target (Obstfeld and Taylor, 1998) Obstfeld et al. (2005) developed the first methods to enable empirical validation of this hypothesis in international macroeconomics.

Historically, in advanced economies, the years before 1914 and the 1970-2014 period were characterized by stable foreign exchange rates and free capital movement – whereas monetary autonomy was limited. The 1914- 1924 and 1950-1969 periods of restrictions on capital movement and capital controls led to prevailing exchange rate stability and monetary policy autonomy. (Eichengreen and Esteves, 2021).

3. Methodology

It is not easy to scientifically prove the existence of an impossible trinity of DCs, even though it is apparent to the authorities and many economists in developing countries. Namely, there are two basic ways to get it confirmed. One is to present indisputable logical proof of its existence. The other is to prove its existence through empirical research.

As for the first method, it should be remembered that the Mundell-Fleming impossible trinity was initially verified thanks to the emergence of the Mundell-Fleming (or IS-LM-BP) model (Zdunić, 2011). It could be stated that it was a kind of deduction application, more precisely an axiomatic method. Mundell and Fleming first deduced the existence of the IS, the LM and the BP curve (which became axioms). They then studied the presence of an impossible trinity by analysing a model based on these curves. It was only after that that numerous researches followed and only empirically confirmed what had already been theoretically proven. However, emigration is not a variable predicted in the Mundell-Fleming model, so this classical model cannot be used to confirm the presence of the Impossible Trinity of developing countries.

Empirical validation of the existence of the impossible trinity in DCs will not be easy either. Theoretically, it would be easiest to use the approach of Aizenman et al. (2008), i.e. modify their *trilemma index* to apply it to the new trinity. However, the problem arises when choosing the right example for conducting the analysis. We recall Dostoevsky's words: *Happy families are all alike; every unhappy family is unhappy in its own way*. It is also the issue with countries facing a choice between emigration, monetary union and expansionary fiscal policy, where it is difficult to find a *clean* case. In particular, due to excessively unfavourable circumstances (war, riots) some developing countries have gone through the experience of mass emigration in the early stages of transition. Therefore, the workforce *reservoir* has been significantly emptied, so it will not be easy to prove that later admission into the monetary union with developed countries generated a new wave of emigration.

In the case of those developing countries that have adopted a monetary policy framework that implies particular exchange rate regime flexibility (such as Serbia, Macedonia and Croatia), proving the existence of this new impossible trinity is even more challenging. Namely, these countries should be able to limit emigration and pursue an expansive fiscal policy, all thanks to the fact that they can use the exchange rate policy and monetary policy to fix their imbalances. However, there are almost no developing countries that have adopted a free-floating exchange rate regime, and in nearly all countries, the authorities are trying to keep the exchange rate stable against the currency of the primary trading partner. The third limiting factor for conducting our analysis is that, in many cases (DCs), the very possibility of pursuing an expansive fiscal policy is debatable. Hence this opportunity depends on the already reached level of public debt and political circumstances (acceptability of further growth of public debt), so it can often be perceived as an exogenously given factor.

Nevertheless, after lengthy deliberations and several attempts to find a proper model for empirical research, we decided to try to prove the existence of the impossible trinity of developing countries using the example of Greece.

For the econometric analysis, based on results of unit-root test, we applied Vector Error Correction Model (VECM). The VECM is commonly used to model the stationary relationships between multiple time series that contain unit roots and implements Johansen’s approach for estimating the parameters (Stata Corporation, 2017). If the variables are order one integrated I(1) and are cointegrated i.e. the long-run equilibrium relationship between them exists, then the interdependence can be presented as the error correction model. The VECM can directly estimate the level to which a variable can be brought back to equilibrium condition after a shock on other variables. It is very useful by which to estimate the short-term effect for both variables and the long run effect of the time series data.

The general form of a VECM (p) where p is the lag of endogenous variables with cointegration rank $r \leq k$ where k is number of endogenous variables, is as follows (Usman et al. 2017; Zou, 2018; Ivanova et. al, 2021):

$$\Delta y_t = \alpha \beta' y_{t-1} + \sum_{i=1}^{p-1} \Theta_i \Delta y_{t-i} + \delta_t + D_t + \varepsilon_t \quad (1)$$

where Δy_t is a vector of the first difference of endogenous variables; α is a vector adjustment matrix with order $(k \times r)$; β' is a vector cointegration matrix $(k \times r)$; Δy_{t-1} is a vector variable endogenous with lag 1; Θ_i is a vector of the short-run coefficients; Δy_{t-i} is a vector variable endogenous with lag i ; δ is a $k \times 1$ vector of trend coefficients; D_t is a $k \times 1$ vector constant, ε_t ; $k \times 1$ vector residuals.

As stated above, α is vector adjustment matrix and shows the speed of error correction mechanism. A larger α imply a faster convergence toward long-run equilibrium in cases of short-run deviations from this equilibrium. The $\beta' y_{t-1}$, usually denoted as ect_{t-1} , is the error correction term which reflects long-term equilibrium relationships between variables.

4. Empirical data

Using the World Economic Forum terminology, as a country with a GDP of \$ 17,647.2 per capita in 2020 (World Bank, 2022), Greece is on the verge of belonging to a group of countries whose development is based on increasing productivity (industrialized economies, countries with upper-middle income) or a group of countries (Schwab, 2014) whose development is based on innovation (post-industry economies, high-income countries)⁸. In addition, Greece has been a

⁸ According to the development level, all countries fall into three categories in the Global Competitiveness Report 2014/15: Phase 1 - countries whose development is based on resources, Phase 2 - countries whose development is based on increasing productivity and Phase 3 - countries whose development is innovation-based. You enter the third group of countries after your GDP per capita exceeds \$ 17,000.

member of the EMU for 20 years, and after 2010 it experienced the implementation of a restrictive fiscal policy. Considering that the motive of this paper is to warn the Croatian public about the risks of entering a monetary union with more developed economies and that Greece's GDP per capita is only 25% higher than Croatia's GDP per capita, this example seemed adequate. This warning of ours is not something entirely new. The well-known Croatian economist Zdunić (2011) pointed to the connection between the impossible trinity, fiscal policy and possible recession in countries in transition, including Croatia.

After selecting an example for empirical research, we could apply analysis to prove the existence of the impossible trinity of developing countries. In doing so, the chosen example proved once again convenient because, thanks to Greek membership in EMU since 2001, research into the relationship between three variables (trinity) has practically been reduced to research into the relationship between two variables (duality). More specifically, this allowed us to focus on confirming the existence of a negative link between fiscal policy and emigration and quantifying that link.

However, as in any research, several practical issues/problems arose. The first was how to measure the autonomy of the fiscal policy of the observed country. Should one consider public revenues (changes in the tax burden) or public spending (or only some of its components)? Should we only regard indicators for one country or, as autonomy usually implies, take into account the correlation in the movement of fiscal policy of two or more countries?

Our choice was to measure the expansiveness of fiscal policy through indicators of the movement of the salary fund of employees in the public sector (Sector: General Government – Compensation of employees). This indicator best reflects the austerity policies the Western Balkan countries had to implement after the 2008 crisis. The total public spending, especially measured as a percentage of GDP, would blur the notion. This *blurring* would be a consequence before the fall in the GDP of these countries, making it impossible to notice how much the reduction in public spending has occurred. Also, the focus of fiscal consolidation in these countries in the 2012-2016 period on limiting or even reducing wages in the public sector has convinced us that of all the components of public spending, this one best reflects the purpose of this research. Data on this indicator (General Government – Compensation of employees) are from the IMF (International Monetary Fund, 2022).

Also, aware that in modern times the value of money changes significantly even in shorter intervals and that our analysis is based on research on the movement of observed variables in the twenty-year period, we opted to analyse the salary fund of employees in the public sector both in current (current €) and in stable values (€ 1999). We achieved this by correcting the value of the public sector salary bill, the Money Purchasing Power Index. For building this index, we used data on the

inflation rate in Greece (measured as CPI), and we found this data on the World Bank's website (2022).

Having applied the Eurostat (2022) website, we attempted to find data on the second variable (emigration from Greece). To our surprise, these data for Greece date back only to 2009, which was not enough for the needs of our research, i.e. we would not be able to conduct a reliable regression analysis with such a short data series. That is why we turned to an alternative source of data – the Federal Statistical Office of Germany. German Federal Statistical Office – Statistisches Bundesamt, (2022). Namely, this German state body is known for its thorough and transparent work, so it is possible to find data on the number of foreigners who visit this country yearly for various reasons in their publicly available databases.

Although emigration from Greece is not equal to mere emigration to Germany, the largest European economy is naturally the most alluring bait for the workforce from the rest of the continent (including Greece). Therefore, it seems reasonable to assume that the data of this German state institution can be helpful in our finding a fairly reliable substitute for the data we wanted to obtain from Eurostat. Of course, when interpreting the obtained results, we always have to consider their meaning regarding the data sources used.

However, we have encountered another problem here. Namely, as Delors plan for the establishment of an economic and monetary union provided for the abolition of all restrictions on the movement of the workforce in EU member states⁹, it is not simple to extract data from the total number of Greeks who visit Germany annually which would refer only to those going there to work. In particular, the Federal Statistical Office of Germany, which provides data on as many as 13 grounds for obtaining a residence permit in Germany, in the case of Greek citizens, uses only one basis for obtaining a residence permit – Right of resid. acc. to EU Law on Freedom of Movement (European Commission, 2022). Therefore, in our analysis, we had to accept the data for which we have a reliable source (on the number of Greek citizens who visit Germany every year) as a substitute for data on the number of Greek citizens who come to Germany with the intention of working there.

To avoid the problem of one independent – one dependent variable, in addition to two independent variables, we introduced two control variables (Economic Freedom and Human development) into the analysis. The reason for choosing these two variables is that, through a review of the relevant literature, we noticed that the most frequently mentioned factors that influence migration movements are economic factors, political factors (level of freedom), and sociological factors (level of social development).

⁹ It is because Directive 2004/38 and the Treaty on the Functioning of the European Union from 2012 pledge complete freedom of movement for citizenship of any EU member state within all other countries.

The data for the estimation is available for the period 1999-2020 on an annual basis. It is a relatively small number of observations for time series analysis, but on a semi-annual or quarterly level, the data are not available. We tried to use two different control variables, which, according to previous research and our assumptions, could impact immigration, such as the level of human development and economic freedom and life expectancy. The description and specification of all variables used in natural logarithms (Table 1).

Table 1: Specification of research variables

Variable	Type	Label	Source
Immigration from Greece (number of people)	Dependent	Immig	German Federal Statistical Office – Statistisches Bundesamt (2022)
Government Compensation of employees adjusted for the Purchasing Power Index (in EUR)	Independent	comp_ppp	International monetary Fund (2022)
Government Compensation of employees (in EUR)	Independent	Comp	World Bank (2022)
Economic freedom, index	Control	Freed	The Heritage Foundation (2022)
Human development	Control	Hdi	World bank, World Development Indicators

Source: Author's research

To choose the appropriate econometric model for testing the existence of the relationship between immigration from Greece and government compensation, we started by detecting the order of integration variables used in the model. For this purpose, we used three different unit-root tests: Augmented Dickey-Fuller, Phillips-Perron, and Zivot-Andrews. The last one allows for a single break in intercept and/or in a trend. The last one is important because conventional-unit root tests, such as Dickey-Fuller and Phillips-Perron, are not completely reliable if the time series contains a structural brake. So, taking into account that the last 15 years were characterized by crises and also prosperity (before 2008), we also tested the series for the structural break using the supremum Wald test.

