ECONOMIC RESEARCH INSTITUTE
BULGARIAN ACADEMY OF SCIENCES

ИНСТИТУТ ЗА ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ НА БЪЛГАРСКАТА АКАДЕМИЯ НА НАУКИТЕ

ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ

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CONTENTS

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Address: Economic Research Institute at Bulgarian Academy of Sciences, 3 "Aksakov" str., Sofia 1000, BG
Chief Editor / Journal Secretary: (+359-2) 8104019, e-mail: econ.studies@iki.bas.bg

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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Eva Kovářová[1]
Tomáš Váňa[2]

REDUCTION OF POVERTY AND MATERIAL DEPRIVATION IN THE EU COUNTRIES: WHAT MATTERS THE MOST?[3]

Poverty reduction belongs to the long-term priorities of public policy actions in most countries. In 2010, the European Union and its member states aimed to reduce the number of people living at risk of poverty by 2020. However, most EU countries failed to achieve their targets concerning poverty reduction, partly because of the challenges they had to cope with (slow economic recovery after the crisis, migration, COVID-19). In 2022, poverty risks were increasing in the EU countries once again. Therefore, research focused on determinants of poverty can help policymakers to identify the areas in which policy measures will be useful for poverty reduction or at least its stabilisation in the EU countries. The paper introduces an analysis examining five determinants of poverty (related to employment, incomes, education, and social protection), when poverty was understood in terms of incomes as well as material deprivation. The panel regression analysis was done for cross-sectional data covering EU 26 countries and the period 2010–2019. Statistical results revealed the statistically significant relationships between poverty risks (measured with the use of at-risk-of-poverty rate and rate of material deprivation), and employment, work intensity, and income inequality (representing the determinants of poverty). Findings indicated that particularly the policy measures adopted within the employment and labour market policies must be used in the fight against poverty in EU countries.
Keywords: employment; income inequality; material deprivation; panel regression; poverty; work intensity
JEL: I32; I38; P46

[1] *Eva Kovářová, Ing., Ph.D., VŠB – Technical University of Ostrava, Faculty of Economics, Department of International Economic Relations, the Czech Republic, +420 596 992 301, e-mail: eva.kovarova@vsb.cz, ORCID 0000-0002-1548-6889.*
[2] *Tomáš Váňa, Bc., VŠB – Technical University of Ostrava, Department of Public Economics, the Czech Republic, e-mail: tomas.vana.st@vsb.cz.*
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1. Introduction

In 2010, the European Union (EU) adopted the Strategy Europe 2020, which put forward three mutually reinforcing priorities of the EU and its member states (European Commission, 2010). The third priority was formulated as inclusive growth, and it committed the EU and EU countries to reduce the number of people living at risk of poverty by 20 million by 2020. The fight against poverty was further strengthened with the European Pillar of Social Rights that was set out in 2017 as a shared political commitment for a stronger social Europe. This commitment included 20 principles divided into three main chapters, which explicitly or implicitly address poverty and social exclusion as well. Explicitly, the Pillar spoke about the protection of children against poverty and about the prevention of in-work poverty (European Commission, 2022a). However, other principles introduced there that concerned education, gender equality, employment, wages, social protection, and care were also closely related to the risks of poverty and social exclusion. Therefore, during the second decade of the 21st century, the reduction of poverty got higher attention in the EU agenda than at any time before. However, many commitments concerning the reduction of poverty remained only political commitments, and the EU and some EU countries were too ambitious in their plans focused on the reduction of poverty risks. However, the period between 2010 and 2020 was full of challenges the EU countries had to cope with, and these challenges limited the success of EU countries in the fight against poverty.

The Strategy Europe 2020 was launched for the period 2010–2020 and aimed to help the EU and EU countries to overcome the global economic and financial crisis that started in 2007. Despite common and national policy actions, the economic recovery after the crisis was too slow in most EU countries and was connected with some internal structural and economic imbalances (Tuca, 2014). However, some EU countries had to cope with migration and refugee crises as well. This crisis reached its peak in 2015 (UNHCR, 2015) and hit mainly countries located near the Mediterranean Sea (Spain, Italy, Greece) and Germany or Sweden. Finally, in 2020, the EU countries were hit by the pandemic of COVID-19. All these challenges posed barriers to stronger social progress in the EU.

At-risk-of-poverty rate calculated for the EU 27 countries reached in 2019 the same value of 16.5% as in 2010, and values of the rate even grew between 2010 and 2016. Between 2019 and 2020, the proportion of people living at risk of poverty in EU-27 countries grew only slightly (from 16.5 to 16.6%) despite the risks associated with the pandemic of COVID-19. So far, any significant progress in poverty reduction has not been observed in EU countries, but unfortunately, statistical data has not revealed any significant regress despite the challenges the EU faced in the last ten years. However, new challenges rising in the EU in 2022 make further social progress an ambiguous one, because they are accompanied by the rapid growth of consumer prices and costs of living across the EU countries. As a result, an increase of poverty risks can be expected in most EU countries, and most countries have already introduced particular policy measures to cope with rising energy and food prices. Therefore, the identification of areas where the policy measures can be useful for at least stabilisation of the prevalence of poverty or for the further reduction of poverty should have the highest research priority.

Several research studies addressing poverty have already been published. They introduced this issue at the macro- or micro-level, and they did the analyses for different countries and different periods of time. The analysis introduced in the paper examined poverty and its determinants at the macro-level of EU countries, and it covered the period 2010-2019. The aim of the analysis was to examine the relationship between poverty and its selected determinants in the EU countries during the specified period of years. Determinants of poverty were selected according to the EU's understanding of poverty and its interconnections with education and employment and according to the ability of the variables to capture the achievements of EU countries in areas which are under direct or indirect policy control of the national policymakers. Therefore, the analysis aimed as well to identify the areas where the policy measures can be useful for the fight against poverty in the EU countries. To address the issue of the relationship between poverty and its five selected determinants, the panel regression analysis was used. Reduction of poverty was considered in terms of the declining rates of monetary poverty as well as in terms of declining rates of material deprivation.

Before the analysis, the relationship between the decreasing poverty rates and increasing employment rates, values of the ratio expressing the expenditures on social protection to incomes, and levels of attained education were expected. At the same time, it was expected that the increasing proportions of people living in households with very low work intensity, and increasing income inequality would be associated with the increasing poverty rates. These research expectations were assessed according to the results of the panel regression analysis and were discussed. The findings that are presented in the paper were consistent with the recently published studies, although they addressed the issue of poverty in the EU countries during different periods of time. Presented results confirmed particularly the statistically significant relationship between decreasing poverty rates and increasing employment rates, respectively decreasing proportions of people living in households with very low work intensity. Therefore, the findings indicated that policy measures must be related mainly to employment and labour market policies to be useful in the fight against poverty.

The following text is structured in a way that corresponds to the structure of the analysis. First, poverty is interpreted in the EU context. The main attention is given to the EU indicators measuring poverty risks. Then, variables and methods used in the analysis are introduced and explained; particular attention is paid to the literature review concerning the determinants of poverty. The empirical results are presented in the next section of the paper with the use of tables and figures. The last section of the paper is devoted to the summary and discussion of the findings.

2. Understanding of Poverty in the European Union

Poverty reduction is a traditional and legitimate goal of public policy actions (Ravallion, 2019). Therefore, the reduction of poverty belongs to the long-term priorities of all stakeholders in the EU countries as well. The EU agenda focused systematically on poverty reduction date back to the 1970s and 1980s. Since the 1970s, poverty has been understood in the EU, like in other developed countries with advanced economies, in relative terms. The EU's understanding of poverty refers to the definition introduced by Townsend (1979).

Townsend (1979, p. 31) understood poverty as a situation when individuals lacked resources to satisfy their needs in a way that excluded them from the participation in activities and living conditions and amenities "*which are customary, or are at least widely encouraged or approved*", in societies these individuals lived in. The first official EU definition of poverty was adopted by the EU Council of Ministers in December 1984. This definition considered to be poor those people "*whose resources (material, cultural and social) are so limited as to exclude them from the minimum acceptable way of life in the Member States in which they live*" (Council of the EU, 1985, Article 1, paragraph 2). In the 1990s, the EU's understanding of poverty was extended with the concept of social exclusion, which was introduced by the European Commission as a dynamic and multidimensional phenomenon affecting social cohesion in EU countries. The European Commission (1992) explained that social exclusion went beyond insufficient incomes or participation in working life and could be recognised in areas like housing, education, health, or accession to services. In general, the concept of social exclusion covers a wide range of socio-economic problems, because being socially excluded means to suffer from a combination of linked problems, including low incomes, unemployment, poor skills, poor housing, high crime environment, poor health, and family breakdowns (Social Exclusion Unit, 2001). However, low incomes are still understood as ones of the most important causes and consequences of social exclusion. Since the 1990s and particularly since the 2000s, the terms poverty and social exclusion have been used simultaneously in the EU official documents and combat with the risks of poverty and social exclusion has been recognised among the highest priorities of the EU institutions as well as the EU countries.

In general, two main approaches to the construction of poverty measures can be recognised – unidimensional, or multidimensional measures are then specified (Costa, 2003). The unidimensional measures refer to only one variable, while the multidimensional measures are based on several relevant dimensions of poverty (Alkire, 2007). Unidimensional poverty measures commonly observe poverty directly through consumption, or indirectly through incomes (Richardson, Bradshaw, 2012; Ringen, 1988). At the EU level, measures of income poverty have been well-established since 2001, when the Laeken indicators were agreed upon by the European Council. Laeken indicators were adopted with the aim to monitor the performance of EU countries and their progress towards the key EU targets stated by the European Council one year earlier (Atkinson et al., 2004). Laeken indicators included the first EU official at-risk-of-poverty rate (Rodrigues, 2014). The rate was defined as a proportion of persons with an equivalised total net income below 60% of the median of national equivalised income, which was officially recognised as the monetary (income) poverty threshold. This concept of monetary poverty is still essential in the EU's understanding of poverty, although it cannot satisfactorily capture the diversity of living conditions in EU countries (Fusco et al., 2010). Therefore, it is commonly argued that the at-risk-of-poverty rate monitors rather an income inequality more than poverty in the EU countries (Copeland, Daly, 2014; Nolan, Whelan, 2011). Therefore, the at-risk-of-poverty rate underestimates poverty in some countries, particularly in those countries having lower income inequality (Bradshaw, Mayhew, 2010; Bradshaw, Movshuk, 2019). As a result, countries with lower income inequality seem to have a lower occurrence of income poverty. However, the monetary understanding of poverty seems to be insufficient as well. If the emphasis is put on low incomes as the defining characteristic of poverty and the non-

monetary sources of the households' standard of living are not considered in relation to the risk of poverty, then the prevalence of poverty can be underestimated or overestimated. Being aware of these shortcomings, the European Commission measures poverty with the use of material deprivation rate as well. This later extension of the EU methodology for the poverty measurement shifts the EU understanding of poverty close to the multidimensional understanding of poverty (Alkire, Apablaza, 2016) that reflects poverty in a more complex manner and enables to identify of the most fundamental wants of households living in poverty.