According to the ADF and Phillips-Perron unit root test, all variables contain a unit root at level. The index of economic freedom became stationary at 5% of significance after first differencing but other variables did not. Results of Zivot-Andrews unit-root test confirmed non-stationarity of the time series at the level, but also confirmed the stationary of all variables at their first difference, except

immigration, which required two differentiations to become stationary. As the supremum Wald test proves the existence of the structural brake all time-series contains a structural brake, the Zivot-Andrews was taken as authoritative for the conclusion regarding the order of integration of our variable. All variables are integrated of order I (1), while the dependent variable, immigration, are integrated of order I (2).

Results of unit-root root testing are presented as well as estimated break date-root test (Table 2.).

Table 2: Unit-root test

Variable (in log)	Unit-root at	ADF (Z(t))	Phillips-Perron (Z(t))	Zivot-Andrews (t-stat)	Break date
immig	Level	-0.589	-0.793	-3.981	2010
	First difference	-2.793	-2.754	-3.780	
	Second difference	-5.567	-5.735	-8.771	
comp_ppp	Level	-1.712	-1.745	-3.004	2010
	First difference	-3.001	-2.789	-7.703	
comp	Level	-1.542	-1.531	-2.768	2010
	First difference	-2.724	-2.760	-7.735	
freed	Level	-1.922	-2.103	-3.166	2012
	First difference	-3.662	-3.627	-5.278	
hdi	Level	-2.474	-2.583	-4.538	2007
	First difference	-3.391	-3.313	-6.026	

Notes: 5% Critical value for: ADF and Phillip-Perron unit root test is 3.6; for Zivot-Andrews test is 5.08.

Source: Author's calculation

The order of integration of our variables determined the appropriate model for determination appropriate model for the further analysis. Since all our variables are integrated of order (1) except one, which is integrated of order (2), we decided to use Johansen cointegration test and Vector Error Correction Model – VECM. These techniques require that all of variables are integrated of order one what we archiver by using the immigration variables at the first difference.

The Johansen procedure allows to analyze whether two- or more-time series can form a co-integrating relationship – i.e., if they have a long-run equilibrium relationship. VECM is an error correction model that is embedded into Vector autoregressive (VAR) framework so that the short- and long-run relationships

between a set of variables can be modeled simultaneously. If the Johansen procedure confirms that there is the existence of the long-run relationship between variables, VECM can be applied. So VECMs are used to model the stationary relationships between multiple time series that contain unit roots, and it implements Johansen procedure for estimating the parameters of a VECM (Brooks, 2014; Asteriou and Hall, 2016; Stata Corporation, 2017)

Before the determination of the cointegration and the estimation of long- and short-run relationships among observed variables, descriptive statistics are shown (Table 3). In the econometric analysis, natural logarithms are used but in the descriptive statistic, variables are expressed in original values for information reasons.

Table 3: Descriptive statistic

Variable	Obs	Mean	Std. Dev.	Min	Max
Immigration (number of persons)	21	327,461	33,012	276,659	365,438
Government compensation of employees (in EUR, adjusted for PPP)	21	16,265	2,475	13,445	22,061
Government compensation of employee (in EUR, adjusted for PPP)	21	21,598	4,275	13,445	30,425
Index of Economic Freedom	21	58.58	2.94	53.20	63.40
Human development index	21	0.86	0.03	0.80	0.89

Source: Author's calculation

Descriptive statistics provide simple summaries of the sample and of the observations that have been made. There is no objective standard for small and large standard deviations. We can only judge whether the average deviation is small or large depending on the context and the particular thing we are trying to measure. Generally, more than two standard deviations above or below the mean are considered high. In that case, 95.5% of data will be present within two standard deviations of a normal distribution. In this case data on the number of migrants in the observed period vary from 276,659 to 365,438 with a standard deviation of 33,012. According to this data, it is obvious that the standard deviation of migration is high, which means that the numbers have changed significantly from year to year. However, the standard deviation data for Government compensation of employees (in EUR, adjusted for PPP) and Government compensation of employees (in EUR, adjusted for PPP) vary even more but do not exceed two standard deviations. On the other side, there are no big variations in the Index of Economic Freedom and Human Development Index.

Since we have a very short time series (21 years, for the period 1999-2019), In the Johansen procedures, we use our variables of interest immigration and amount

of government compensation of employees (in current EUR and adjusted for PPP) and one of the proposed control variables. It is not possible and reasonable to use a lot of variables in very short time series. The model which only showed the existence of cointegration was one that included the following variables (prefix “I” denotes indicates that the variable is used in the logarithm): immigration (limmig), government compensation of employee adjusted for PPP (lcomp_ppp) and Index of Economic freedom (lfreed). Due to the fact that Johansen procedure and VECM require the use of variables integrated in the order I (1), we used immigration as their first difference. The number of lags used in the estimation is three.

Results of the Johansen cointegration in immigration, compensation of employees, and economic freedom are presented in Table 4. Because the trace statistic at $r = 0$ of 36.8468 exceeds its critical value of 29.68, we rejected the null hypothesis of no cointegrating equations and accepted the alternative saying that there is cointegration in the system. Since the trace statistic at $r = 2$ of 14.7527 is less than its critical value of 15.41, we cannot reject the null hypothesis that there is one cointegrating. So we accepted $r = 1$ as our estimate of the number of cointegrating equations between these three variables and concluded that a long-term relationship between the analyzed variables exists.

Table 4: Johansen cointegration in immigration, compensation of employee and economic freedom

Number of obs:	17	Lags	3	Sample:	2003-2019
Maximum rank (r)	Params	LL	Eigenvalue	Trace statistic	5% Critical value
0	21	105.8999	.	36.8468	29.68
1	26	116.9469	0.72737	14.7527*	15.41
2	29	122.2344	0.46316	4.1776	3.76
3	30	124.3233	0.21788		

Source: Author’s calculations

If a set of variables is found to have one or more cointegrating vectors, then VECM is appropriate as the estimation technique, which adjusts to both short-run changes in variables and deviations from long-run equilibrium.

In table 5 the VECM estimates for immigration, compensation of employee and economic freedom is presented, and, as we expected, confirms the existence of a long-run relationship between immigration, government compensation and economic freedom in Greece for the period 1999-2019. Our equation of interest is the first equation, where immigration is a dependent variable.

Table 5: VECM estimates for immigration, compensation of employee and economic freedom

VARIABLES	(1)	(2)	(3)
	D_dlimmig	D_lcomp_ppp	D_lfreed
L_ce1	-0.993*** (0.284)	0.471 (0.852)	-0.185 (0.267)
LD.dlimmig	-0.171 (0.263)	-0.139 (0.789)	0.268 (0.248)
L2D.dlimmig	-0.191 (0.241)	-0.0751 (0.723)	0.0696 (0.227)
LD.lcomp_ppp	-0.431*** (0.148)	0.452 (0.442)	0.290** (0.139)
L2D.lcomp_ppp	-0.343** (0.149)	0.279 (0.446)	0.270* (0.140)
LD.lfreed	0.174 (0.233)	0.0906 (0.699)	-0.164 (0.219)
L2D.lfreed	0.745*** (0.192)	-1.062* (0.576)	-0.436** (0.181)
_trend	-0.00167 (0.00186)	-0.00177 (0.00558)	0.00448** (0.00175)
Constant	0.0129 (0.0194)	0.00905 (0.0581)	-0.0470*** (0.0182)
Observations	17	17	17

Source: Author's calculation

A crucial parameter in the estimation is the coefficient of the error correction term (ect $t-1$ denoted in the table 5 as L_ce1), which measures the speed of adjustment of immigration to its equilibrium level. This parameter is statistically significant an 1% of significance and negative. The value of the error correction term is -0.993 which means that 99.3 % of the deviation from long run equilibrium are corrected within on year.

The second part of Table 5 reveals information about whether the past values of variables affect the current values of the variables (short-run coefficients). If we look at the short-run coefficient, it can be concluded that our variable of interest, government compensation of employees has a statistically significant and negative impact on immigration at the first and second lags. The signs are negative which means that an increase in government compensation will decrease immigration from Greece in the next two years. The index of economic freedom is also significant and has the opposite direction compared to government compensation. An increase in economic freedom increases immigration from Greece in for two years.

We also tested if we correctly specified the number of cointegrating equations. The results of the stability conditions are presented in Table 6 and Figure 1.

Table 6: Stability test for the cointegration relationship

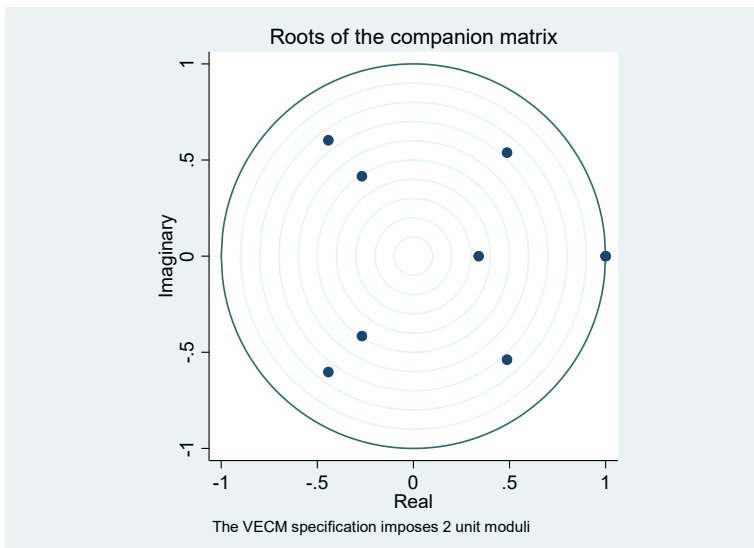
Eigenvalue	Modulus
1	1
1	1
$-.4426788 + .6026721i$	0.747782
$-.4426788 - .6026721i$	0.747782
$.4870174 + .5384714i$	0.726042
$.4870174 - .5384714i$	0.726042
$-.2679291 + .4156049i$	0.494483
$-.2679291 - .4156049i$	0.494483
0.3395482	0.339548

Notes: The VECM specification imposes 2 unit moduli

Source: Authors' calculation

If the process is stable, the moduli of the remaining eigenvalues are strictly less than one. Since there is no general distribution theory for the moduli of the eigenvalues, detecting whether the moduli are too close to one is difficult. But in our results, all eigenvalues are strictly less than one, thus confirming the stability of our model.

Figure 1: Stability test for the cointegration relationship



Source: Author's research

Figure 1 shows that none of the remaining eigenvalues (except the first two) appear close to the unit circle, which means that the stability check does not indicate that our model is misspecified.