The European Commission introduced, in relation to the Strategy Europe 2020, a composite indicator measuring the number of people living at risk of poverty or social exclusion (the indicator is further referred to as AROPE). This indicator expresses the sums or proportions of people who are affected at least by one of these three risks: (1) monetary poverty after social transfers; (2) severe material deprivation; (3) living in a household with very low work intensity. Therefore, the AROPE indicator compromises (Eurostat, 2022): (1) at-risk-of-poverty rate defined earlier as one of the Laeken indicators; (2) severe material deprivation rate defined as the proportion of persons who cannot effort at least four out of nine predefined material or monetary items regarded as desirable or necessary for the adequate life; (3) the proportions of persons living in households with very low work intensity. The AROPE can be characterised as the summary measure (Tsanov, Shopov, 2018) and its components measuring monetary poverty and material deprivation can be considered complementary (Copeland, Daly, 2014; Fusco et al., 2010), in spite of the fact that at-risk-of-poverty rate reflects poverty in the national socio-economic context because of the use of national monetary poverty thresholds, and material deprivation rate reflects poverty in the EU context because the set of items is commonly applied in all EU countries (Atkinson, 2010; Fusco, et al., 2010). The third component of AROPE measures the number of people living in households with very low work intensity that is defined to be equal or less than 20% of the total work potential during the previous year. However, the use of this measure reflecting the work intensity of EU households for poverty measurement is questioned, and some researchers argue that jobless or quasi-jobless households are not necessarily poor households (Copeland, Daly, 2014; Nolan, Whelan, 2011) even though the evidence from some EU countries suggests that the poverty risk is associated with household work intensity (Ward, Ozdemir, 2013). Despite the complex nature of AROPE that balances the direct and indirect approaches to poverty measurement, resp. unidimensional and multidimensional understandings of poverty, its shortcomings are accompanied by the shortcomings of its components that were indicated above. In addition, in general, the methodology of AROPE is not sensitive enough to consider the specifics existing in the EU countries, while such specifics can define the minimum or the average acceptable standard of living in these countries.

The construction of AROPE indicates that insufficient earnings from the labour market and total households' incomes after social transfers are key determinants of poverty risks. Other determinants of poverty recognised at the EU level can be deducted from the Strategy Europe 2020, which interprets the interrelations among poverty reduction and other headline targets, as for example the Strategy states, "*better educational levels help employability and progress increasing the employment rate helps to reduce poverty*" (European Commission, 2010, p. 9).

3. Data and Methods

In EU countries, the prevalence of monetary poverty is monitored through the number of persons (and their proportions in the total population) whose incomes are below the national poverty threshold. These persons are considered to live at risk of poverty. However, it does not necessarily mean that they are limited in or excluded from the minimum acceptable way of life in the countries they live in. They just have their incomes below the national poverty threshold. Reduction of poverty defined in this way poses a challenge for the policymakers, because at-risk-of-poverty rates observed in the EU countries reflect income inequality, and fight with poverty is then the fight against income inequality without the knowledge of the specific needs of people living at risk of poverty.

Because of the shortcomings of the EU's understanding of monetary poverty, the European Commission introduced the concept of material deprivation, which enables better targeting of policy measures focusing on poverty reduction. Material deprivation rates are denoted to specific lacks the EU households have. In the EU, material deprivation is understood as a state defined as the enforced inability to pay for at least three of the nine items, including rents, utility bills, home warming, unexpected expenses, meat, holidays, TV, washing machine, car, telephone. Severe material deprivation is then defined as deprivation in at least four items (Eurostat, 2022). Both understandings of poverty are used in the presented analysis, it means poverty was measured in terms of insufficient incomes (when the at-risk-of-poverty rate was used as a measure of poverty), and as well in terms of material deprivation (when the material deprivation rate was used as a measure of poverty).

At-risk-of-poverty rates and material deprivation rates differ across the EU 27 countries, and their variability is also visible over time. Therefore, an investigation of poverty determinants gets specific attention in recent research studies, and various research methods are applied to address this issue. The most common methods include: (1) multi-criteria decision-making methods (e.g. Łuczak, Kalinowski, 2020; Bárcena-Martín et al., 2020; Herman, 2014); (2) methods measuring efficiency (e.g. Vall Fonayet et al., 2020; Habidov, Fan, 2010); (3) methods of regression and correlation analysis (e.g. Halaskova, Bednar, 2020; Bosco, Poggi, 2019; Dudek, Sedefoglu, 2019; Miežienė, Krutulienė, 2019; Kis, Gábos, 2016; Duiella, Turrini, 2014; Nolan, Whelan, 2011).

Determinants of poverty are commonly addressed at the micro (households) level or at the macro (national, countries) level (Labudová et al., 2019). The most common determinants of poverty recognised at the macro-level are presented in Table 1, which summarises the findings presented in the selected relevant studies dealing with poverty and its determinants.

In the presented analysis, poverty and its determinants were examined at the macro level, and the analysis covered the period between 2010 and 2019. The aim of the analysis was to examine the relationship between poverty and its selected determinants in the EU countries during the specified period of years. Determinants of poverty were selected according to the EU's understanding of poverty and its interconnections with education and employment and according to the ability of the variables to capture the achievements of EU countries in areas, which are under direct or indirect policy control of the national policymakers. Therefore, the analysis aimed as well to identify the areas where the policy measures can be useful for the

fight against poverty in the EU countries. To address the issue of relationship between poverty and its five selected determinants, the panel regression analysis was used.

Table 1. The most addressed determinants of poverty

Determinants of poverty (rates)	Research study by
Employment, resp. unemployment	Paľová, Vejačka (2018); Darvas (2017); Herman (2014); Duiella, Turrini (2014); Daly (2012); Herman, Georgescu (2012); Atkinson (2010)
Earnings – incomes	Duiella, Turrini (2014); Daly (2012); Herman, Georgescu (2012)
Inequality in incomes, distribution of income	Duiella, Turrini (2014); Herman (2014)
Education	Paľová, Vejačka (2018)
Social spending programmes, redistributive social policies	Balvočiūtė (2019); Miežienė, Krutulienė (2019); Leventi et al. (2017); Daly (2012); Caminada et al. (2010)
Social investment policies	Van Vliet, Wang (2015)
Economic growth	Page, Pande (2018); Darvas (2017); Leventi et al. (2017)
Demographic characteristics of population	Leventi et al. (2017)

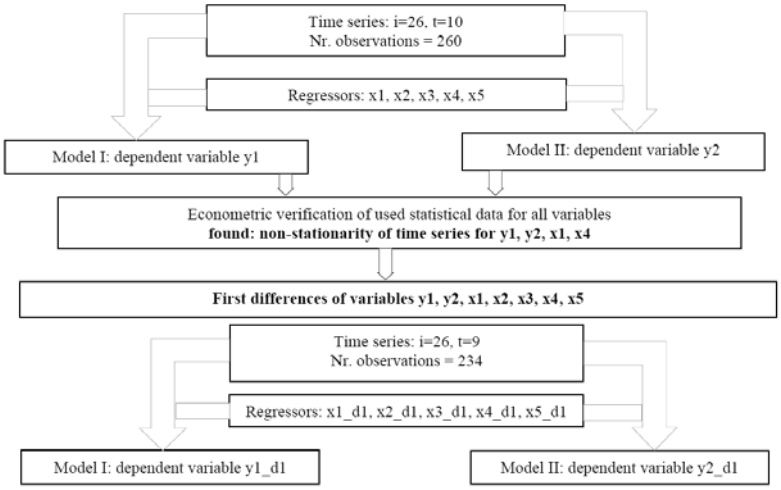
Zulfikar (2018) explains that regression analysis of panel data means a regression analysis of data combining the cross-section data and time series data. It means that the same cross-section units are measured at different times. If the data are available for all units (countries *i*) and times (years *t*), the panel is balanced. To meet the aim of the analysis, panel regression analysis was done for two slightly different models. Model I understood poverty in its unidimensional meaning, and the at-risk-of-poverty rates were used as the dependent variable ($y1_{it}$). Model II reflected the multidimensionality of poverty, and material deprivation rates were considered as the dependent variable ($y2_{it}$). Material deprivation was defined as the enforced lack of at least three out of nine material deprivation items. Both models (Model I and Model II) used the same five ($k = 1,.., k = 5$) explanatory variables (regressors xk) defined as follows:

- total employment rate for the population group aged from 20 to 64 years in the percentage of the total population ($x1_{it}$);
- percentage of the total population aged less than 60 living in households with very low work intensity ($x2_{it}$);
- ratio of the first quartile top cut-off point to the third quartile top cut-off point, quartiles respect the distribution of incomes expressed in PPS ($x3_{it}$);
- ratio of expenditure on social protection per inhabitant in PPS to adjusted gross disposable income of households per capita in PPS ($x4_{it}$);
- percentage of the population with at least upper secondary educational attainment for the population group aged from 25 to 64 years ($x5_{it}$).

It was assumed that regressors x_k differed over time (period of years 2010–2019) and across EU countries, and thus they can explain the variability of at-risk-of-poverty rates and material deprivations rates in the EU countries during the specified period.

Analysis was done for EU 26 countries; Malta was excluded because of the lack of data on incomes. Used data panels were balanced, but one improvement of data was done. Instead of missing Bulgarian values of the variable x4 in 2018 and 2019, the value calculated for the year 2017 was used. All data were downloaded from Eurostat during December 2021 and January 2022. A statistical description of the used data is presented in Annex 1. Stata software was used for all calculations. The structure of the analysis is introduced in Figure 1.

Figure 1. Design of the analysis



Because of the non-stationarity of time series for variables specified in Figure 1, first-difference models were constructed, where the first differences (*d1*) of all variables were used. The relationship between dependent variables (y1_d1, y2_d1) and regressors xk was defined to be in standard form, specified in Equations 1, 2, 3 and 4, defined as follows:

- *Fixed effect equation* (Zulfikar, 2018; Brüderl, Ludwig, 2015):

Model I: $y1\_d1_{it} = \beta_k xk\_d1_{it} + \alpha_i + \varepsilon_{it}$ (1)

Model II: $y2\_d1_{it} = \beta_k xk\_d1_{it} + \alpha_i + \varepsilon_{it}$ (2)

Where:

y1_d1 is used for the first differences of the variable y1;

y2_d1 – used for the first differences of the variable y2;

xk_d1 – used for first differences of variables x1, x2, x3, x4, x5;

β_k *– the vector of parameters to be estimated by the model;*

α_i *– the stable country-specific unobserved characteristics (so-called unknown intercept for a country i);*

ε_{it} *– the idiosyncratic error that varies across countries I and over time t (so-called error term).*

- *Random effect equation* (Zulfikar, 2018):

Model I: $y1\_d1_{it} = \alpha + \beta_k xk\_d1_{it} + u_i + \varepsilon_{it}$ (3)

Model II: $y2\_d1_{it} = \alpha + \beta_k xk\_d1_{it} + u_i + \varepsilon_{it}$ (4)

Where:

u_{it} and ε_{it} again express the errors – so-called between-country error (u_{it}) and within-country error (ε_{it}).

After the first differencing of all variables, Model I and Model II were considered new models and all the tests and calculations were done once again. Variables used for the calculations and obtained statistical results were verified with standard tests for normality, multicollinearity, heteroscedasticity, and stationarity (test for the normality of residuals; test of Variance Inflation Factor; White test, Levin, Lin, and Chu test). The decision between fixed and random effects was based on the results of the Hausman test.

4. Empirical Results

Traditionally, the European Union has been engaged in the promotion of inclusive economic growth and socio-economic progress in its member states, which was several times confirmed with the EU agendas focusing on the reduction of poverty and social exclusion. Reduction of poverty was reaffirmed among the highest political priorities of the European Commission and EU countries by the Strategy Europe 2020 as well as with the set of commitments entitled European Pillar of Social Rights. The Strategy was introduced with the Communication from the Commission in March 2010 with the subtitle "*A strategy for smart, sustainable and inclusive growth*". The Strategy represented a plan for the economic recovery after the crisis and formulated a vision of the EU economy for the 21st century. The Strategy proposed five measurable EU targets concerning employment, education, research and innovations, climate change and energy, and combating poverty. The main target in poverty reduction was formulated as "*20 million less people should be at risk of poverty*". This target meant to reduce "*the number of Europeans living below the national poverty lines should by 25%*" (European Commission, 2010, p. 3, 9).