5. Results and discussion

The results of a regression confirm our hypothesis that the restrictive fiscal policy of Greece has led to a significant increase in the emigration of their population toward Germany. The analysis results provide confirmation of the initial research hypotheses of the study. The final phase of analysis proves the existence of a significant inverse relationship between the government compensation of Greece and their population's emigration toward Germany. Namely, with a 95% confidence interval, the expansiveness of Greek fiscal policy can justify that as much as 76% of the labor force emigrates from Greece to Germany.. It is not only the period from 2011 up to the present but also the earlier period. By carefully analyzing the data it is noticeable that while the Greek government pursued an expansive fiscal policy (1999-2010), Greece permanently recorded a trend of declining emigration towards Germany. When the Greek government, pressured by the burden of public debt, had to change its fiscal policy from an expansive to restrictive one in 2011, this led to a renewed increase in the number of Greeks emigrating to Germany.

Those findings are quite significant. Earlier, the concept of an optimal currency area did not take into account the long-run costs of emigration of the labor force. Considering that *optimality* means that benefits prevail over costs, introducing this new kind of cost could change the result in the same cases. This means that the basic theory of the optimal currency area is upgraded by the developing country's experience. We believe that, after this work, every researcher in the field of optimal currency area should pay attention to those findings.

Apart from academics, those are also significant findings at the political level. This indicates that big and developed countries, seeking leadership positions, should have more understanding of the more expansive fiscal policy of less developed countries that participate in economic integrations with them. This would be ethical because we proved that the cost of participating in a monetary union with more developed countries means that costs of restrictive fiscal policy are much higher in developing countries compared to costs in developed countries.

6. Conclusion

Contemporary economic theory is full of *triangles*, i.e. trilemmas, some of which are unquestionable while others are yet to prove their validity. One of these new

trilemmas, which is to be confirmed, is the *Impossible Trinity of developing countries*, presented in this paper. The essence of this trinity is that in conditions when a developing country enters into a monetary union with a developed country (or binds its currency to the currency of that other country), the authorities of that country face a dilemma – to pursue an expansive fiscal policy or allow mass emigration of the labor force. The third option is to abandon the peg of the exchange rate, and in that case, there is a trilemma where the country can choose any two of the three considered positions.

We determine a significant regression interconnection between government compensation and migration in Greece. We believe that this paper has unequivocally confirmed the existence of this new impossible trinity. Of course, many questions remain open. First, there should be more research on this topic to substantiate the existence of the impossible trinity of developing countries on a much more extensive number of examples. Currently, only the example of Greece proves the existence of the impossible trinity of developing countries analyzed exclusively in the last 20 years or so.

We regret to note that most of the examples that are to appear in the future will probably be negative. They will discuss countries that, as a consequence of entering an economic and monetary union with significantly more developed countries, had to go through a period of significant labor emigration before achieving the new macroeconomic balance.

Moreover, if the major political blocs (like the EU and the USA) do well economically, which would suit us all, we will lack examples to prove the impossible trinity of developing countries. It is because, as a rule, in periods of prosperity, there is not so much pressure on the governments of developing countries to lead restrictive fiscal policies. Nevertheless, it still will not be proof of the non-existence of the impossible trinity of developing countries, but, unfortunately, it will only linger for a fresh opportunity.

Then, it is necessary to introduce this trinity into the analytical apparatus for the macroeconomic trends analysis, which has not been the case so far. We believe that whoever develops such an analytical apparatus would deserve great gratitude from students of economics, professional (macro) economists, and the governments of developing countries.

Also, there should be additional research on the impact of labor force emigration on the longterm rate of aggregate supply. We have noticed a considerable ideological influence in the papers we have encountered. The once indisputable fact that the departure of the labor force leaves the country without a part of available resources (which is why it harms LRAS) has been relativized in the last thirty years. Therefore, there is even talk of an increase in welfare due to the mass departure

of the workforce. The logic is based on pointing to the productivity increase of the labor force remaining in the country. However, theoretically and empirically, there are several ways to increase labor productivity, so starting from the premise that labor force emigration is the only possible way, in our opinion, is wrong.

So there is an expected fierce struggle ahead of researchers.

However, even just confirming the existence of the Impossible Trinity of developing countries is a significant alarm to the authorities of the countries wanting to enter a monetary union with developed countries. It warns them to reckon that in the catching-up period (economic development), they will be forced to pursue expansionary fiscal policy or to allow the workforce departure from the country with all the implications on the LRAS. Furthermore, further research should focus on exploring the interdependency of these data with the growth rate of the gross domestic product of CEE countries.

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Nemoguće trojstvo zemalja u razvoju – primjer Grčke

Marko Đogo¹, Dragan Gligorić², Miloš Grujić³, Boško Mekinjić⁴

Sažetak

Mobilnost faktora proizvodnje od samih početaka teorije optimalnog valutnog područja (OCA) izdvaja se kao jedan od primarnih mehanizama za postizanje ravnoteže platne bilance, odnosno održivosti monetarne unije (Mundell kriterijum). Međutim, postoji značajna kvalitativna razlika između situacija u kojima postoji monetarna unija zemalja sa sličnim dohodovnim razinama i kada postoji monetarna unija zemalja u različitim razvojnim fazama. Naime, u prvom slučaju mobilnost radne snage, po pravilu, ima kratkoročne ekonomske efekte, dok u drugom slučaju ima dugoročniji (negativniji) utjecaj – posebno na dugoročnu agregatnu ponudu (LRAS). To su doživjele mnoge istočnoeuropske zemlje, koje su nakon propasti komunizma izrazile želju da postanu dio evropskih integracija i monetarne unije. U prethodnom radu smo postavili tezu o postojanju “Nemogućeg trojstva zemalja u razvoju”. Ovaj rad nastoji potvrditi valjanost ove teorije. To smo učinili analizirajući događanja u Grčkoj u periodu (1999-2020). Konkretno, analizira se utjecaj triju varijabli (fiskalne politike, nivoa društvenog razvoja, razine ekonomskih sloboda) na emigraciju stanovništva u uvjetima monetarne unije i mobilnosti radne snage. Rezultati koje smo dobili pokazuju da je fiskalna politika u promatranom periodu bila najznačajniji čimbenik u objašnjenju migracijskih kretanja. Implikacije za zemlje u razvoju koje trenutno ulaze (poput Hrvatske) ili namjeravaju ući u monetarnu uniju s razvijenijim zemljama su značajne.

Ključne riječi: nemoguće trojstvo, optimalno valutno područje, migracije, zemlje u razvoju

JEL klasifikacija: F4, O15, O1

¹ Izvanredni profesor, Sveučilište u Istočnom Sarajevu, Ekonomski fakultet, Alekse Šantića 3, 71420 Istočno Sarajevo, Bosna i Hercegovina. Znanstveni interes: međunarodna ekonomija. Tel.: +387 66 903 411. E-mail: marko.dogo@ekofis.ues.rs.ba; markodjogo@yahoo.com. ORCID: 0000-0001-6898-9968.

² Izvanredni profesor, Sveučilište u Banjoj Luci, Ekonomski fakultet, Majke Jugovića 4, 78000 Banja Luka, BiH. Znanstveni interes: međunarodna ekonomija, primijenjena ekonometrija i zdravstvena ekonomija. Tel.: +387 51 430 043 Fax: +387 51 430 053, E-mail: dragan.gligoric@ef.unibl.org. ORCID: 0000-0002-7171-8699.

³ Docent, Nezavisni univerzitet Banja Luka u Banjoj Luci, Ekonomski fakultet, Veljka Mladenovića 12e, 78000 Banja Luka, Bosna i Hercegovina. Znanstveni interes: poslovne financije, ekonomija. Tel.: +387 51 456 600 Fax: +387 51 456 617. E-mail: milos.grujic@nubl.org, gruja84@gmail.com. ORCID: 0000-0001-5566-5921.

⁴ Docent, Sveučilište u Banjoj Luci, Ekonomski fakultet, Majke Jugovića 4, 78000 Banja Luka, Bosna i Hercegovina. Znanstveni interes: poslovne financije. Tel.: +387 51 430 022. Fax: +387 51 228 488. E-mail: bosko.mekinjac@ef.unibl.org. ORCID: 0009-0000-7150-1775.

Strategist's cognitive perspectives, innovation, and competitive advantage: An empirical study in Vietnam*

Mai Ngoc Khuong¹, Nguyen Quoc Loc², Nguyen Ngoc Duy Phuong³,
Nguyen Nhu Ty⁴

Abstract

The main aim of this study is to investigate the relationship between strategists' intuitive and analytical thinking, innovation, and corporate competitive advantage. This study not only proposes the new model to the academic world but also provides the empirical investigation on the direct and indirect effect of a strategist's analytic reasoning perspective and strategist's generative reasoning perspective on innovation and competitive advantage as well as the mediating role of innovation between the strategist's cognitive perspective of reasoning and corporate competitive advantage. This study conducted questionnaires of 382 samples in state-owned

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¹ Lecturer, School of Business, International University – Vietnam National University, Ho Chi Minh City, Quarter 6, Linh Trung ward, Thu Duc district, Ho Chi Minh City, 700000, Vietnam. Scientific affiliation: tourism development, tourist behaviour, organizational behaviour, consumer behaviour, public policy. E-mail: mnkhuong@hcmiu.edu.vn.

² PhD Candidate, School of Business, International University – Vietnam National University, Ho Chi Minh City, Quarter 6, Linh Trung ward, Thu Duc district, Ho Chi Minh City, 700000, Vietnam. Lecturer, Faculty of Business Administration, Ton Duc Thang University, 19 Nguyen Huu Tho Street, Tan Phong ward, District 7, Ho Chi Minh City, 700000, Vietnam. Scientific affiliation: organizational behaviour, innovation, strategic management, sustainable development, human resources management. E-mail: nguyenquocloc@tdtu.edu.vn.

³ Lecturer, School of Business, International University – Vietnam National University, Ho Chi Minh City, Quarter 6, Linh Trung ward, Thu Duc district, Ho Chi Minh City, 700000, Vietnam. Scientific affiliation: strategic management, organizational behaviour, customer behaviour, public management, service quality. E-mail: nndphuong@hcmiu.edu.vn.

⁴ Lecturer, School of Business, International University – Vietnam National University, Ho Chi Minh City, Quarter 6, Linh Trung ward, Thu Duc district, Ho Chi Minh City, 700000, Vietnam. Scientific affiliation: operations management, evaluation, motivation. E-mail: nhutynguyen@hcmiu.edu.vn.

companies, FDI, and private companies in Vietnam. Structure equation modelling was applied through smart PLS to analyse the valid data. The results provide substantial evidence of significant relationships between strategists' cognitive perspectives of reasoning, innovation, and competitive advantage in the context of State own, FDI, and private companies in Vietnam. Besides, the findings also show that there are non-relationships in the direct effect between product innovation and competitive advantage and between marketing innovation and competitive advantage. Moreover, the research results imply various managerial implications regarding how organizations successfully increase their competitive advantage by increasing their leader's cognition in management.

Keywords: *a strategist's analytical reasoning perspective, a strategist's generative reasoning perspective, innovation, competitive advantage*

JEL classification: *M12, O15, O30*

1. Introduction

In the global marketplace, competitiveness is inevitable; as a result, every achievement should be made to stay informed about what is occurring in the economy, what clients desire, and how the financial world is changing to be a contestant with the others (Kuncoro and Suriani, 2018). As a result, an endeavor must always be made to grasp what and how to handle various options possessed to beat other competitors and get a competitive advantage. One strategy to gain competitiveness is developing our products through product innovation, process innovation or marketing innovation (OECD, 2018). As a result, businesses must develop different perspectives, strategies, and products to win over competitors in the marketplace. On the other hand, thinking differently in a strategic way is a strategic topic on which every manager should have their viewpoint. Strategists should offer insight into what defines deliberate reasoning, what approaches are most productive and how they might enhance their strategic abilities. Superior productivity could be achieved through strategy development inside the organization.

According to Meyer (2007), the strategist's thinking is a complicated and intriguing mechanism that never ceases to amaze and dazzle on the one hand while also disappointing and frustrating on the other. We are frequently astounded by the individual brain's capacity but similarly astounded by its limits. It is not required to untangle all the secrets underlying the working of the human mind for this debate, but a summary of the human mind's powers and limitations can tremendously assist in understanding the subject of strategic reasoning.

Many previous articles have suggested the paradox of managers' intuitive and rational thinking (Langley, 1989; Langley, 1995; Meyer, 2007); some academics argue that more given study is necessary, while others disagree (Isenberg, 1984; Schoemaker and Russo, 1993). There is a widespread belief that CEOs must use both generative and analytic reasoning, especially if they are opposed.

The primary purpose of this research is to comprehend the link between logical thinking and generative thinking of strategists, innovation, and those impacts on the competitive advantage inside the organizations. The authors hope to test the direct effect of a strategist's analytic reasoning perspective and a strategist's generative reasoning perspective on innovation and competitive advantage, as well as the indirect effect of innovation between the relationship of a strategist's cognitive perspective of reasoning and corporate competitive advantage, by presenting the new model to the scientific community. With this in mind, we propose the following research hypotheses:

- H1: *Strategist's analytical reasoning perspective positively affects competitive advantage.*
- H2: *Strategist's generative reasoning perspective positively affects competitive advantage.*
- H3: *Strategist's analytical reasoning perspective positively affects innovation.*
- H4: *Strategist's generative reasoning perspective positively affects innovation.*
- H5: *Innovation positively affects competitive advantage.*
- H6: *The effect of strategist's analytic reasoning perspective on competitive advantage is mediated by innovation.*
- H7: *The effect of strategist's generative reasoning perspective on competitive advantage is mediated by innovation.*

The first section presents the background literature review, the authors' perspectives on this subject matter, the previous research findings. The second section deals with the purpose and the methodology used in this research, including how primary data was collected, interpreted, and appraised. The finding part is separated into four sections, each of which focuses on describing the results in the context of Vietnam, evaluating the results, verifying the results, and emphasizing the mediating role of innovation, the relationship between the strategist's cognitive perspective of reasoning, and corporate competitive advantage. Last but not least, the discussion and conclusion parts propose some discussions, implications, and limitations of this research for the future scientific world.

2. Literature review

In this section, the research theoretical foundation will be clarified. The concept of competitive advantage, strategist's cognitive perspectives (strategist's analytical reasoning perspective and strategist's generative reasoning perspective), innovation

(product innovation, process innovation, marketing innovation, organizational innovation) and its relationships will also be raised. In order to prepare for the theoretical basis system and build the model as well as the hypothesis of the report, the authors will list a number of concepts related to the topic as a basis for reasoning for the research.

2.1. Competitive advantage

Competitive advantage indicates that an organization earns huge returns or advantages over its rivals, such as cost, technologies, branding, leadership (Barney, 1991). Recent research on competitive advantage has expanded the reach from the viewpoints of the product life cycle and future growth abilities (as stated by Piccoli and Ives, 2005), implying that competitive advantage is obtained by improving organizational circumstances and significant future growth abilities. Chen and Tsou's (2007) work made an essential contribution to these discussions by identifying two competitive advantages: external and internal advantage.

According to Dirisu et al. (2013), competitive advantage can be obtained by opening new rivals, the danger of replacement goods substitution, the authority of suppliers and customers to pay, and competitiveness among competitors. Competitive advantage is when a corporation has control over a commercial rivalry arena; they have advantages that are difficult to copy, allowing a company to capture and sustain market leadership.

Companies gain continuing competitive advantage through their ability to create a set of core competencies that allow them to better serve their potential clients than their rivals. Srivastava et al. (2013) stated that major competency refers to a set of distinctive competencies established in a company in its primary sectors, such as excellence, service quality, team training, innovation, adaptability, and reactivity, in order to outperform competitors.

2.2. Strategist's cognitive perspectives

In the 1980s, Huff (1982) and her associates contributed the theory of cognition to strategy management studies, underlining the significance of strategy's conceptualization and separating it from the major impacts of the manager's knowledge. By proving the impacts of organizational competitive advantages and behavior patterns on the marketplace networks and industry, Porac and his partners (Porac et al., 1989; Porac and Thomas, 1990; Porac et al., 1995; Porac et al., 2011) established a new conceptual framework for strategy and competitive market research.

Although Schwenk (1988) may have been the first to adopt the term strategic cognition (SC), this concept began to occur often in the late 1990s (e.g., Hodgkinson

and Thomas, 1997) as a practical way of encapsulating the theoretical frame in strategy formulation. SC concentrates on the connections between *cognitive structures* and decision-making processes in strategic management in terms of strategic planning (Porac and Thomas, 2002). Top management's opinions about the surroundings, direction, close corporation, and business condition are among the cognitive structures (as stated by Porac and Thomas, 2002). These cognitive structures facilitate realizing the importance and interpreting procedures during the distinct stages of strategic planning, diagnosis, and choosing. During execution, organizational members participate in sense-making practices, which are defined as the effect in relation of information search, meanings designation, and deeds (Thomas et al., 1993) – similar to management behavioral processes efforts involving the use of signs and labeling to form meaning, both contribute to a collective understanding of choices and, ultimately, to execution.

According to Evans (1984; 1989), the original generative and analytical theory of thinking was considered as the most suitable concept. The theory was conducted to describe the common occurrence of cognitive perspective in thinking tests, as well as the perplexing aspect that rational ability exhibited on one activity frequently did not translate to the other (for a consideration of similar cases, see Evans, 1989). According to the generative-analytical theory, two different types of cognitive perspective were entailed: generative procedures that formed selected models of trouble information and analytical procedures that generated conclusions or assessments from these models.

Many leadership theories have observed that the opposites of perception and research cause conflict for leaders (e.g., Langley, 1989; 1995). While some scholars argue for more detailed logic (e.g., Isenberg, 1984; Schoemaker and Russo, 1993), there is widespread agreement that CEOs must use both intuition and reason, even if they are opposed. Without being unplanned, incomplete, and informal, rational thought serves to make the strategy's thinking more reasonable – thorough, complete, and regular. Besides, doing in the innovative aspect aim to promote the strategic plan in becoming more creative, resulting in more unexpected discoveries, innovative notions, and unique solutions.

2.2.1. Strategist's analytical reasoning perspective

The logical thinking school of thought contends that strategic reasoning is primarily a rational endeavor (Andrews, 1987). Proponents of the logical thinking viewpoint say that it closely reflects the way people resolve the trouble issues used by chess masters (Simon, 1987). They also evaluate their aggressive situation in depth, sift through numerous choices, and determine which course of action has the highest possibility of success. As a result, chess masters' thinking processes may be utilized as an example for what goes on in the manager's head.

According to March and Simon (1993), when it comes to designing and implementing a strategy's resolution, rational thought could assist managers to avoid the pitfalls of old habits and daily activities. Daily tasks are pre-programmed scenarios created with intention but absorbed and used mechanically. Daily tasks are unconscious patterns of behavior established over time. Meyer (2007) also stated that managers could eliminate traditional habits and propose improvements to acquiring and maintaining competitiveness by openly defining possible decisions and exposing them to a proper review. Furthermore, rational reasoning can assist in distinguishing both imagination and reality. By assessing the aspects that will influence successes and failures, reasonable reasoning can help to screen out a strategy's purely speculative possibilities. Based on the thought above, the hypothesis proposed in this study is:

H1: *Strategist's analytical reasoning perspective positively affects competitive advantage.*

2.2.2. Strategist's generative reasoning perspective

According to Mason and Mitroff (1981) and Rittel and Webber (1973), the evolutionary thinking paradigm emphasizes the terrible character of strategy issues that are impossible to clearly and accurately characterize, but an infinite number of perspectives could help interpret them.

The procedure of generative reasoning in all strategy reasoning movements is focused on making something more innovative rather than calculating based on a number (Liedtka, 2000). Creating new thoughts is more challenging because managers need to abandon the cognitive comfort of well-established ideas in seeking new thoughts prompted solely by their emotions. They have to be happy to develop, examine, argue, challenge, question, and live between the debris of destroyed certainty without the safety net of new certainty. Managers must like the difficulty of imagining beyond the boundaries, even if doing so disturbs the current system and is not well received by those who have their feet (stuck) on the ground.

Managers must provide a moderately unorthodox mindset according to advocates of the creative thinking viewpoint (Hurst et al., 1989) and innovative tendency (Hamel, 1996). According to Liedtka (2000), all strategy's reasoning actions are directed in a creative way to producing rather than measuring - *creating* rather than *discovering*. Therefore, we hypothesize that: H2: *Strategist's generative reasoning perspective positively affects competitive advantage.*

2.3. Innovation

Schumpeter coined the word *innovation* for the first time at the turn of the twentieth century (Hagedoorn, 1996). Following this, innovations are product, process, and organizational changes that do not always result from new scientific inventions but can also result from a mix of previously existing technology and their relevance in a new environment. The general study is also a source of innovation by Autant-Bernard (2001). As a result, it is feasible to conclude that, according to these definitions, innovation encompasses technical and technological advancements and practical applications and stems from the study.

Since manufacturing and service operations have become increasingly interwoven, it is more important than ever to create a shared structure for examining them rather than keeping the distinction between them (Drejer, 2004). As a result of developments in the finding of service innovation, an integrated structure of the innovation process relevant to both fields and includes all elements of the innovation process has been developed (Gallouj and Windrum, 2009). In line with this trend, the Oslo Manual (OECD, 2018), realizing that the notion of technical product and process innovation did not sufficiently capture a significant portion of service sector innovation, updated prior editions' definitions, and extended the scope of what is considered innovation. The Manual specifies four categories of innovation, each of which encompasses a large variety of alterations in a company's operations and may be used in both manufacturing and service industries (OECD, 2018): (i) product innovation, which entails the creation of new goods and services or substantial enhancements to existing ones; (ii) process innovation, which entails noteworthy alterations in manufacturing and delivery techniques; (iii) modification in product design and packing, product promotion and positioning, and pricing techniques are all examples of marketing innovation; and (iv) organizational innovation, which refers to introducing of a new organizational way in a company's business operations, workplace association, or external connections.