4.1. Poverty and material deprivation in the EU countries during the period 2010-2019

The EU target formulated for the fight against poverty, introduced by the European Commission in 2010, was translated into national targets of the EU countries introduced within the European Semester framework. However, the EU countries were free to set their national targets for poverty reduction, and countries could even specify their own indicators they would use for the monitoring of their achievements. The AROPE, measuring the number of people at risk of poverty or social exclusion, was used for the formulation of national targets in 19 EU countries. Bulgaria, Denmark, Estonia, Germany, Ireland, Latvia, Netherlands, and Sweden used different indicators, either the components of AROPE or other indicators related to poverty. Bulgaria and Estonia formulated their targets with the use of at-risk-of-poverty rates, while Germany and Sweden focused their efforts on the reduction of

unemployment, or the growth of employment (European Commission, 2022b). However, only 9 out of 19 EU countries met their AROPE national target, when the values of AROPE monitored in 2019 were compared with the requested targeted values of the indicator. Bulgaria and Estonia did not meet their targets defined with the use of at-risk-of-poverty rates as well. Therefore, it is not surprising that the overall EU target adopted for the fight with poverty was not met, probably, the EU and EU countries were too ambitious in their plans for poverty reduction. On average, any stronger progress in poverty reduction was not observed in EU countries between 2010 and 2019, but unfortunately, statistical data did not reveal any regress despite the challenges the EU and its member states coped with during the period of years 2010–2019 (slow economic recovery after the crisis connected with internal structural and economic imbalances, migration crisis).

In all EU 27 countries (respecting the EU membership from 2020), around 103.7 million people lived at risk of poverty or social exclusion in 2010. During the period of years 2010–2019, first, the number of people at risk of poverty or social exclusion grew up to 108.7 million (in the year 2012). Then, they started to decline and reached a value of around 91.3 million in 2019. The EU target was defined to reduce the number of people living with incomes below the national monetary poverty threshold by 20 million by 2020. In 2010, around 71.5 million people were recognised as living at risk of monetary poverty in all EU 27 countries, and the overall trend of the prevalence of monetary poverty was like that one identified for the risk of poverty or social exclusion. First, the number of people at risk of poverty grew and reached the value of 76.6 million (in the year 2016), then number declined to 73.8 million (in the year 2018). However, between the years 2018 and 2019, new growth was evident, and in 2019, 75.5 million people lived with incomes below the national poverty thresholds in the EU 27 countries. The highest prevalence of monetary poverty was monitored in Romania in most years, while the lowest one was in Czechia (see the details about at-risk-of-poverty rates in Table 2).

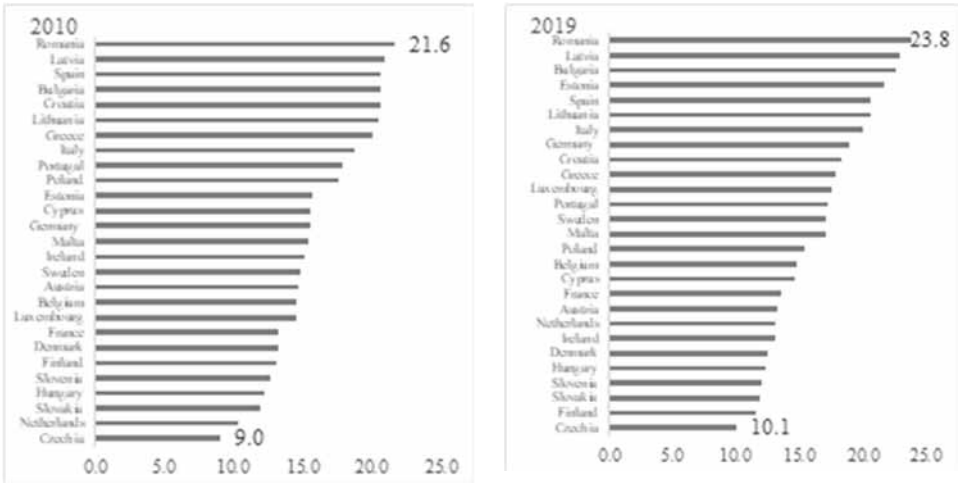
Table 2. Values of at-risk-of poverty rates: average trend (in %)

Rate	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Max. value	21.6	22.3	23.1	23.1	25.1	25.4	25.3	23.6	23.5	23.8
Country	*Romania*	*Romania*	*Greece*	*Greece*	*Romania*	*Romania*	*Romania*	*Romania*	*Romania*	*Romania*
Min. value	9.0	9.8	9.6	8.6	9.7	9.7	9.7	9.1	9.6	10.1
Country	*Czechia*	*Czechia*	*Czechia*	*Czechia*	*Czechia*	*Czechia*	*Czechia*	*Czechia*	*Czechia*	*Czechia*
Mean value	16.0	16.3	16.3	16.4	16.9	17.1	17.1	16.8	16.7	16.5
Median value	15.5	15.4	15.3	15.9	16.4	16.3	16.5	15.9	16.4	17.1

Source: Eurostat.

The at-risk-of-poverty rates of EU 26 countries (without Malta) were used in Model I as the dependent variable y1. Its cross-sectional variability in 2010 and 2019 is visible in Figure 2. Figure 2 indicates that when these two years are compared, both extreme values (max. and min. value) were higher in 2019 than in 2010. The figure indicates as well that the risks of poverty were higher in Baltic, Southern and South-East EU countries than in the rest of the EU. The relatively better situation was monitored in Central and Western Europe, or in Sweden. The variability of dependent variable y1 across EU countries and over the period 2010–2019 is presented in Annex 2 as well, where the figures aim to demonstrate a high dispersion of the values of at-risk-of-poverty rates across the EU countries.

Figure 2. At-risk of poverty rates: variability in 2010 and 2019 (in %)



Source: Eurostat, own data processing.

Statistical data available in Eurostat enable us to examine material deprivation to various extents and depths. Table 3 presents material deprivation rates expressing the proportions of people living in enforced lack of at least three out of nine defined items. In all EU 27 countries, 18.5% of people were materially deprived in 2010. Like the at-risk-of-poverty rates, material deprivation rates grew first up to 20.2% (in the year 2012), then the rates started to decline and reached the lowest value in 2019 (12.0%). This development indicated strong progress in the reduction of material deprivation in some EU countries. This strong positive progress was visible mainly in the EU countries occupying the worst positions in countries' ranking in 2010. The highest rates of material deprivation were reached in Bulgaria in most years, where nearly 60% of citizens in 2010 and nearly 33% of citizens in 2019 lived in conditions of material deprivation. However, the material deprivation rate of Bulgaria was reduced by nearly 50% between 2010 and 2019, which revealed the most significant achievement among the EU countries. Details about the material deprivation rates are presented in Table 3 and in Annex 2.

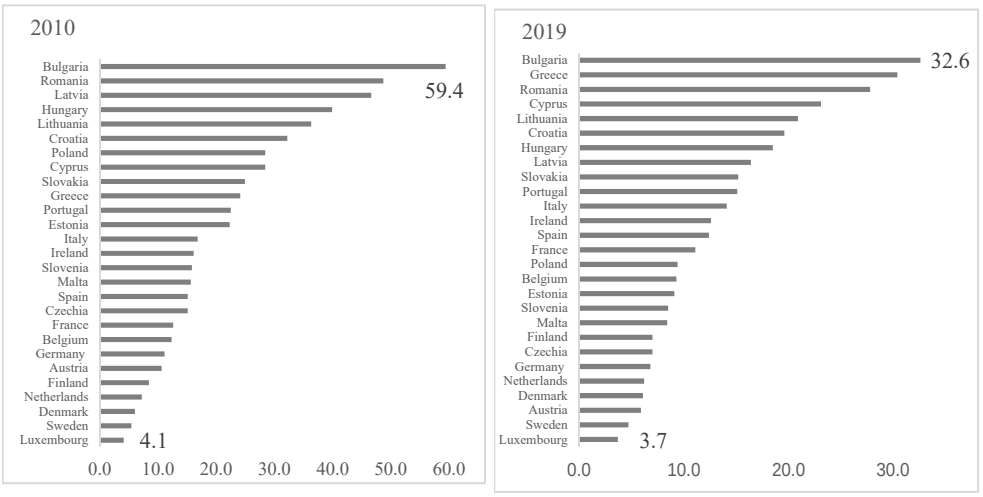
Material deprivation rates were used as the dependent variables y2 in Model II. The cross-sectional variability of material deprivation rates is presented in Figure 3, which compares values of the rate monitored in 2010 and 2019.

Table 3. Values of material deprivation rates: average trend (in %)

Rate	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Max. value	59.4	60.1	61.6	58.0	46.8	49.1	46.9	43.8	33.6	32.6
Country	*Bulgaria*	*Bulgaria*	*Bulgaria*	*Bulgaria*	*Bulgaria*	*Bulgaria*	*Bulgaria*	*Bulgaria*	*Greece*	*Bulgaria*
Min. value	4.1	4.7	4.5	5.4	4.4	4.0	3.7	4.2	4.5	3.7
Country	*Luxembourg*	*Luxembourg*	*Luxembourg*	*Sweden*	*Sweden*	*Sweden*	*Sweden*	*Sweden*	*Sweden*	*Luxembourg*
Mean value	21.7	22.4	23.2	23.1	21.7	19.9	18.3	16.7	14.9	13.4
Median value	16.1	20.9	21.3	19.9	19.9	16.5	15.0	12.8	11.0	11.1

Source: Eurostat.

Figure 3. Material deprivation rates: variability in 2010 and 2019 (in %)



Source: Eurostat, own data processing.

Figure 3 reveals that, unlike the at-risk-of-poverty rates, the extreme values of material deprivation rates declined between the years 2010 and 2019, particularly the maximum value was reduced significantly. Figure 3 indicates as well that material deprivation was higher in some countries accessing the EU after the year 2003, but progress was visible, for instance, in Poland and Latvia. Thus, in 2019, material deprivation affected mainly citizens in the South-East EU countries. The variability of dependent variable y2 across EU countries and during the period of years 2010–2019 is presented in Annex 2, where the figures aim to demonstrate a high dispersion of the values of material deprivation rates across the EU countries.

4.2. Determinants of poverty in the EU countries during the period 2010-2019

The relationship between dependent variables (y1_d1, y2_d1) and regressors xk (x1_d1, x2_d1, x3_d1, x4_d1, x5_d1) was investigated with the use of panel regression analysis. Two models were constructed. The model I was designed to show the relationship between y-o-y changes in at-risk-of-poverty rates (y1_d1) that were considered as the depended variables, and y-o-y changes in five selected regressors (xk_d1).

It was expected before the analysis that:

- *positive effects on poverty reduction, represented by declining values of at-risk-of-poverty rates, will have:*

    1. Increasing employment rates – Generally, as deduced from the Strategy Europe 2020, increasing rates of employment (variable x1_d1) should have positive effects on the reduction of poverty risks.

2. Increasing values of the ratio expenditures on social protections to incomes (variable x4_d1) – Social expenditures are commonly used by the policymakers in the EU countries to reduce income inequality and thus poverty understood in monetary terms.
3. Increasing proportions of people with at least upper secondary education (variable x5_d1) – Deducted from the Strategy Europe 2020, higher levels of education should reduce the poverty risks because higher education increases employability.

- *negative effects on poverty reduction or the growth of poverty, represented by increasing values of at-risk-of-poverty rates, will have:*

1. Increasing proportions of people living in households with very low work intensity (variable x2_d1) – Full-time jobs and jobs or employment, in general, are the main sources of incomes of EU households.
2. Increasing income inequality, represented with the variable x3_d1. – Poverty itself is understood in terms of income inequality in AROPE.

All the calculations were done in Stata. Statistical results for Model I, examining the relationship between at-risk-of-poverty rates and five selected determinants of poverty, are presented in Table 4. Based on the results of the Hausman test, Model I was designed as the model with random effects.