2.3.1. Product innovation

According to Yusof et al. (2015), competition is defined as the transition of understanding into new processes, products, and services. Innovation may also be described as incorporating new ideas into goods, processes, or other parts of a business. The goal of innovation is to improve the process of turning an invention into something we can utilize. New goods, new manufacturing methods, new supply sources, new exploitation, new markets, and new ways to run the business are the five forms of innovation.

Yeşil et al. (2013) describe innovation in a variety of ways, with the majority of them focusing on improving technology or developing productiveness. The ability

of innovation is defined as a company's capacity to improve overall performance through various sorts of innovation. To create new items, provide new services to customers, and assign new products to consumers, innovation must employ manufacturing and marketing technologies (Yeşil et al., 2013). According to Panigrahy and Pradhan (2015), innovation is a new concept of recombining previous ideas that are unique and may be produced domestically. The definition of a company's innovation is the creation or adoption of a new concept or new actions that may be turned into new goods or services, the manufacture of new technology, any surgical technique, or a new method or new management plan. Consequently, the following hypotheses are proposed:

H3a: Strategist's analytical reasoning perspective positively affects product innovation.

H4a: Strategist's generative reasoning perspective positively affects product innovation.

2.3.2. Process innovation

According to West and Anderson (1996), the extent to which a company adds new ideas or enhancements to procedures or organizational practices is known as process innovation. It is unique to each company and is regarded as a critical performance indicator (Damanpour, 2010; Piening and Salge, 2015). The procedure of innovation literature, however, has two significant drawbacks. The first is that empirical information is scarce on the impact of process changes on productivity. The second issue is the uncertain outcome (Chiva et al., 2013; Piening and Salge, 2015), beneficial impact (Murat and Baki, 2011; He and Wong, 2004); as well as an unhelpful impact (Mavondo et al., 2005) and both helpful and unhelpful effects (Baer and Frese, 2003).

Process innovation has an inner emphasis and generally involves strategies for creating and selling products or services. It may be expressed, for instance, through lean product development procedures or performance management strategies and focuses on changes in productivity and efficiency (Piening and Salge, 2015). Process innovation, in contrast to product innovation, has received little attention. Nonetheless, process innovations, as opposed to product innovations, are conceivable in nearly all sectors, and process innovations can affect productivity (Jiménez-Jiménez and Sanz-Valle, 2011). Process innovation, for example, may provide benefits that are hard for rivals to detect and reproduce (Damanpour, 2010). Piening and Salge (2015) even argue that process innovation is one of the most significant competitive sources for businesses in active or rapid sectors due to its constant contribution to enhancing technical and administrative procedures. Consequently, the following hypotheses are proposed:

H3b: *Strategist's analytical reasoning perspective positively affects process innovation.*

H4b: *Strategist's generative reasoning perspective positively affects process innovation.*

2.3.3. Marketing innovation

Marketing innovation is defined as creating substantial changes in some marketing components such as product, pricing, advertising, delivery, and marketplace. It might be based on product variety, advertising, delivery, marketplace, or expenses, such as pricing (Higgins, 1995). Changes in the environment in which goods and services are launched in the market are analyzed (Tidd and Bessant, 2005). So, marketing innovation is concerned with applying new approaches, resulting in substantial changes in product creation, packing, advertising, branding, and even price. As a result, marketing innovation tries to satisfy customers' demands by creating new markets and repositioning a company's product in the market, to increase sales (OECD, 2018). Consequently, the following hypotheses are proposed:

H3c: *Strategist's analytical reasoning perspective positively affects marketing innovation.*

H4c: *Strategist's generative reasoning perspective positively affects marketing innovation.*

2.3.4. Organizational innovation

Many fields, including leadership, commerce, political science, and marketing, have investigated organizational innovativeness. According to Ries and Trout (1981), innovation is a method of education. Gopalakrishnan and Damanpour (1997) concluded that innovation is defined as anything new. According to Waterman and Peters (1982), innovation is a method through which businesses adapt to a range of environmental alterations. According to Rogers (1995), innovation is defined as a new concept, item, technique, or service implemented in companies. Consequently, whereas some academics describe innovativeness as the acceptance of new concepts, techniques, or services (Subramanian and Nilakanta, 1996), others define it differently. For example, Vigoda-Gadot et al. (2005) consider innovativeness to be a multifaceted organizational feature. Organizational innovativeness is defined as having five factors: invention, adventurousness, flexibility to change, goal clarity, and proactivity.

There are several categories of organizational innovativeness in the material. Many scholars propose an innovation separation. Subramanian and Nilakanta (1996),

for example, divide organizational innovation into two groups: (1) technological innovation, which includes goods, services, and procedures; and (2) administrative innovation, which includes organization formation, administrative procedures, and schedule.

Pacharn and Zhang, 2006 distinguish two forms of innovation: organizational innovation and technological innovation. Indeed, academics such as Desouza et al. (2007) contend that two types of innovation occur in a business setting (i.e., user innovations and organizational innovations). Furthermore, many studies categorize organizational innovation into three groups. According to Johne (1998), there are three types of innovation: market innovation, product innovation, and administration innovation. On the other hand, Popadiuk and Choo (2006) divide organizational innovation into three categories: technological innovation, market innovation, and administrative innovation. Consequently, the following hypotheses are proposed:

H3d: *Strategist's analytical reasoning perspective positively affects organizational innovation.*

H4d: *Strategist's generative reasoning perspective positively affects organizational innovation.*

2.4. The relationship of innovation between strategist's cognitive perspectives and competitive advantage

According to Meyer (2007), strategists should be highly appropriate on the top trends in the marketplace, spotting the latest chances and shifting situations to compete with their competitors. Thinking strategically concentrates on comprehending and directing the tomorrow; thus, strategists must be able to question their assumptions and alter their thoughts. They might devise new methods that are both imaginative and viable considering the changing realities.

Meyer (2007) also stated that there is an obvious necessity for both analytical and intuitive thinking. This puts managers in the problematic situation of combining two potentially incompatible ways of reasoning in one procedure of strategy's thinking. The use of rational reasoning can make strategic planning more coherent, while on the other side, generative thinking supports the strategic reasoning process in becoming more innovative. The significant difficulty in achieving an equilibrium of those opposing mindsets is that the strategic reasoning process should be essentially logical or considerably more creative. Furthermore, Fréchet and Goy (2017) examined in their research is to improve knowledge of strategy formalization in the innovation process. They proposed the argument over the benefits of strategic thinking may have been favorable to innovation.

According to Urbancova (2013), in numerous ways, innovation helps to achieve a competitive advantage. The following are the most significant considered aspects of

innovations: (i) a significant connection between high productivity in the marketplace and the product development; (ii) developing latest products give the assistant to companies retain the segmentation in the marketplace and increase profits; (iii) the growing aim to a priceless value such as designation, product standard; (iv) capability to replace out-of-date items or goods to make the production's life shorter; and (v) the innovating in the procedure help to shorten the duration in make a product and accelerate the developing of the latest items. In sum, we assume that:

H5a: Product innovation positively affects competitive advantage.

H5b: Process innovation positively affects competitive advantage.

H5c: Marketing innovation positively affects competitive advantage.

H5d: Organizational innovation positively affects competitive advantage.

Professionals and academicians also proposed a wide range of techniques and strategies that companies should use to improve their chances of favorable outcomes with innovation. Nonetheless, the function of these techniques and strategies is still up for debate. It is about the overall impact of the strategist's cognitive thinking on a company effectiveness, which has sparked a long-running discussion. In general, the adoption of strict guidelines, methods, and attitudes is referred to as a strategist's cognitive thinking (Sivadas and Dwyer, 2000; Vlaar et al., 2006). For years, scientists have been able to figure out which one benefited or hindered an organization's effectiveness, especially innovation and competitive advantage.

Martín-de Castro et al. (2013) also mentioned that technology innovation is critical for establishing and maintaining a competitive advantage for an enterprise. Accordingly, spending on investigation, innovation, and new technology launches are the key factors in attaining market dominance. Autant-Bernard et al. (2013) also emphasized the relevance of localized improvement, arguing that organizations must have unique marketing tactics and promote information flows from and to them. This is also advocated in Autant-Bernard (2001), Avadikyan et al. (2016), and Noruzy et al. (2012).

Based on previous studies, organizations' activities in innovating have a strong impact on competitive advantage built on unique talents and capabilities. Increasing competitive advantage through innovation entails generating less expensive goods and a greater standard than the competition. Therefore, the author proposes the hypotheses below:

H6: The effect of strategist's analytic reasoning perspective on competitive advantage is mediated by innovation.

H7: The effect of strategist's generative reasoning perspective on competitive advantage is mediated by innovation.

3. Research methodology

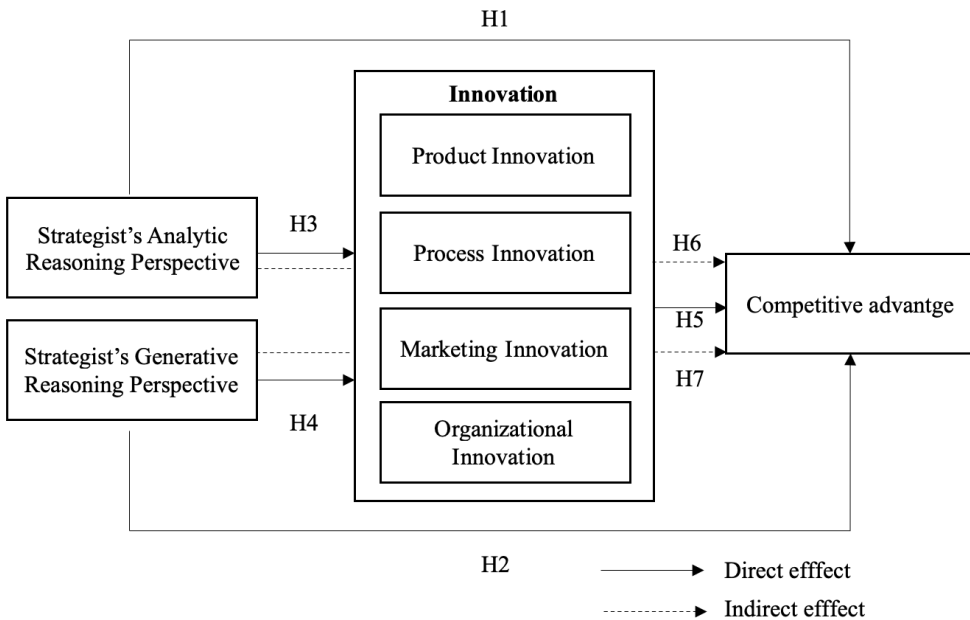
This section presented the proposed model along with the research hypotheses aimed to introduce the research process, methodologies used to evaluate the scales and quantitative research that will be utilized to collect data and analyse the research findings in the following chapter.