Table 4. Model I: results of the panel regression analysis

y1_d1	Coef. β	St. Err.	t-value	p-value	[95% Conf. Interval]		Sig.
x1_d1	.039	.047	0.83	.407	-.054	.132	
x2_d1	.101	.046	2.18	.029	.01	.192	**
x3_d1	9.589	.963	9.95	0	7.701	11.477	***
x4_d1	8.763	6.507	1.35	.178	-3.99	21.516	
x5_d1	-.015	.05	-0.31	.76	-.114	.083	
Constant	.03	.065	0.45	.649	-.098	.158	

Mean dependent var	0.050	SD dependent var	0.835
Overall r-squared	0.343	Number of obs.	234
Chi-square	119.251	Prob > chi2	0.000
R-squared within	0.338	R-squared between	0.423

**** p<.01, ** p<.05, * p<.1*

Results presented in Table 4 clearly showed that in Model I, two explanatory variables were considered significant (for p = 0.05). These were variables x2_d1 and x3_d1. These results indicated that when poverty was understood simply in monetary terms, explanatory variables concerning work intensity and incomes were significant, and the relationships between their y-o-y changes were positive (see the values of β_2 for x2, and β_3 for x3). It means that if the government aims to reduce poverty, it should lower the number of people living in households with very low work intensity. However, the positive value of β_3 indicated that decreasing at-risk-of-poverty rates were accompanied by decreasing values of variable x3, expressing income inequality. Decreasing values of x3 meant widening of the gap between the first and third quartile top cut-off of incomes, and thus rising income inequality in a

country. This result indicated that the declining prevalence of poverty was related to rising income inequality, which differed from the expectations formulated before the analysis.

Model II was designed to identify the relationship between y-o-y changes in material deprivation rates (y2_d1, and y-o-y changes in five selected regressors (xk_d1). The interpretation of the relationships between material deprivation rates and determinants of poverty was expected to be the same as in Model I because the material deprivation rate was understood Model II to be the measure of poverty. Based on the results of the Hausman test, the model was designed to have fixed effects. Statistical results of Model II are presented in Table 5.

Table 5. Model II: results of the panel regression analysis

y2_d1	Coef. β	St. Err.	t-value	p-value	[95% Conf. Interval]		Sig.
x1_d1	-.491	.134	-3.65	**0**	-.756	-.226	***
x2_d1	.713	.124	5.74	**0**	.468	.959	***
x3_d1	2.06	2.575	0.80	.425	-3.017	7.136	
x4_d1	-5.928	17.911	-0.33	.741	-41.244	29.388	
x5_d1	.232	.155	1.50	.135	-.073	.537	
Constant	-.622	.179	-3.48	**.001**	-.974	-.269	***

Mean dependent var	-0.926	SD dependent var	2.262
R-squared	0.334	Number of obs.	234
F-test	20.332	Prob > F	0.000
Akaike crit. (AIC)	912.130	Bayesian crit. (BIC)	932.862

**** p<.01, ** p<.05, * p<.1*

Results presented in Table 5 showed that two explanatory variables were considered significant (for p = 0.05) in Model II. These were y-o-y changes in employment rates (x1_d1) and y-o-y changes in the proportions of people living in households with very low work intensity (x2_d1). The value of β_2 again indicated the positive relationship between the reduction of material deprivation and lowering proportions of people living in these households. The relationship between the material deprivation rate and the employment rate was identified to be negative (negative value of β1), which indicated that increasing employment rates were related to declining material deprivation rates. Both identified relationships between the dependent variable and these two regressors met the expectations formulated before the analysis.

5. Discussion and Conclusion

The persistent poverty is one of the most serious socio-economic phenomena that influence individuals' well-being around the world. Therefore, the European Union considers poverty reduction relevant to its policy agenda as well and in 2010, the European Commission formulated the target to reduce the number of EU citizens living at risk of poverty by 20 million by the year 2020. Despite the policy efforts made at the EU level as well national level in the EU countries, the target was not met. However, the second decade of the 21st century was full of challenges the EU countries faced. First, most EU countries had to cope

with slow economic recovery after the global financial and economic crisis that revealed their internal structural and economic imbalances. The recovery, understood here in terms of economic growth, was not visible in most EU countries until 2014. Then, some EU countries – especially those located around the Mediterranean Sea (like Spain, Italy and Greece), or Germany and Sweden, were affected by the peak of the migration and refugee crisis in 2015, followed by increased migration inflows also in other years. The end of the decade was influenced by the pandemic of COVID-19 starting in the EU countries in spring 2020.

According to the EU official documents, poverty is understood in most EU countries in terms of insufficient incomes, and the poverty cut-off point is defined with 60% of the median of national equivalised income. This measure of poverty is discussed a lot because it reflects rather income inequality than poverty and it omits the non-monetary aspects of the living standards. Therefore, the prevalence of the risks of poverty or social exclusion is monitored by the European Commission with the use of a summary or complex indicator called AROPE that also includes two other components, capturing the proportions of people living in conditions of material deprivation, and the proportions of people living in households with very low work intensity. Respecting the EU's understanding of poverty, the presented analysis aimed to examine the relationship between poverty and its five selected determinants. As the determinants of poverty were chosen variables that had the ability to capture the achievements of EU countries in policy areas controlled by the national policymakers (employment, work intensity, income inequality, public expenditures on social protection, education). Panel regression analysis was used to investigate the relationship between poverty and these determinants. The analysis examined for expected relationships between poverty reduction and these five determinants. Two models were used. The model I understood poverty in terms of monetary poverty, and Model II dealt with material deprivation.

Statistical results calculated for Model I indicated that a significant relationship existed during the period of years 2010-2019 between the at-risk-of-poverty rates as the dependent variable, and the proportion of people living in households with very low work intensity, and the income inequality as two explanatory variables. Values of β-coefficients indicated positive relationship between y-o-y changes of the dependent variable (at-risk-of-poverty rate) and y-o-y changes in these two explanatory variables. Results calculated for Model II indicated a significant relationship between y-o-y changes in material deprivation rates as the dependent variable, and employment rates, and proportions of people living in households with very low work intensity as two explanatory variables. The relationship between y-o-y changes in material deprivation rates and changes in rates of employment was identified to be negative; hence the increasing employment rates were accompanied by declining rates of material deprivation. The relationship between material deprivation and very low work intensity was again positive, similarly to Model I.

The results of the analysis were limited by the applied statistical method (panel regression analysis), the length of the examined period (2010–2019), and selected dependent and independent variables. Therefore, it is crucial to discuss the presented findings in the context of other relevant studies examining poverty in EU countries. However, despite the indicated limitations, the presented findings were consistent with findings presented in other recently published studies dealing with poverty in the EU context (Paľová, Vejačka, 2018; Duiella,

Turrini, 2014; Herman, Georgescu, 2012). For instance, Duiella and Turrini (2014) analysed poverty in EU countries between the years 2005 and 2012, and they did not identify any clear drivers of at-risk-poverty rates, but they discovered a significant relationship between severe material deprivation rate as a dependent variable, and two explanatory variables – incomes and unemployment rates. Herman and Georgescu (2012) showed that employment and incomes were essential for the combat against poverty in Romania. The importance of other selected determinants of poverty, particularly the very low work intensity, was shown by other researchers, such as Goerne (2011), Mysikova et al. (2015), Horemans (2017) or Gerlitz (2018). For instance, Mysiková at al. (2015) found a significant relationship between work intensity and poverty in Central European countries for the period of years 2006–2013. Horemans (2017) associated poverty with part-time jobs that can be statistically captured by an indicator of very low work intensity. Repeatedly confirmed associations between poverty and low work intensity pose a serious policy challenge because studies with microdata showed that low work intensity of households resulted from the configurations of households (Marx, Nolan, 2014), and low work intensity was mainly related to households with a single parent and dependent children (Šoltés, Šoltésová, 2016; Raitano et al., 2019).

Relationships between poverty and its five selected determinants identified in the empirical analysis presented in the paper were mostly consistent with expectations formulated before the analysis and were in line with the EU's official understanding of poverty. Quite surprising was the positive relationship between y-o-y changes in at-risk-of-poverty rates and changes in a variable expressing income inequality. However, also here, the analysis confirmed the findings of previous studies, which were not unambiguous about the relationship between poverty and income inequality. For instance, Beker (2020) considered the relationship between poverty and income inequality as complex; McKnight (2019) showed that the relationship between poverty and inequality was dependent on the extent to which the inequality measure was sensitive to the dispersion of incomes; and finally; and Beteille (2003) argued that relationship between poverty and income inequality was neither clear nor direct, and the poverty and inequality could even change in the opposite direction.

Results presented in the paper indicated that policy measures concerning employment, work intensity and incomes could matter for the reduction of poverty in the EU countries. These findings enable to formulate of specific political recommendations. The main policy attention should be paid in the EU countries in the next years to employment and labour market policies. They should be focused primarily on people with insufficient attained education as they are the most vulnerable ones in the labour market. These policies can be oriented toward strengthening the business environment and generating new job opportunities. The employability of individuals with low or insufficient skills and working habits should be boosted through the public support provided to the social entrepreneurship. Special policy measures should be then focused on single-parent households with dependent children as well. In 2020, nearly 8 million households consisting of single parent and dependent children lived in the EU countries, and these families were at the most serious risk of low work intensity because of the necessity to take care of children. If low work intensity was identified as a significant determinant of the poverty risk as well as the risk of material deprivation, then the policymakers must focus as well on measures that will ease the childcare to offer parents the option to have full-time jobs. These measures should be adopted within the pro-family policies and should include material (financial) and immaterial support. The

immaterial support should be targeted at the accessibility of adequate social services of childcare and the prevention of the families' breakdowns. It seems that they will be useful for the reduction of poverty (or at least for the stabilisation of the current socio-economic situation) in EU countries in the next years as well.

Since 2020, the EU countries have had to cope with newly arising challenges affecting the standard of living of EU citizens, as well as the macroeconomic situation in the EU and its member states (the COVID-19 pandemic, Russian attack in Ukraine accompanied by new migration wave and rapid growth of energy and food prices). An increase in poverty risks and risks of material deprivation is expected in most EU countries. Some EU countries have already adopted specific policy measures to protect households against poverty and social exclusion in the next years. Therefore, the current situation opens a venue for further research dealing with more determinants of poverty, including also consumer prices in the EU countries.

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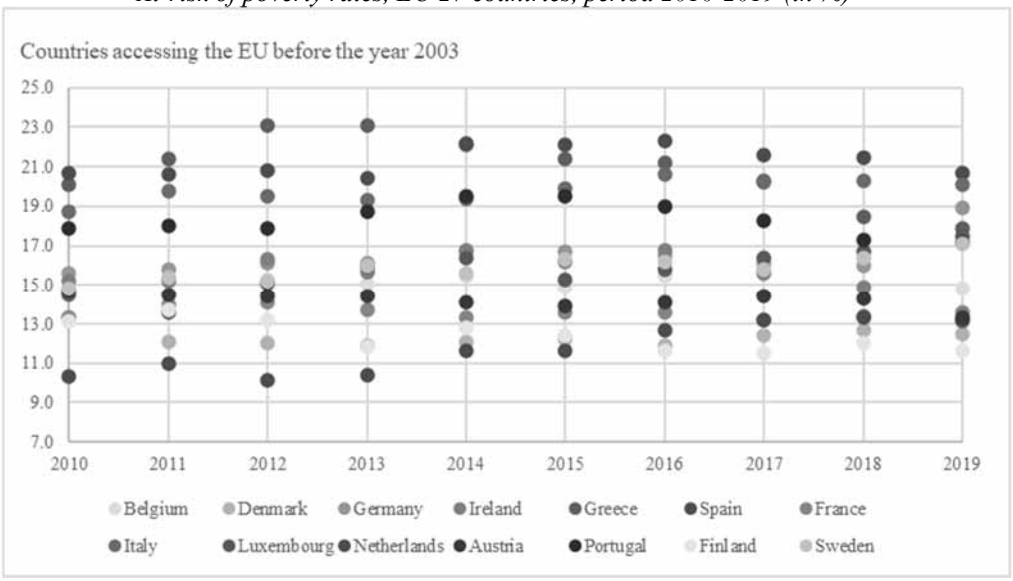
Annex 1
Description of used variables

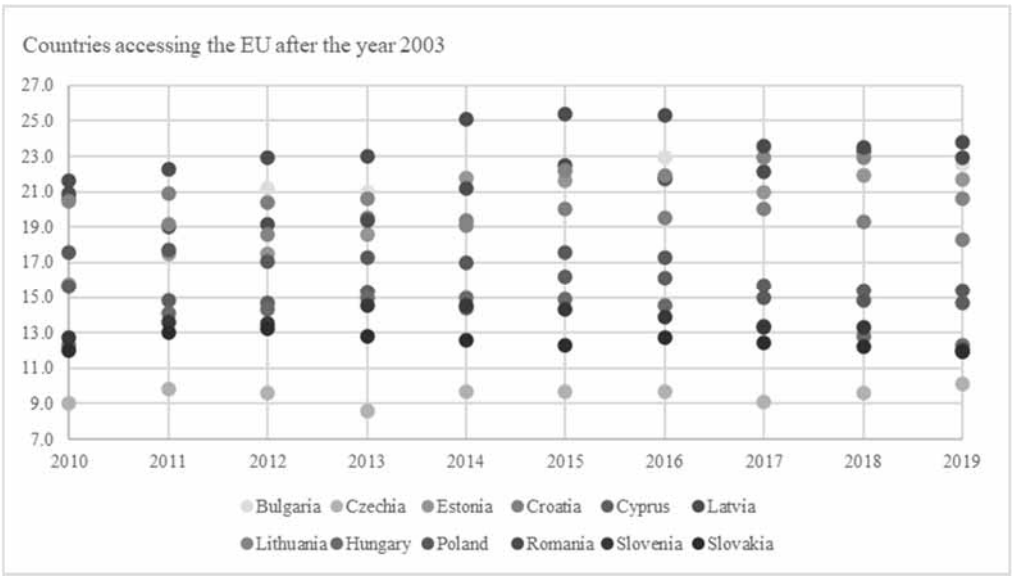
Variable		Mean	Std. dev.	Min	Max
y1	overall	16.63	3.85	8.6	25.4
	between		3.78	9.49	23.65
	within		1.00	12.52	19.08
y2	overall	19.75	12.78	3.70	61.60
	between		12.02	4.75	49.12
	within		4.89	2.98	35.58
x1	overall	70.19	6.18	52.50	82.40
	between		5.50	57.08	80.47
	within		3.01	62.12	78.09
x2	overall	9.89	3.53	4.20	26.9
	between		3.13	6.20	19.74
	within		1.73	2.77	17.05
x3	overall	2.00	0.23	1.62	2.53
	between		0.22	1.67	2.40
	within		0.05	1.83	2.16
x4	overall	0.34	0.08	0.21	0.52
	between		0.08	0.22	0.50
	within		0.01	0.30	0.37
x5	overall	79.54	11.88	31.70	95.00
	between		11.83	42.87	93.75
	within		2.44	68.37	88.87

Source: Eurostat, own data processing.

Annex 2
At risk-of-poverty and material deprivation rates in EU countries

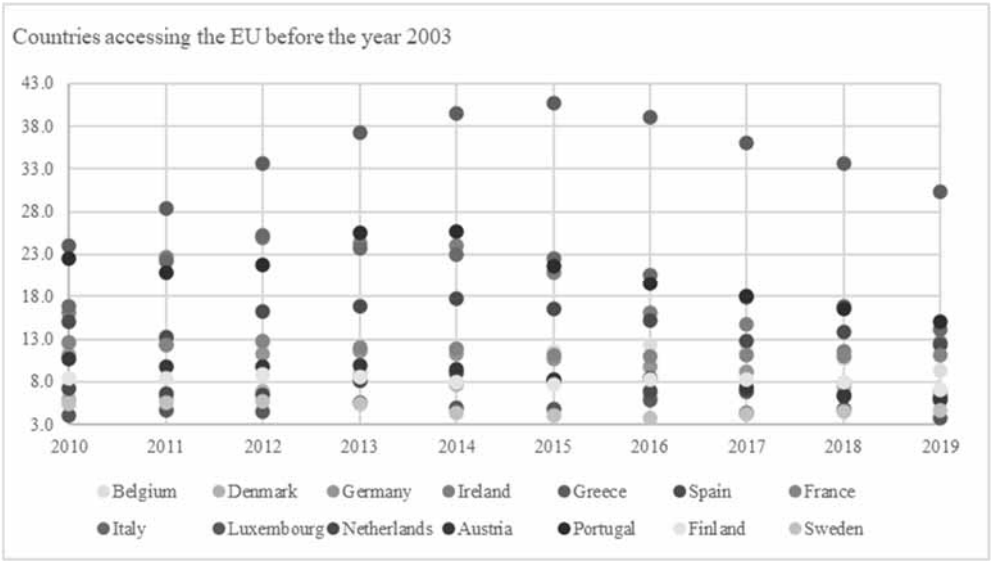
At-risk of poverty rates, EU 27 countries, period 2010-2019 (in %)

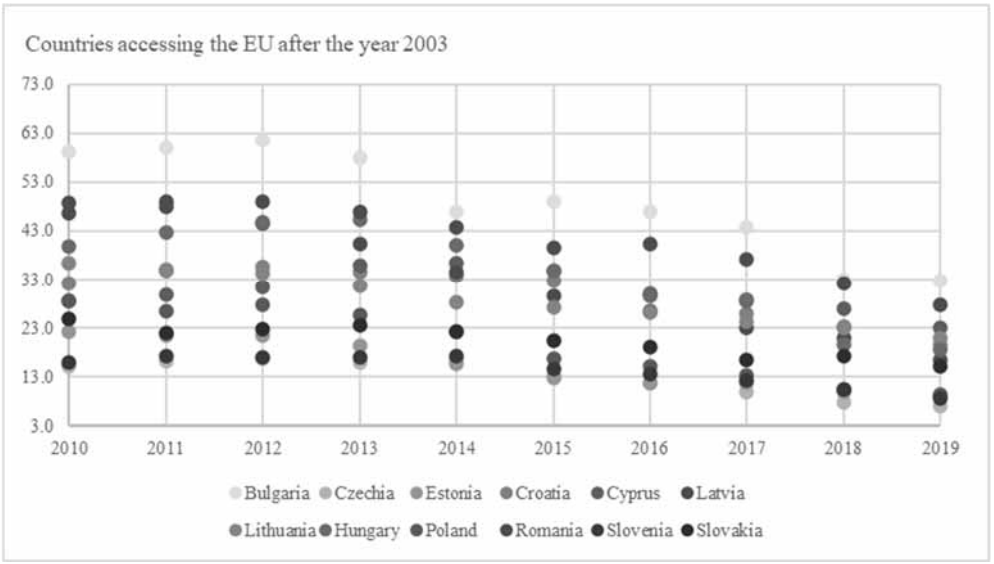




Source: Eurostat, own data processing.

Material deprivation rates, EU27 countries, period 2010-2019 (in %)





Source: Eurostat, own data processing.

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Alban Elshani[1]
Lekë Pula[2]

IMPACT OF TAXES ON ECONOMIC GROWTH: AN EMPIRICAL STUDY IN THE EUROZONE[3]

This paper analyzes the effects of types of taxes on economic growth in Eurozone countries. Three of the largest types of taxes are taken into analysis, namely personal income tax (PIT), corporate income tax (CIT), and value-added tax (VAT). The data for the independent variables (types of taxes) and the dependent variable (Gross Domestic Product – GDP) from 2002 (since the creation of the currency union) until 2019 have been taken into consideration. A total of 306 observations are entered into the panel model and analyzed using a fixed effect regression. The purpose of this paper is to highlight which types of taxes can affect growth and the magnitude of their effect. Results reveal that personal income tax, social security contribution, and customs duties and excises have a negative effect on GDP in the Eurozone countries. Whereas corporate income tax and value-added tax have a positive effect. We also find that as the share of tax income in GDP increases, their impact on economic growth deteriorates. Based on the empirical findings, we recommend that policymakers should focus on Value Added Tax and corporate income tax in order to have an impact on economic growth. Extra care should be taken in personal income tax revenues and customs and excise revenues, revenues that negatively affect economic growth.
Keywords: Tax revenue; Economic Growth; Value Added Tax; Personal Income Tax; Corporate Income Tax
JEL: C50; E62; F43; H20; P10

1. Introduction

Fiscal policy can be considered one of the most important economic policies of policymakers. The relationship between taxation and economic growth has been one of the most important and studied issues in economics (Cashin, 1995). Taxes occupy an important place in the economic policy of every economy. Governments need to be aware that any tax increase can have a negative impact on key economic indicators. Taxes are the main source of income for any economy, they can be a powerful tool that affects economic growth. Since economic growth represents one of the most important concepts in economic theory and achieving a sustainable gross domestic product is the main goal of any country, then special attention

[1] *Faculty of Economics, University of Prishtina "Hasan Prishtina", email: alban.elshani@uni-pr.edu.*
[2] *Faculty of Economics, University of Prishtina "Hasan Prishtina", email: leke.pula@uni-pr.edu (corresponding author).*
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should be paid to what types of taxes a government should focus on (Prillaman & Meier, 2014). It is important to identify the main taxes and optimize their structure in order to have a positive impact on economic growth.

Besley and Persson (2013) argue that tax systems can minimize the losses that are imposed by taxes and positively affect economic growth. According to these authors, low-income countries have tax revenues between 10% and 20% of gross domestic product, while the average tax revenue in high-income countries is more than 40%. Governments usually manipulate government spending and taxes in order to carry out their policies (Rosen, 2004). Theoretical models predict that higher levels of taxes reduce economic activity (Karras & Furceri, 2015). However, the extant research examining the effect of taxes on economic growth falls short in providing consensus on whether increases in taxes increase or retard economic growth (Alinaghi, 2017). The countless empirical studies of the effects of taxation report very inconsistent results, ranging from positive to negative effects of tax variables (Mofidi & Stone, 1990).

The art of taxation consists in determining the kind of tax rates to provide the greatest possible income with the minimum taxpayer response (Jean-Baptist Colbert, as cited in Becker & Mulligan, 2003). Okun (1978) suggests that the choice of the best taxation system lies in the balance between "honesty or equality" and efficiency. Both neoclassical and Keynesian theoretical models predict that higher taxes reduce economic activity, even though there is considerably less agreement on the exact mechanisms of how this plays out. On the other hand, taxes may be beneficial for the economy because taxes are the basic source for financing public goods and services, and hence, increase the living standards and wealth of the whole society (Szarowska, 2013).

The tax system must be flexible in order to respond in a timely manner to changing economic circumstances. How do taxes affect economic growth? In this paper, we demonstrate which types of taxes have a negative impact on economic growth and which types of taxes have a positive impact on economic growth in the eurozone member states. Although there are many studies that have studied the impact of taxes on economic growth, to the best of our knowledge, no previous paper has included only Eurozone countries. The main reason why we studied these countries has to do with the use of the same currency (EURO) by many different countries with different fiscal policies. Also, in the Eurozone member states, there are countries that apply the linear tax to personal income tax and corporate income tax. Countries such as Estonia, Latvia, Lithuania and Slovakia apply linear taxation, while other countries apply progressive taxation.

The first country in Europe to apply the linear tax is Estonia, as of 1994 (Ellis & Peter., 2012). Following Estonia, other Baltic states like Latvia and Lithuania applied the linear tax rate. A justification for the application of linear taxation may be investment growth, employment growth, and growth of production (Schratzen-staleer, Wagener, & Kohler-Toglhofer, 2005).

The time period which is taken in the study has to do with the time period when the EURO was used for the first time (2002) until the end of 2019 (before entering the COVID-19 pandemic). Not every member state of the Eurozone adopted the common currency Euro in 2002. Slovenia adopted the Euro currency in 2007, followed by Slovakia in 2009, Estonia in 2011, and Latvia and Lithuania in 2015. The main objective of this paper is to show us which

type of tax should be given the greatest importance. After analyzing the data, eurozone member states can react through their fiscal policies in regulating tax revenues. In our model, we have included: tax revenues in personal income, corporate income tax, and value-added tax and we have added other types of tax revenues that have a smaller share in GDP. Our analyzes, in detail, are specified in the findings and discussions, where we show their effect on economic growth.

The remainder of the paper is organized as follows. The next section presents the literature review. Section 3 describes the data set, variables, period, and sources, as well as the econometric methodology applied. Section 4 presents the results and analyses the estimations and draws policy implications, while Section 5 presents results for an exercise in which we estimate. Finally, Section 6 presents the conclusions.