3.1. Conceptual framework

From the above developed hypotheses, the authors propose the research model (Figure 1), which is classified up into various relationships, particularly:

- Direct effects: H1, H2, H3, H4, H5
- Mediating effects: H6, H7

Figure 1. Conceptual framework



Source: Authors’ construction

3.2. Research methods

This research conducts quantitative research methods, which are carried out in two stages:

In the first stage, this research was based on integrating previous theoretical backgrounds to propose a new research model from which preliminary measurement scales were proposed. To ensure the validity of scale measurements and the understanding of interviewees, in-depth interviews and focus groups were required to verify the sentiment and language supplied in this preliminary scale. In this stage, the authors asked participants to read all the questionnaires and give their comments, then discuss the content before answering survey questions. Subsequently, the authors updated the original measurement scale and conducted an official survey. Next, before the official survey was applied, the questionnaires were conducted by a pre-test to identify and address any design issues. For the pretest, 50 respondents were chosen whose traits were sufficiently comparable with those of the questionnaire survey. Following the findings of the pre-test, the questionnaire was then modified and published.

In the second stage, the quantitative methodology was applied through an official self-administered questionnaire. To evaluate the validity of the research model and hypotheses, the authors extended the sample size to 382 observations. After the official questionnaire had been developed from the results of the qualitative research, the authors conducted official research by sending the questionnaire to State Own, FDI, and Private Companies in Ho Chi Minh City, Vietnam. Collected data will be encrypted and cleaned, then processed using Smart PLS software.

In this study, the authors aim to employ Smart-PLS analytical software (Hair et al., 2019) to facilitate the categorization and analyzing of primary data information acquired relevant to the study objective which is often used in social and economic research studies. Besides, the author uses Descriptive statistics, Cronbach's Alpha reliability test, Discriminant validity, Cross-loadings and Structural Equation Modeling (SEM).

4. Empirical data and analysis

This section focuses on the interpretation of data on the relationships between a strategist's cognitive perspective of reasoning, innovation, and competitive advantage in the context of State own, FDI, and private companies in Vietnam, including descriptive statistics, reliability, and validity analysis as well as SEM analysis through smart PLS software, therefore, the discussion of the results of the process of evaluating the hypotheses formulated at the beginning of the research.

4.1. Data collection and the sample

According to Hair et al., 2010, the author gave the sample formula: $N = 5 * \text{Items}$ (where N is the number of observations and items is the number of questions in the scale). With this formula, the minimum sample size for using EFA is 50 with a ratio of 5: 1, meaning that for every 1 measurement variable, a minimum of 5 observations will be required. Therefore, there are total 35 items from seven constructs in this study, which means we took at least $5 * 35 = 175$ observations.

A standardized questionnaire was developed to gather data in order to evaluate the proposed study model and hypothesis development. Data gathering techniques include delivering questionnaires to respondents and creating documentation or copies of the sources of data. To find suitable participants, we used a variety of convenient sampling, maximum variation sampling, and snowball sampling techniques. To guarantee that the sample reflects a wider category in terms of skill level, professional experience, position, and so on, we employed maximum variation sampling. Authors also used snowball sampling technique to employ the respondents through our relationships.

The aim of this research is to investigate the field of state-owned companies, FDI, and private companies in Ho Chi Minh City, Vietnam. Based on our accounts with the list of members in Masterclasses at the International University in Vietnam and Ton Duc Thang University in Vietnam, they are also the leaders, supervisors, and managers in State Own, FDI, and Private Companies in Ho Chi Minh City, Vietnam. By this, we aim to take a survey with the company owner, chief executive officer, vice director, management board assistant, and head of the department in those companies. Furthermore, we could ask all the members in our classes to bring the questionnaires to their upper level in their company then we will follow up with the respondents by sending them reminder emails for collecting enough respondents. Furthermore, the authors tried to join some trade shows and trade fairs organized at SECC (Saigon Exhibition and Convention Center) in District 7, and TBECC (Tan Binh Exhibition and Convention Center) in Tan Binh District in Ho Chi Minh City. By visiting all the companies which joined in trade shows and trade fairs, we could carry out some direct interviews at the site as well as collect some name cards from the exhibition to enable sending the survey through emails. We also tried to make phone calls after sending emails to check whether they were received, and whether they fully completed the questionnaires.

In this research, the authors sent more than five hundred surveys. After reducing error data and inadequacies, the author used a sample size of 382 surveys with response's rate was almost 76%.

4.2. Measurement scale

The survey includes two parts:

Part 1: Demographic data such as gender, educational level, position, type of company and type of industry will be conducted to collect on respondents.

Part 2: In the second part, a question table is listed for participants to rate the agreement based on the 7-point Likert scale that are: 1. *strongly disagree*, 2. *disagree*, 3. *somewhat disagree*, 4. *neutral*, 5. *somewhat agree*, 6. *agree*, and 7. *strongly agree*.

A measurement scale that contains 35 items from seven constructs was collected based on several studies. First, a strategist's cognitive perspective of reasoning includes two constructs that are measured based on the study of Meyer (2007). To be precise, a strategist's analytic reasoning perspective includes 06 items; a strategist's generative reasoning perspective includes 06 items.

Second, innovation, which includes 04 constructs, is measured based on the study of Nieves et al. (2014). In particular, product innovation has 05 items; process innovation has 05 items; marketing innovation has 04 items; and organizational innovation has 04 items.

Third, competitive advantage is measured based on 05 items according to the studies of El-Garaihy et al. (2014), Saeidi et al. (2015) and Shore et al. (1995)

4.3. Data analysis

After data collection, the results of the description of the research sample are shown in Table 1.

Table 1: Sample characteristics

	Characteristics	Frequency	Percentage (%)
Gender		382	100
	Male	239	62.6
	Female	143	37.4
Educational Level		382	100
	High School and Vocational School	14	3.7
	College level	29	7.6
	University level	281	73.6
	Master level	47	12.3
	Doctoral level	11	2.9
Position		382	100
	Company owner	88	23.0
	Chief Executive Officer	47	12.3
	Vice Director	44	11.5
	Management Board Assistant	53	13.9
	Head of Department	150	39.3
Type of company		382	100
	State Own Company	132	34.6
	FDI Company	35	9.2
	Private Company	214	56.0
	Other	1	0.3
Type of industry		382	100
	Trade and Service	211	55.2
	Production	99	25.9
	Real Estate	33	8.6
	Others	39	10.2

Source: Author's calculation

The descriptive analysis in Table 1 suggested that about 62.6 percent of the interviewees were male, and 37.4 percent of the respondents were female. Regarding the type of company in those surveys, there are 214 (56.0 percent) private companies, 132 (34.6%) State Own companies, 35 (9.2 percent) FDI companies, and the other 1 (0.3 percent). According to the statistic, it is evident that the population of the Trade and Service Industry has the highest number at 55.2 percent while the production industry is noticeably lower at 25.9 percent and the Real estate industry displays the lowest at 8.6%; the others at 10.2 percent.

First, the author aims to test the reliable and valid constructs to give some solid confirmation for measurement scales. Composite reliability (CR) is a form of consistency dependability similar to Cronbach's alpha shown in Table 2. The CR and Cronbach's Alpha of all constructs were higher than 0.7, which met the rules

of thumb of Hair et al. (2013). Hair et al. (2010) also proposed that items having a minimum factor loading of 0.6 will be acceptable. Besides, the convergence's validity, assessed by using the average variance extracted (AVE), exceeded 0.5 in all variables (Fornell and Larcker, 1981). Table 2 shows that the factor loadings and the AVE of all variables were sufficient.

Table 2: Measurement Model Evaluation

Constructs	No. Items	Factor Loadings	Cronbach's Alpha	CR	AVE
Strategist's Analytic Reasoning Perspective (SARP)	6	0.666-0.836	0.841	0.887	0.613
Competitive Advantage (CA)	5	0.730-0.776	0.746	0.840	0.568
Marketing Innovation (MI)	4	0.737-0.824	0.777	0.857	0.599
Organizational Innovation (OI)	4	0.748-0.835	0.793	0.866	0.618
Process Innovation (PCI)	5	0.671-0.844	0.845	0.890	0.619
Product Innovation (PDI)	5	0.739-0.791	0.831	0.880	0.595
Strategists' Generative Reasoning Perspective (SGRP)	6	0.656-0.808	0.673	0.801	0.503

Source: Author's calculation

To measure the discriminatory validity, the cross-loadings index was applied, in which the opposition construct was not higher than the above indicator's loading (Hair et al., 2012). The square root of the AVE of every variable should have overtaken the number of the inter-correlations between the variable and others. Table 3 shows the number of variables dedicated to the discriminated validity of all the variables.

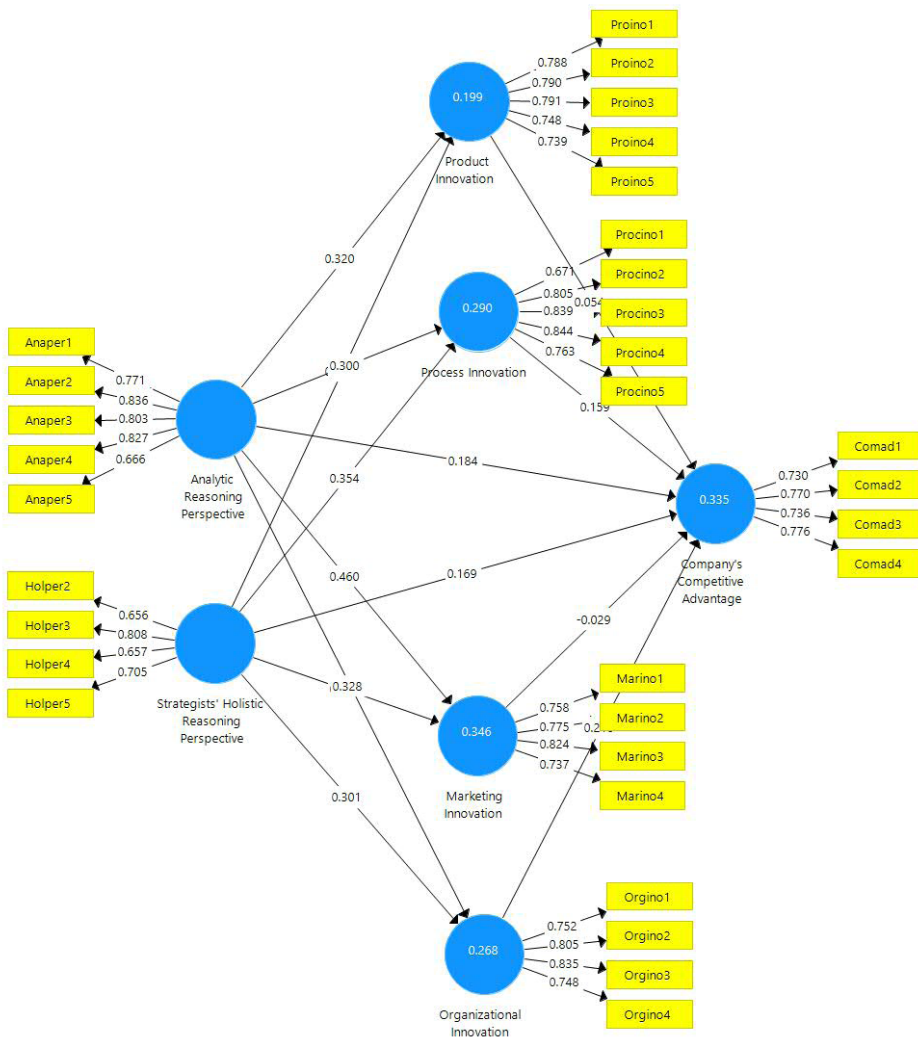
Table 3: Discriminant Validity Coefficients