2. Literature Review and Hypothesis Development

2.1. Prior literature

The breadth of empirical literature studying the effect of taxes on economic growth across countries is overwhelming. Depending on the countries surveyed, results differ. Previous research focusing on different time periods and country data observation has shown different results regarding the impact of taxes on economic growth. However, according to almost all authors, taxes have impacted economic growth.

Tanzi and Zee (1997) analyzed the relationship between economic growth and other factors such as taxes, government spending, macroeconomic stability and income distribution. Authors show that government taxes and expenditures have an impact on GDP growth. The same effect was evidenced by Atkinson and Stern (1980), who studied Great Britain between 1973 and 1979. They came to the conclusion that taxes have a very small impact on economic growth in the long run. They present the relationship between theory and econometric results for public policy analysis. Along with the same line Fu et al. (2003), analyzing data from the USA and utilizing types of taxes, concluded that they have an impact on GDP growth. These authors showed the correlation between fiscal policy and economic growth in the US, as well as the correlation between taxes, government spending and deficit. These results are achieved using the econometric VAR model.

Another stream of research finds negative effects of taxes on economic growth. (Blanchard & Perotti, 2002) find that increasing total revenues, including tax revenues, has a negative impact on investment and GDP. The authors studied the United States, but the period of time that was studied was shortly after World War II. Similar findings are shared by Fölster & Henrekson (2001), who studied only rich countries, from 1970 to 1995, Holcombe & Lacombe (2004), studied by the US, from 1960-1990 and Bania, et al. (2007), who also studied the US. Bleaney, Gemmell, and Kneller (2001) studied direct taxes and indirect taxes in OECD countries from 1970 to 1995 and concluded that increasing tax revenues reduce GDP growth. According to these authors, the increase in tax revenues has a negative correlation with GDP growth.

2.2. Hypothesis development

2.2.1. Personal income tax and economic growth

A large number of studies have tried to identify the link between personal income tax and economic growth. Most of the scientific papers have been conducted in or using data from developed countries, members of the OECD. Bleaney et al. (2001) studied the OECD member countries from 1970 to 1995 and used the panel as an econometric model, concluding that personal income tax reduces (reduces) economic growth. Gemmell et al. (2011) have come to the same conclusions, where they have used the same states but with a greater extension of the years (1970-2004) as well as the same econometric model, Personal income tax has a negative impact on economic growth. Widmalm (2001) also studied the OECD countries from 1965 to 1990, and came to the same results, personal income tax has a negative impact on economic growth. The econometric model used was the Panel Section Data. Elshani and Ahmeti (2017) have analyzed European OECD member countries. They came to the same conclusions as the above authors using the Panel data econometric model. That personal income tax has a negative impact on economic growth in OECD countries (Schwellnus et al., 2008; Arnold et al., 2011). The most widely used econometric model is the Data Panel, as the best econometric model when dealing with many countries for many years.

Mertens and Ravn (2013) studied the changes in personal income tax and corporate income tax in the United States of America after the Second World War. They concluded that personal income tax has a negative impact on economic growth. A reduction in personal income tax of 1% causes GDP growth from 1.4% in the first quarter to 1.8% in the fourth quarter. Canavire-Bacarreza, et al. (2013) have studied Latin American countries. GDP has been taken as a dependent variable, while one of the independent variables has been the personal income tax. The econometric model used was the Panel model. They concluded that personal income tax has a negative impact on economic growth in Latin American countries. Therefore, we propose the following hypothesis:

H1: Personal Income Tax has a negative impact on economic growth in the Eurozone countries

2.2.2. Corporate income tax and economic growth

Goolsbee (2004) has analyzed how corporate income tax influences economic growth, studying 70 developed countries around the world. The author concluded that a higher corporate income tax rate is associated with a lower economic growth rate. The econometric model used was time data series. Lee and Gordon (2005) came to the same conclusions when they also included in the study of 70 developed countries. The reduction of corporate income tax by 1% affects economic growth from 0.1 to 0.2 points. The reduction of corporate income tax by 1% affects economic growth from 0.1 to 0.2 points (Ergete & Dahlby, 2012). The authors have considered data from Canada from 1977-2006. Mertens and Ravn (2013), studied the US after World War II and concluded that CIT has a negative impact on economic growth. According to these authors, a 1% reduction in corporate income tax causes an increase in GDP from 0.4% in the first quarter, to 0.6% after the other three quarters.

Canavire-Bacarreza et al. (2013) studied Latin American countries and concluded that CIT has small negative effects on economic growth. The authors took GDP as the dependent variable, while PIT, CIT, and VAT were taken as independent variables.

All authors who studied the OECD member states came to the same conclusions. Corporate income tax has a negative impact on economic growth and, in the long run, undermines economic development in OECD countries from 1970 to 2004 (Gemmell et al., 2011). CIT negatively affects economic growth in OECD countries, studied from 1996 to 2004 (Arnold et al., 2011). Padovano & Galli (2001), in their study of 23 OECD member countries, from 1951 to 1990, concluded that the marginal rate of CIT has a negative correlation with GDP growth. All of these authors have used the econometric data panel model.

Other authors have not found any correlation between CIT and GDP. Widmalm (2001) studied the OECD countries from 1965 to 1990, using the Panel section data econometric model, and concluded that the CIT has no impact on economic growth. Mendoza et al. (1997) studied 18 OECD member countries from 1965 to 1991, using the panel and model as a model, and concluded that CIT affects investment, but the effect on GDP is not significant. But, based on subsequent studies, some authors have found a positive effect of CIT on economic growth. Elshani & Ahmeti (2017) have studied the European OECD countries, from 2002 to 2015, with panel data and have found a positive correlation between CIT in GDP. Drawing from the literature review, we set forth the following hypothesis:

H2: Corporate Income Tax has a negative impact on economic growth in the Eurozone countries.

2.2.3. Value-added tax and economic growth

Kneller et al. (1999) examined the OECD member states between 1970 and 1995, GDP as dependent variables, while direct taxes and VAT were taken as independent variables, while the econometric model used was Panel data. They concluded that VAT has a positive impact on economic growth. Authors conducted a similar study with data from 1970 and 2004, with panel data, and came to the same conclusion (Gemmell et al. 2011).

Elshani and Ahmeti's (2017) study analyzed European countries and members of the OECD, and came to the same conclusions as the aforementioned authors. So, value-added tax has a positive impact on economic growth in OECD countries from 2002 to 2014. Several other authors (Chiricu, 2019; Canavire-Bacarreza et al., 2013; Olufemi et al.; 2018; Martinez-Vazquez et al., 2011; Jinill & Henry Kim, 2003; Nikoloski, 2020); Stoilova (2017) came to the same conclusion. All of these authors have used the econometric data panel model.

Contrary to the previous stream of research, Emran and Stiglitz (2005) have studied tax reforms in developing countries, and find that VAT has a negative impact on economic growth. While, according to Harberger (1962), that the United States has studied, VAT does not have any impact on economic growth. Given the discussion of previous studies, we propose the following hypothesis:

H3: Value-added tax has a positive impact on economic growth in the EUROZONE countries.

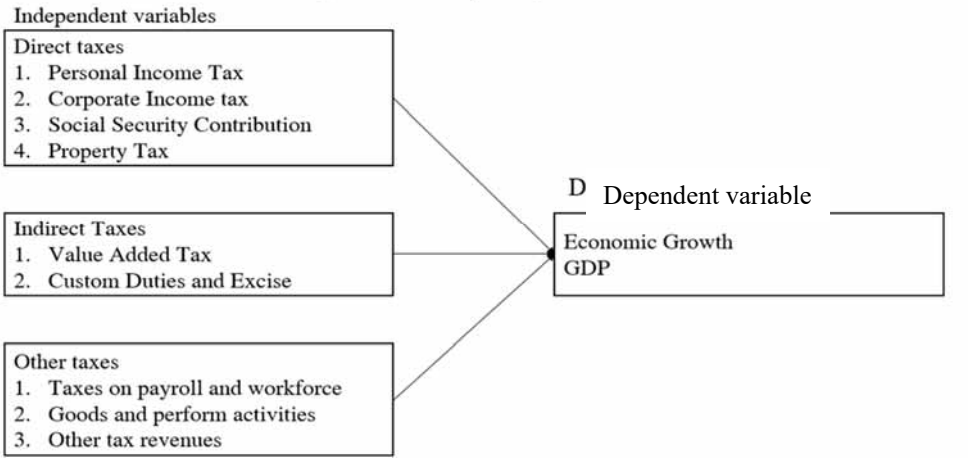
Based on the above data, we can conclude that the findings of the authors differ from each other and the reasons for these may be: different periods taken into analysis, different countries, regions or constituencies analyzed, etc. This study is of particular importance because it includes countries that use the common currency (EURO), although they are different countries with different fiscal policies.

3. Methodology and Conceptual Framework

In this section, we present a standard model of tax revenue and economic growth. Some recent paper has used a Panel Data model approaches for evaluating the comparison between these two variables. The use of panel data enables the evaluation of changes in time, but also differences between states (Hsiao, 2007; Petranov et al., 2022). Through the application of the Panel Model, it is possible to control the variables that, in reality, are very difficult to measure. Our Panel data is strongly balanced. GDP growth is the dependent variable obtained from the World Bank database. This variable was also taken by most researchers (Martinez-Vazquez et al., 2011; Canavire-Bacarreza et al., 2013; Kneller et al., 1999; Padovano & Galli, 2001; Widmalm, 2001; Schwellnus, 2008; Arnold et al., 2011; Romer & Romer, 2010; Lee & Gordon, 2005; Mendoza et al., 1997; Elshani & Ahmeti, 2017). Independent variables taken in the study are: Revenues from Personal Income Taxes, Corporate Income Taxes, Value Added Tax, Customs and Excise, Social Security Contribution, Property Tax, taxes on payroll, goods perform activities and other tax revenues. All independent variables show their share in Gross Domestic Product (GDP) as a percentage. All data from independent variables are collected from the OECD database.

Figure 1 presents the conceptual framework of this study. Independent and dependent variables are outlined as well as the relationships studied are presented.

Figure 1. Conceptual framework



The paper includes European states and members of the EUROZONE, which apply EURO currency and are in a total of 17 states. The countries that are surveyed are Austria, Belgium, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Portugal, Slovakia, Slovenia, and Spain. The study has included a total of 18 years, from 2002 to 2019. The year 2002 was the first year of study, the year in which the application of the common euro currency has begun. Eurozone countries since the creation of the currency union (Afonso & Leal, 2019). Not all countries have accepted the Euro currency in 2002. Through Dummy variables, we will show, for each country, how the observed variables evolve, before and after the acceptance of the Euro currency. With D0 are marked the years before the introduction of the Euro currency and with D1 are marked the years after the acceptance of the Euro. During this analysis, it turns out that Slovenia had greater economic growth before entering the Eurozone by 2.37% compared to the years after it accepted the Euro; followed by Slovakia with an economic growth of 4.45% compared to the years after the adoption of the Euro. While in the Baltic countries, the situation was as follows. Lithuania has had an increase of 0.93%, Latvia with 0.62%, while the only country that has had an economic decline is Estonia with -0.36%. If we analyze these countries in more detail, we find that their economic growth was 1.60% greater before entering the Eurozone. Therefore, these data did not affect the final result. While the independent variables have not had any major changes that could affect our results. It is important to note that all these countries, with the exception of Slovenia, until 1991 were Eastern Bloc countries.

In the table below (Table 1), we show the share of revenues in GDP, as well as economic growth in percentage. The data were taken from the respective databases of the OECD and the World Bank and processed by the authors.

Table 1. Total tax revenue (% of GDP) vs GDP growth (average 2002-2019)

Country	Total Tax Revenue	GDP growth
AUT	41.28	1.55
BEL	43.60	1.62
EST	31.87	3.60
FIN	42.29	1.37
FRA	43.80	1.27
DEU	36.28	1.27
GRC	32.11	(0.07)
IRL	27.39	4.72
ITA	40.85	0.12
LVA	29.15	3.59
LTU	28.99	4.09
LUX	37.50	2.85
NDL	36.36	1.37
PRT	32.33	0.68
SVK	30.77	3.97
SVN	37.74	2.36
ESP	33.46	1.55
Average	35.63	2.11

Source: OECD[4] and World Bank, processed by authors.

[4] Data extracted on 10 Jan 2022 10:00 UTC from data world bank and OECD.

In the table above, we have presented the average share of tax revenues in GDP, and at the same time, we have presented the GDP growth. Based on the above data, it turns out that the states that have had the lowest share of tariffs have a predisposition to have greater economic growth. Based on the table, it can be seen that the country with the largest economic growth was Lithuania, with 4.09% and which had a share of tax revenues of 28.99%. After Lithuania, the largest economic growth was Slovakia, with 3.97% and a share of tax revenues of 30.77%, followed by Estonia, with GDP growth of 3.60% and a share of tax revenues of 31.87%. It is important to note that countries that have had the greatest economic growth, such as Lithuania, Slovakia and Estonia, apply linear taxation to personal income tax and corporate income tax. The countries that apply the linear tax have greater economic growth than the countries that apply the progressive tax (Elshani et al., 2018). On the other hand, the country with the largest share of tax revenues in GDP is France, but it has had a very small economic growth (1.27%), followed by Belgium, which has had a share of GDP revenues of 4.60% with economic growth of only 1.62%. From the analyses, it can be concluded that the higher the share of tax revenues in GDP, the lower the economic growth. This finding is supported by many authors (Bania et al., 2007; Tanzi & Zee, 1997; Atkinson & Stern, 1980; Fu et al., 2003; Blanchard & Perotti, 2002; Fölster & Henrekson, 2001; Holcombe & Lacombe, 2004; Padovano & Galli, 2001; Kneller et al., 1999).

Table 2. Revenue of taxes in % in Gross Domestic Product (2002-2019 average) by states[5]

Nr	Country	P.I.T.	C.I.T.	SSC	TPW	TP	V.A.T.	CDE	GPA	Other
1	AUT	9.41	2.20	14.18	2.76	0.55	7.63	3.33	0.94	0.29
2	BEL	12.46	3.22	13.75	0.00	3.08	6.89	3.54	0.66	0.01
3	EST	5.65	1.59	11.09	0.00	0.29	8.52	4.32	0.42	0.00
4	FIN	12.70	2.75	11.93	0.00	1.20	8.63	4.59	0.45	0.04
5	FRA	7.94	2.42	16.12	1.36	3.72	7.50	3.50	0.31	0.92
6	DEU	9.21	1.74	13.88	0.00	0.91	6.78	3.16	0.60	0.00
7	GRC	4.80	2.16	10.86	0.00	2.46	6.96	3.72	1.15	0.00
8	IRL	8.63	2.87	4.37	0.18	1.76	5.95	2.94	0.67	0.00
9	ITA	10.78	2.41	12.62	0.00	2.42	5.92	4.08	0.69	1.94
10	LVA	5.85	1.63	8.52	0.02	0.95	7.79	3.81	0.58	0.00
11	LTU	5.07	1.63	10.55	0.00	0.33	7.71	3.44	0.26	0.00
12	LUX	8.02	5.48	10.67	0.00	3.09	6.23	3.79	0.16	0.05
13	NDL	7.04	2.92	13.44	0.00	1.53	6.67	3.49	1.13	0.14
14	PRT	6.00	3.03	8.70	0.00	1.19	8.10	4.59	0.44	0.27
15	SVK	3.08	2.88	13.08	0.00	0.44	6.83	3.77	0.69	0.00
16	SVN	5.44	1.91	15.28	0.61	0.61	8.25	4.86	0.77	0.00
17	ESP	7.12	2.65	11.74	0.00	2.48	5.78	2.92	0.77	0.01
	average	7.60	2.56	11.81	0.29	1.59	7.18	3.75	0.63	0.22

Source: OECD, processed by authors.

In the table above (where the averages of the states are presented), it is seen that the states that have higher tax rates have even higher revenues from these types of taxes. The more developed countries have a larger share of direct taxes, such as PIT and CIT, while those less developed countries depend on indirect tax revenues, such as VAT. Finland has the largest share of PIT revenues in GDP with 12.7%, followed by Belgium with 12.46% and Italy with

[5] Data extracted on 10 Jan 2022 18:45 UTC (GMT) from OECD.Stat

10.78%. While the lowest share of revenues from PIT is evidenced in Slovakia with 3.08%, followed by Greece with 4.80% and Lithuania with 5.07%. In terms of the share of revenues from CIT in GDP, Luxembourg leads with 5.48%, followed by Belgium with 3.22% and Portugal with 3.03%. Estonia has the lowest share of revenues from CIT with 1.59%, followed by Latvia and Lithuania with 1.63%. Finland has the highest share of VAT revenues as a percentage of GDP with 8.63%, followed by Estonia with 8.52% and Slovenia with 8.25%. While Spain has the lowest share of VAT with 5.78%, followed by Ireland with 2.94% and Germany with 3.16%.

The total number of observations in this grouping is 17 states for 18 years, a total of 306 observations. The econometric model used in this case is the Fixed Effects Model.

Table 3. Details and description of the variables

Variable	Abbreviation	Calculation	Source
Gross Domestic Product	GDP growth	Annual growth rate	Worldbank
Personal Income Tax	PIT	Percentage share of GDP	OECD
Social Security Contribution	SSC	Percentage share of GDP	OECD
Taxes on payroll and workforce	TPW	Percentage share of GDP	OECD
Property tax	TP	Percentage share of GDP	OECD
Value Added Tax	VAT	Percentage share of GDP	OECD
Excise and Custom Duties	CDE	Percentage share of GDP	OECD
Goods and perform activities	GPA	Percentage share of GDP	OECD
Corporate Income Tax	CIT	Percentage share of GDP	OECD
Other tax revenues	OTh	Percentage share of GDP	OECD

Source: Illustration by authors.

To prove hypotheses 1, 2 and 3 the following model is used:

$$Yit = \alpha + \beta 1pit + \beta 2ssc + \beta 3tpw + \beta 4tp + \beta 5vat + \beta 6cde + \beta 7gpa + \beta 8cit + \beta 9oth + \mu it + \epsilon it$$

Where:

Yit represents a growth of GDP;
PIT – personal income tax;
SSC – social security contribution;
TPW – taxes on payroll and workforce;
TP – property tax;
VAT – Value Added Tax;
CDE – excise and customs;
GPA – goods and perform activities;
CIT – Corporate Income Tax;
OTh – other tax revenues.

Hausman Test – When using the panel model, we also used the Hausmann test, so that the results obtained are as accurate as possible. Using the Hausman test, we come to the conclusion that a fixed effect should be used, which is more accurate (in our case) than the random effect. The formula is:

$$H = (b\text{-}B)\ (Var\ (b) – Var\ (B))\ (b\text{-}B)$$

4. Results and Discussion

Descriptive statistics were used to describe and summarize the ratios of the variables in the study, including GDP growth, personal income tax, corporate income tax, social security contribution, taxes on payroll and workforce, property tax, value-added tax, excise and custom duties, goods and perform activities and other tax revenues. They are presented in Table 4.

Table 4. Descriptive statistics

	GDP	PIT	CIT	SSC	TPW	TP	VAT	CDE	GPA	Oth
Mean	2.112	7.600	2.558	11.809	0.29	1.589	7.184	3.755	0.628	0.216
Stand.Dev.	3.860	2.734	1.049	2.836	0.7302	1.099	1.109	0.701	0.310	0.509
Minimum	-14.837	0	0	3.69	0	0.21	0	0.20	0	0
Maximum	25.176	14	7.68	16.91	2.94	4.39	9.29	5.57	1.91	2.44
Obs.	306	306	306	306	306	306	306	306	306	306

Source: Own analysis.

This table provides descriptive statistics used in the analyses. The table shows that the Social security contribution has a very high average value (11,809). While the paper is focused on personal income tax, corporate income tax, and value-added tax, then here we note that Personal income tax has a very high average value (7.60), followed by value-added tax with an average value of 7,184. While corporate income tax has an average value of 2,558. In the following table, we present the correlation analysis.

Table 5. Correlation analysis

Variables	GDP	PIT	CIT	SSC	TPW	TP	VAT	SGS	GPA	OTH
GDP	1.0000									
PIT	-0.1361	1.0000								
CIT	0.0875	0.1869	1.0000							
SSC	-0.2368	0.1313	-0.1271	1.0000						
TPW	-0.0237	0.1342	-0.1068	0.3685	1.0000					
TP	-0.1330	-0.0122	0.4452	0.1142	-0.0350	1.0000				
VAT	0.0276	-0.0122	-0.2650	0.1302	0.1631	-0.3785	1.0000			
CDE	-0.1693	-0.0294	0.0013	0.1148	-0.1428	-0.1803	0.5901	1.0000		
GPA	-0.1577	-0.0133	-0.2097	0.1441	0.1286	-0.0305	-0.0365	0.069	1.0000	
OTH	-0.1638	0.2752	-0.0029	0.2178	0.1432	0.3186	-0.2126	0.0465	-0.0480	1.0000

Source: Own analysis.

Table 5 shows the correlation between GDP growth and Personal Income tax, Corporate income tax, Social security contributions, taxes on payroll and workforce, Property tax, Value Added Tax, Custom duties and excise, goods and performed activities and other tax revenue in the EUROZONE from 2002 to 2019. Results reflect the positive correlation between Corporate income tax (0.0875), Value Added Tax (0.027,6) and GDP growth. All other variables have a negative correlation with GDP growth, starting from Personal Income Tax (-0.1361), Social security contribution (-0.2368), and Custom duties and excise (-0.1693). Based on the results of the correlation analysis, we conclude that Value Added Tax and Corporate Income Tax are of particular importance in economic growth in

EUROZONE countries. While other types of taxes have a negative impact on economic growth in the EUROZONE.

In this section, we present the results obtained and try to validate Hypotheses H1, H2, and H3.

Testing for autocorrelation in a time series is a common task with time series data. First, we used the autocorrelation test, exactly the Woodridge test for autocorrelation in panel data. The autocorrelation taks values +1 and -1. An autocorrelation of +1 represents a perfect positive correlation, while an autocorrelation of negative 1 represents a perfect negative correlation. In Table 6, we presented the results of Woodrindge test for autocorrelation.

Table 6. Estimated results of Woodridge test for autocorrelation

Estimated results	
H0:	no first-order autocorrelation
F(1,16) =	17.938
Prob >F =	0.0006

Source: Own analysis.

Since we did not have autocorrelation, we used the Breusch and Pagan Lagrangian multiplier test gdpgrowth[nr,t] = Xb + u[nr] + e[nr,t]

In statistics, the Breusch–Pagan test, is used to test for heteroskedasticity in a linear regression model. It tests whether the variance of the errors from regression is dependent on the values of the independent variables. In that case, heteroskedasticity is present.

Table 7. Estimated resuts of Breusch and Pagan Lagrangian multiplier test

Estimated results	Var	sd = sqrt(Var)
GDPgrowth	14.90047	3.860113
e	10.75901	3.280093
u	.9884065	.9941864
chibar2(01) = 1.41		
Prob > chibar2 = 0.1172		
Prob > chi2 = 0.0000		
Test: Var(u) = 0		

Source: Own analysis

Here we Reject the null and conclude that random effects are appropriate at this stage, meaning that there is evidence of significant differences across countries, therefore, we can not run a simple OLS; hence we proceed to choose between Random Effect Model or Fixed Effect.

Even in this case, we used the Hausman test (Table 8) so that our results are more accurate. The basic hypothesis states that there is no correlation between state effects and regressors in the model. In our case, this hypothesis stands, so the Fixed Effect Model is better than the other Panel models.

Table 8. Hausman test

	Coef.
Chi-square test value	44.69
P-value	0.000

Source: Own analysis.

chi2(9) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 44.69

Prob>chi2 = 0.0000 (V_b-V_B is not positive definite). Provided that Prob>chi2<0.05 we choose the Fixed Effect Model

From the results of the Hausman test (Prob>chi2 =0.0000; provided that Prob>chi2<0.05) we choose the Fixed Effect Model.