		SARP	CCA	MI	OI	PI	PROI	SGRP
Analytic Reasoning Perspective	SARP	0.783						
Competitive Advantage	CA	0.410	0.753					
Marketing Innovation	MI	0.544	0.430	0.774				
Organizational Innovation	OI	0.434	0.488	0.690	0.786			
Process Innovation	PCI	0.424	0.479	0.692	0.674	0.787		
Product Innovation	PDI	0.397	0.420	0.600	0.641	0.729	0.772	
Generative Reasoning Perspective	SGRP	0.352	0.403	0.401	0.417	0.460	0.331	0.709

Source: Author's calculation

To examine the model hypotheses, we run the non-parametric bootstrapping with 2,000 samples in Smart-PLS (Wetzels et al., 2009) as shown in Figure 2. The statistic in Table 4 shows that all the path coefficients are acceptable except for H5a and H5c. The regression coefficient shows in Table 4 with H1, H2, H3a, H3b, H3c, H3d, H4a, H4b, H4c, H4d, H5b, H5d, H6, H7 at level P-value < 0.05, therefore those hypotheses are supported. Except for two hypotheses, all the hypotheses in the research model are supported. That means we may conclude that there is a relationship between strategists' cognitive perspective of reasoning, innovation, and competitive advantage in the context of State own, FDI, and, private companies in Vietnam.

Figure 2: Results of the structural model



Source: Author's elaboration

Table 4: Path coefficient and hypothesis testing

Hypothesis	Relationship	Path Coefficient	P Values	Conclusion
H1	SARP → CA	0.183	0.001	Supported
H2	SGRP → CA	0.170	0.001	Supported
H3a	SARP → PDI	0.320	0.000	Supported
H3b	SARP → PCI	0.300	0.000	Supported
H3c	SARP → MI	0.460	0.000	Supported
H3d	SARP → OI	0.328	0.000	Supported
H4a	SGRP → PDI	0.218	0.000	Supported
H4b	SGRP → PCI	0.354	0.000	Supported
H4c	SGRP → MI	0.239	0.000	Supported
H4d	SGRP → OI	0.301	0.000	Supported
H5a	PDI → CA	0.054	0.445	Not Supported
H5b	PCI → CA	0.159	0.041	Supported
H5c	MI → CA	-0.030	0.676	Not Supported
H5d	OI → CA	0.217	0.002	Supported
H6	SARP → Innovation → CA	0.122	0.000	Supported
H7	SGRP → Innovation → CA	0.126	0.000	Supported

Source: Author's calculation

The purpose of this research is to examine the relationship between a strategist's cognitive perspective of reasoning, innovation, and competitive advantage. With the unsupported results in hypotheses H5b and H5c, the author can conclude that there is a non-relationship between product innovation, marketing innovation, and competitive advantage in the context of state own, FDI, and, private companies in Viet Nam. This result could help those companies pay some attention when strategists make plans for innovating products and marketing in their future strategies.

Based on the results in Table 4, those hypotheses support the previous studies of Isenberg (1984), Schoemaker and Russo (1993), Meyer (2007). Even if logical and generative thinking is opposed, CEOs are widely agreed that they must employ both strategist's reasoning. Therefore, we have enough grounds to conclude the following relationships.

H1: Strategist's analytical reasoning perspective is positively related to competitive advantage ($\beta = 0.183$; $p < 0.01$). That means a strategist's analytic thinking could help the organization achieve competitiveness to formulate strategies that require

strong logical thinking, and managers should be highly rational in developing strategies for long-term development.

H2: Strategist's generative reasoning perspective is positively related to competitive advantage ($\beta = 0.17$; $p < 0.01$)

H3a, c, b, d: Strategist's analytical reasoning perspective is positively related to product innovation ($\beta = 0.32$), process innovation ($\beta = 0.3$), marketing innovation ($\beta = 0.46$) and organizational innovation ($\beta = 0.328$). For more precise, the statistic shows that the relationship between strategist's analytical reasoning perspective and marketing innovation is the strongest with the path coefficient is 0.46. That means the strategist's analytical thinking plays the most indispensable role in marketing innovation than product, process, and organizational innovation.

H4a, b, c, d: Strategist's generative reasoning perspective is positively related to product innovation, process innovation, marketing innovation, and organizational innovation. Influential leaders rely primarily on their instinctive abilities to comprehend strategies' concerns, and crafting plans necessitates strong innovative reasoning that leads to organizational innovation.

H5a, b, c, d: It is evident from the information provided that process innovation (*H5b*: $\beta = 0.159$; $p < 0.05$) and organizational innovation (*H5d*: $\beta = 0.217$; $p < 0.01$) significantly impact on competitive advantage. This result also confirms with the studies of Autant-Bernard (2001), Noruzy et al. (2012) and Martín-de Castro et al. (2013). However, the impact of product innovation (*H5a*: $\beta = 0.054$; $p > 0.01$) and marketing innovation (*H5c*: $\beta = -0.03$; $p > 0.01$) on competitive advantage are not accepted. Therefore, it is noticeable that changing and developing the process and organization's structuring would better improve employee commitment, knowledge, and competence. However, actions to revolutionize product and marketing in terms of a new or improved good or service, the designing of products, the production of placement, packaging, promotion, and pricing will not help organizations enhance competitiveness. Those non-confirmed hypotheses could be explained by the period of collecting data, since the period of the COVID-19 pandemic might have notably affected numerous organizations all around the world, especially in Vietnam. This period witnessed a devastating decrease in most corporations' operations and businesses; consequently, they could not be sufficient to concentrate on product and marketing development as well.

The results also confirm the mediating impact of innovation between the relationship of strategist's analytic reasoning perspective, a strategist's generative reasoning perspective and competitive advantage through (*H6*: $\beta = 0.122$; $p < 0.01$; *H7*: $\beta = 0.126$; $p < 0.01$). These results also suggest that both logical views and creative views help make the strategy more reasonable, thorough, comprehensive, as well as helps to make the strategic reasoning process producing more unorthodox insights, imaginative ideas, and unique solutions.

5. Results and discussions

In this section, both theoretical and practical implications are presented. The study's findings effectively provide substantial evidence that both strategist's cognitive perspectives in terms of logical thinking and intuitive thinking positively affect product innovation, process innovation, marketing innovation, and organizational innovation. This phenomenon implies various managerial implications regarding how organizations can successfully increase their creativity in increasing their leader's cognition in management. Managers should be highly rational in developing strategy as well as strategizing should be driven by creativity and supported by analysis.

5.1. Theoretical implications

In terms of theory, our research significantly supports the field of strategy-as-practice by utilizing an added logical perspective to comprehend numerous levels of strategic processes. To be precise, this research successfully brings to the scientific world a new research model that can help understand the mediating effects of innovation to comprehend better the relationships between and the practical methods of a strategist's cognitive perspective in terms of logical thinking and generative thinking and competitive advantage. There is no previous study in the scientific world that demonstrated that a leader's intuition and analysis thinking affect innovation and how they behave to increase their competitiveness. Only a few previous publications sufficiently prove the relationship between how innovation affects competitive advantage (Autant-Bernard, 2001; Noruzy et al., 2012; Urbancova, 2013; Martín-de Castro et al., 2013; Avadikyan et al., 2016). This research adds more aspects in terms of the role of leaders' thinking in pursuit of that leader's cognitive also plays an indispensable role to help businesses enhance their creativity as well as competitive advantage. That is to say, our research donates a wide range of contributions to the scientific world on a strategist's cognitive perspective, innovation, and field in several different ways.

5.2. Practical implications

This research reflects several implications to help business executives and managers more outstandingly oversee and manage their organizations, particularly in the setting of Vietnam. First, these results suggest that both logical views and creative views help make the strategy more reasonable, thorough, and comprehensive, as well as help to make the strategic reasoning process produce more unorthodox insights, imaginative ideas, and unique solutions. Therefore, it could be a piece of strong advice to Vietnamese businesses to promote generative reasoning rather than analytical reasoning to encourage employees' innovation and business advantages. Nobody could dispute the influence of data and statistics in the technological era we are living in. In contrast, innovative process based on leaders'

knowledge and intuition has still been favored over logical thought based on facts and strict procedures, according to research findings from the Vietnam context. The innovative viewpoint of a leader helps employees as well as corporations to generate, utilize, renovate, and practice creativity to build the fundamental skills necessary for improving business advantages.

Second, the statistic shows that the relationship between a strategist's analytical reasoning perspective and marketing innovation is the strongest. That means the strategist's analytical thinking plays the most indispensable role in marketing innovation than product, process, and organizational innovation. It could be beneficial advice for Vietnamese managers to use more statistical aspects rather than their experiences in the process of implementing an innovative marketing strategy that involves substantial adjustments to product positioning, marketing, price, or aesthetics into practice.

Third, as a conclusion of the findings of this research, it acquired implications as follows: product innovation and marketing innovation have not been able to provide a competitive advantage in the context of FDI, state-owned companies, and private companies. For that matter, 55.2 percent of companies that belong to the trade and service industry could mean that companies working in the trade and service industry should be more concentrated on innovating the procedure instead of the product and marketing activities.

Last but not least, the mediating effect reported in this study imply that managers and strategists who have both creative and analytical thinking could make organizational innovation in term of creating innovative products, procedures, marketing, and organizational activities could lead the outstanding competition in the marketplace. Strategists and managers should be aware of boundary conditions that can constrain the positive impact of creativity on innovation. The results show that the percentage of males and females are almost equal, but the educational level allocated at the university level, which means creating innovation in organizations much more requires the qualification of a strategist.

6. Conclusions

There is no argument that leadership thinking has a huge role in not only determining employee behavior in terms of employee creativity but also creating business advantages. Business advantages are impacted by management thinking, which forms corporate culture and directly influences employees' behaviors in the organizations. Corporate culture must be raised by leaders through communication and their career path. Moreover, in the context of Vietnamese business in our survey, both holistic and analytic thinking of managers have significant effects on business advantages through innovation. That explains why renovating the thinking of every individual in

the organization, starting with the top executives and promoters of the corporate, is essential to altering the corporation to achieve the desired business advantages.

Although the study has provided much valuable knowledge, there are still many limitations in the implementation process to complete this research, such as the time restraint, the number of samples to collect, the literature review, and statistical analyses.

This research pays attention to investigating the relationship between those factors in 03 types of industry (Trade and Service, Production, and Real Estate) in a specific country (Vietnam). The findings cannot be generally applied to other industries such as tourism and hospitality, hospital, logistics, and different geographical areas. Moreover, this research merely considers the moderating roles of the innovation variable without considering other variables. For that reason, this study fails to enumerate all the potential factors of all the mediating roles between a strategist's cognitive perspectives of thinking with a competitive advantage. However, the overall structure and process can be employed in an analysis and discussion in other areas. A possible path for future research is its repetition in other geographical/cultural settings to explore the relationships identified in this study.

The research findings reveal that product and marketing innovation did not directly influence competitive advantage. It could be explained due to the effects of the COVID-19 pandemic since the COVID-19 pandemic might have notably affected business performance in numerous organizations worldwide, especially in Vietnam. Further studies should conduct the data analysis in the new normal situation to see whether product innovation and marketing innovation may implement the competitive advantage in addition to the corporation's performance.

Furthermore, this study only focuses on the strategist's cognitive perspective of thinking to innovation and competitive advantages. Besides, the best practices in a strategist's cognitive thinking might help improve corporate performance in terms of financial performance, technological performance, and environmental performance. It might contribute to the scholars to acquire an in-depth acknowledgment of various issues occurring in the corporation in implementing the strategist's cognitive perspective of thinking and innovation.

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Kognitivne perspektive, inovativnost i konkurentska prednost stratega: empirijska studija u Vijetnamu

Mai Ngoc Khuong¹, Nguyen Quoc Loc², Nguyen Ngoc Duy Phuong³,
Nguyen Nhu Ty⁴

Sažetak

Glavni cilj ove studije je istražiti odnos između intuitivnog i analitičkog razmišljanja stratega, inovativnosti i konkurentske prednosti poduzeća. Ova studija ne samo da predlaže novi model akademskom svijetu, već također pruža empirijsko istraživanje izravnog i neizravnog učinka analitičke perspektive razmišljanja stratega i perspektive generativnog razmišljanja stratega o inovacijama i konkurentske prednosti, kao i o posredničkoj ulozi inovacije između kognitivne perspektive razmišljanja stratega i konkurentske prednosti poduzeća. Ovim istraživanjem provedena je anketa s 382 uzoraka u državnim tvrtkama, izravnim stranim ulaganjima i privatnim tvrtkama u Vijetnamu. Modeliranje strukturnih jednadžbi primijenjeno je putem pametnog PLS-a za analizu valjanih podataka. Rezultati pružaju bitne dokaze o značajnim odnosima između kognitivnih perspektiva razmišljanja, inovativnosti i konkurentske prednosti stratega u kontekstu državnih poduzeća, izravnih stranih ulaganja i privatnih tvrtki u Vijetnamu. Osim toga, nalazi također upućuju na ne postojanje veze s izravnom učinkom ni između inovacije proizvoda i konkurentske prednosti niti između marketinške inovacije i konkurentske prednosti. Štoviše, rezultati istraživanja upućuju na različite menadžerske implikacije o tome kako organizacije uspješno povećavaju svoju konkurentsku prednost povećanjem kognitivnih sposobnosti svog lidera u upravljanju.

Ključne riječi: perspektiva analitičkog razmišljanja stratega, perspektiva generativnog razmišljanja stratega, inovacija, konkurentska prednost

JEL klasifikacija: M12, O15, O30

¹ Docent, School of Business, International University – Viet Nam National University, Ho Chi Minh City, Quarter 6, Linh Trung ward, Thu Duc district, Ho Chi Minh City, 700000, Viet Nam. Znanstveni interes: razvoj turizma, ponašanje turista, organizacijsko ponašanje, ponašanje potrošača, javna politika. E-mail: mnkhuong@hcmiu.edu.vn.

² Doktorand, School of Business, International University – Viet Nam National University, Ho Chi Minh City, Quarter 6, Linh Trung ward, Thu Duc district, Ho Chi Minh City, 700000, Viet Nam. Lecturer, Faculty of Business Administration, Ton Duc Thang University, 19 Nguyen Huu Tho Street, Tan Phong ward, District 7, Ho Chi Minh City, 700000, Viet Nam. Znanstveni interes: organizacijsko ponašanje, inovativnost, strateški menadžment, održivi razvoj, upravljanje ljudskim resursima. E-mail: nguyenquocloc@tdtu.edu.vn.

³ Docent, School of Business, International University – Viet Nam National University, Ho Chi Minh City, Quarter 6, Linh Trung ward, Thu Duc district, Ho Chi Minh City, 700000, Viet Nam. Znanstveni interes: strateški menadžment, organizacijsko ponašanje, ponašanje kupaca, javno upravljanje, kvaliteta usluge. E-mail: nndphuong@hcmiu.edu.vn.

⁴ Docent, School of Business, International University – Viet Nam National University, Ho Chi Minh City, Quarter 6, Linh Trung ward, Thu Duc district, Ho Chi Minh City, 700000, Viet Nam. Znanstveni interes: poslovno upravljanje, evaluacija, motivacija. E-mail: nhutynguyen@hcmiu.edu.vn.

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Martin, C.L. (1998) “Relationship Marketing: a High-Involvement Product Attribute Approach”, *Journal of Product and Brand Management* [Internet], Vol. 7, No. 1, pp. 6–26. Available at: <<http://www.apmforum.com/emerald/marketing-research-asia.htm>> [Accessed: October 3, 2002]

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Osim tradicionalnog fokusa na empirijske radove, časopis poziva autore da dostave teorijske radove koji bi trebali pokriti nedostatak temeljnih istraživanja i meta-analize literature s ciljem pružanja temelja za kvalitetnija empirijska istraživanja, kao i razvoj novih ideja i uvida u ekonomskoj teoriji i praksi. Posebno pozivamo autore s radovima s visokom razinom teorijske argumentacije (ali za većinu ljudi razumljive) s jasnom analizom / porukama / preporukama usmjerenom na preporuke i buduća istraživanja; studije koje se usredotočuju na međuovisnost različitih, osobito aktualnih, ekonomskih kretanja; studije usmjerene na trans-disciplinarni i interdisciplinarni karakter ekonomskih analiza (tehnička, pravna, socijalna, ekonomska i druga područja).

Časopis crpi metodologiju za teorijske radove iz časopisa Journal of Economic Perspectives (<https://www.aeaweb.org/journals/jep>), sa sličnim ciljevima: sintetizirati i integrirati naučene lekcije iz najrelevantnijih područja i dilema suvremene ekonomske teorije i prakse; prezentirati ekonomske analize vezane za dileme javnih politika; poticati međusobnu razmjenu ideja među pojedinim znanstvenim područjima; ponuditi čitateljima dostupan izvor za najsuvremenija ekonomska promišljanja i predložiti smjerove za buduća istraživanja. Fokus teorijskih članaka trebao bi biti na razumijevanju središnjih ekonomskih ideja, koje su postojeće dileme i neistražena područja, zašto su navedena pitanja posebno važna, koja su najnovija dostignuća i koje aspekte treba ispitati.

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Sadržaj članka

Rad treba biti relevantan za međunarodnu znanstvenu i stručnu javnost s jasno naznačenim ciljevima i rezultatima istraživanja, zaključkom, referencama u tekstu i bibliografskim jedinicama na kraju rada. Ideje u radu moraju biti originalne i trebaju značajno doprinosti razvoju predmeta istraživanja, a metodologija mora biti jasno opisana.

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Članak mora zadovoljavati sve tehničke propozicije navedene u ovim uputama.

Stil i organizacija teksta

Autori se obvezno moraju pridržavati znanstvene metodologije prezentacije građe u pisanju tekstova koja je uobičajena u znanstvenim publikacijama (“Harvard style”). To zahtijeva sljedeći pristup:

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Naslov je najvažniji sažetak rada koji mora održavati sadržaj i svrhu rada. Ne smije biti “opisan” niti sadržavati riječi poput “analiza” ili “metoda”, i sl. Građu se raspoređuje u dijelove kao što su:

- *Sažetak (Abstract)* – ispod naslova
- *Gljučne riječi*
- *JEL klasifikacija*.

Iza toga slijedi glavni dio rada podijeljen u odlomke:

- *Uvod*
- *Pregled literature*
- *Metodologija/metoda/model/koncepcija analize* (treće poglavlje)
- *Empirijski podaci (dokumentacijska podloga) i analiza* (četvrto poglavlje)
- *Rezultati i diskusija* (peto poglavlje)
- *Zaključci* (šesto poglavlje).

(2) Sadržaj pojedinih dijelova prezentirane građe:

a. Sažetak – ispisuje se u 100-250 riječi, a obvezno treba sadržavati:

- utvrđeni cilj istraživanja,
- metodu/model/koncepciju analize,
- glavni rezultat istraživanja (analize),
- temeljni zaključak istraživanja.

Sažetak se ne smije pisati u odlomcima!

b. Ključne riječi – moraju odražavati suštinu sadržaja rada, a navodi se do pet takvih riječi.

c. JEL klasifikacija – autor svoju temu mora razvrstati sukladno kodu časopisa The Journal of Economic Literature (JEL).

d. Uvod – sadrži definiranje problema i predmeta istraživanja s pozivom na recentnu literaturu odnosno rezultate istraživanja. Taj se dio može istaknuti i u posebnoj, tj. 2., poglavlju kao *Literature review*. Pri kraju uvodnog dijela treba utvrditi radnu pretpostavku (hipotezu) istraživanja o kojoj se treba očitovati (kasnije) na početku poglavlja *Zaključak*. *Uvod* treba završiti s naznakom organizacije teksta.

e. Pregled literature – prethodi istraživačkom dijelu, a pruža čitateljima pregled referentne literature s ključnim točkama dosadašnjih spoznaja

temeljenih na relevantnim rezultatima aktualnih istraživanja. Pregled literature ne smije biti taksativno navođenje prethodnog znanstvenog doprinosa, već autori trebaju izvršiti sintezu dosadašnjih istraživanja kako bi dokazali opravdanost teorijskog i empirijskog doprinosa vlastitog rada.

- f. Metodologija/Metoda/Model/Koncepcija** – obično se prezentira u trećem poglavlju; metoda/model/koncepcija analize mora biti transparentno istaknuta radi eventualnog ponavljanja testiranja rezultata od strane zainteresiranih istraživača (to je jedno od temeljnih pravila znanstvene metodologije).
- g. Empirijski podaci i analiza** – sadržavaju dokumentacijsku podlogu i rezultate empirijske analize. Potrebno je opisati i prikazati uzorak podataka korišten u analizi te prezentirati i objasniti statistička te ekonometrijska obilježja dobivenih rezultata uz tumačenje njihova ekonomskog sadržaja.
- h. Rezultati i rasprava** – autor objašnjava rezultate, osobito njihovo ekonomsko značenje i poruke. U ovom dijelu očekuje se argumentacija znanstvenog doprinosa, povezivanje rezultata rada s rezultatima te zaključcima dosadašnjih empirijskih istraživanja te preporuke za promjene javnih i drugih politika.
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