After determining the fixed effects model, we continued with other tests. Modified Wald test for GroupWise heteroscedasticity in a fixed effect regression model. The null is homoskedasticity (or constant variance). Above, we reject the null and conclude heteroskedasticity.

Table 9. Estimated Modified Wald test

H0:	sigma(i)^2 = sigma^2 for all i
chi2 (17)	864.07
Prob>chi2	0.0000

Source: Own analysis.

Before commenting on the findings according to fixed effects, we performed the test for multicollinearity, through the Variance Inflation Factor (VIF).

Table 10. Testing for multicollinearity

Constant	1/VIF (Tolerance)	VIF
P.I.T.	0.783	1.278
C.I.T.	0.641	1.559
S.S.C.	0.767	1.304
T.P.W.	0.695	1.438
T.P.	0.573	1.747
V.A.T.	0.416	2.406
S.G.S.	0.480	2.085
G.P.A.	0.883	1.133
Other	0.686	1.457
Mean		1.601

Source: Own analysis.

The table above presents the results of the VIF (Variance Inflation Factor) test in order to test multicollinearity between independent variables. Since none of the variables has a value higher than 5 and we have an average VIF of 1.601, then we conclude that the problem of multicollinearity does not appear in our data.

The results to be commented on are derived from the FIXED EFFECTS model.

From Table 11, we can see which of the types of taxes have an impact on economic growth. Personal Income tax, Social security contributions, custom duties, excise, and other taxes have a negative impact on economic growth. The increase of revenues from PIT by 1% causes a decline in GDP of 0.64% in the Eurozone countries. The increase of revenues from social security contributions by 1% causes a decline in GDP of 1.97% in the Eurozone countries. The increase of revenues from customs duties and excise by 1% causes a decrease of GDP by 2.75% in the Eurozone, while the increase of revenues from other taxes by 1% causes a decrease of GDP by 3.10% in the Eurozone. Corporate Income tax and Value Added Tax have a positive impact on economic growth in Eurozone countries. If revenues from CIT increase by 1%, the economic growth is 1.06% of GDP in Eurozone countries, while if revenues from VAT increase by 1%, the GDP growth is 0.85% in Eurozone countries. From this, we conclude that special attention should be paid to the increase of revenues from CIT and VAT in the Eurozone countries.

Table 11. Results of Regression Analysis of Tax Revenue on GDP

Variables	Coefficient	Std.Error	T-ratio	p-value	
Cons.	29.42053	4.847839	6.07	0.000	
PIT	-0.642619	0.2922797	-2.20	0.029	***
SSC	-1.971522	0.3117381	-6.32	0.000	***
TPW	-0.8772189	1.067146	-0.82	0.412	
TP	1.142473	0.709705	1.61	0.109	
VAT	0.8479974	0.3755657	2.26	0.025	***
CDE	-2.757764	0.5560632	-4.96	0.000	***
GPA	2.416945	1.586837	1.52	0.129	
CIT	1.060962	0.3749135	2.83	0.005	***
OTHER	-3.103018	1.402232	-2.21	0.028	***
R square				0.2364	
Adjusted R square				0.2308	
F				9.63	
P-value (F)				0.000	

Source: Own analysis.

The R-square in our model indicates that our results explain 24 % of the variance. This is above the Falk and Miller (1992) rule of thumb of 0.1 and just below the Cohen (1988) 0.26 benchmark for substantial explanatory power.

In the following section, we comment on our findings, at the same time, we discuss these results and make comparisons with the findings of other authors.

Hypothesis H1 has been confirmed. Personal Income Tax is significant with $p < 0.05$. Personal Income Tax in countries applying the Euro has a negative impact on economic growth. The increase in the share of personal income tax revenues to Gross Domestic Product by 1%, contributes to the reduction of Gross Domestic Product by 0.64%. This is in line with several authors: Bleaney et al. (2001), Mertens & Ravn (2013), Canavire-Bacarreza, et al. (2013), Elshani & Ahmeti (2017), Gemmell et al. (2011), Schwellnus (2008), Mertens & Ravn (2013), Arnold, et al. (2011). When the tax rates are high, consumers pay more taxes and the purchasing power of consumers falls. This affects the gross domestic product to fall (Abu & Mohammed Gamal, 2022).

Hypothesis H2 is rejected. Corporate Income Tax has a positive and significant ($p < 0.05$) impact on economic growth. An increase in Corporate Income Tax of Gross Domestic Product by 1%, contributes to Gross Domestic Product growth by 1.06%. Similar findings are evidenced in Elshani and Ahmeti (2017); authors have analyzed 20 European countries, members of OECD, for the 2002-2014 period. As for corporate income tax, most authors (Goolsbee, 2004; Lee & Gordon, 2005; Ergete & Dahlby, 2012; Mertens & Ravn, 2013) have come to the conclusion that it either has a negative impact or no impact at all. This also depends on the countries that are studied, but also the years that are taken as a base.

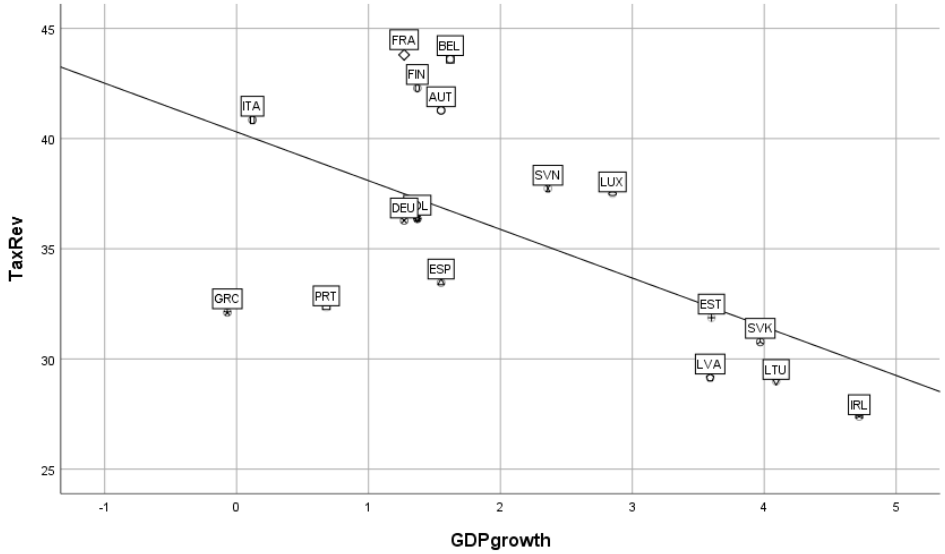
Hypothesis H3 is fully confirmed. Value-added tax is completely significant with $p < 0.05$. From the above results, we can say that: Value Added Taxes in countries applying the Euro have a positive impact on economic growth. The increase in Gross Domestic Product Value Added Tax 1% contribution contributes to Gross Domestic Product growth by 0.85%. The same findings are evidenced by other authors (Chiricu, 2019; Olufemi et al., 2018; Elshani & Ahmeti, 2017; Jinill & Henry Kim, 2003; Martinez-Vazquez et al., 2011; Nikoloski, 2020; Canavire-Bacarreza et al.; 2013; Bleaney et al., 2001; Kneller et al., 1999; Jinill & Henry Kim, 2003. Scholarships to date have observed that VAT has a positive impact on economic growth. The more the state collects this type of tax, the bigger the state's power to invest and increase government spending increases, which is known to have a direct impact on economic growth (Pula & Xhelili, 2022).

In addition to the above-mentioned hypotheses, we can comment on some other indicators that were omitted from our framework. We find that revenue from social security contributions in countries applying the Euro has a negative impact on economic growth. The increase in the share of Social security contribution revenues to Gross Domestic Product by 1%, contributes to the reduction of Gross Domestic Product by 1.97%. This is in line with findings from Olufemi, et al. (2018). Moreover, we find that revenues from Custom and excise duties are significant in countries applying the Euro has a negative impact on economic growth. The increase in the share of custom and excise duties revenues to Gross Domestic Product by 1%, contributes to the reduction of Gross Domestic Product by 2.76%. These findings are in line with Elshani and Ahmeti (2017).

In the graph below, we show the share of revenues in GDP, as well as economic growth in percentage. The data were taken from the respective databases of the OECD and the World Bank and processed by the authors.

Based on the graph, it can be seen that the countries with the highest economic growth have the lowest share of revenues in GDP. Ireland and Lithuania had the highest economic growth during these years, with 4.72% and 4.09%, respectively. Both of these countries had a share of revenues in GDP, the lowest with 27.39%, respectively 28.99%. Based on these data, we conclude that countries that have a share of less than 30% of GDP revenues, also have the highest economic growth (Bania et al., 2007; Tanzi & Zee, 1997; Atkinson & Stern, 1980; Fu et al., 2003; Blanchard & Perotti, 2002; Fölster & Henrekson, 2001; Holcombe & Lacombe, 2004; Padovano & Galli, 2001; Kneller et al., 1999). On the other hand, the countries that had the largest share of revenues in GDP had much lower economic growth. France has the highest share of GDP revenues with 43.8% with economic growth of 1.27%, followed by Belgium with a share of GDP revenues of 43.6% and economic growth of 43.6% respectively, Finland with a revenue share of 42.29% and economic growth of only 1.37%.

Graph. 1 Total tax revenue vs GDP growth (2002-2019 average)



Source: Illustrated by authors'

5. Conclusion, Implications and Future Research

This paper examined the effects of taxes on economic growth in EUROZONE countries. During the literature review, we presented the findings of numerous authors. Based on the findings of the authors, we have also presented the hypotheses which we have tried to prove. Of the three hypotheses raised, two were confirmed, while our findings are opposite from the literature review. This non-confirmation of the hypothesis may have come as a result of the countries being studied. Few authors have studied the Eurozone countries. Moreover, the years taken into analysis have not yet been examined by scholars (from 2002 to 2019). With the collection of more taxes, the marginal cost of each Euro collected becomes more costly.

The empirical results we have gained have given us different effects on economic growth. From the analysis of taxes in Eurozone countries, we find that Personal Income Tax has a negative impact on economic growth, suggesting that countries should keep this tax low to encourage consumption. The obtained results also correspond to the empirical results of many authors who have measured the impact of PIT on economic growth. In the case of Corporate Income Tax, according to the empirical results obtained, we conclude that CIT has a positive impact on economic growth in the countries that are surveyed. The same results are earned concerning the Value Added Tax. VAT has a positive impact on economic growth. According to the results obtained, it appears that VAT is significant and has a great positive impact on economic growth in the countries that are surveyed.

This paper provides important policy implications. The structure of taxes in an economy is a prerequisite for achieving economic growth. Policymakers should pursue optimization of the tax structure to enable economic growth in their countries. Increased income from VAT and

CIT has a positive impact on economic growth. Therefore, policymakers should make sure that these taxes are set to enable the economic growth required.

We introduce Eurozone countries as units of analysis, which provide a viable avenue of research for a multitude of variables in future research. Future research should focus on more complex data to understand better the interplay between tax revenue and economic growth.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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Ivka Tsakova[1]

CONSEQUENCES OF GLOBAL FIRM DOMINATION IN THE POST-DEMOCRATIC EUROPEAN UNION (AND ITS MEMBER STATES)[2]

The article analyses the crisis situation in the EU today, caused by the dominating influence of big companies and banks in public affairs on national and European levels in post-democracy (C. Crouch). In light of the political-economic and critical approach, the article analyses the power of global firms as a main factor in the New public management (NPM) during the current neoliberal capitalism. The post-democratic consequences by the implementation of the NPM in the EU and its member states are: a) emptying political institutions of their democratic content; b) defective market economy due to existing monopolies, and c) attempts to privatisation of civil society. The conclusion comprises some ideas for the rehabilitation of politics and its democratisation.
Keywords: European Union; Post-democracy; New public management; Neoliberalism; global/giant firms
JEL: P16; H1; D42; L38; K4

Introduction

At the beginning of the third decade of the XXI century, the condition of the EU is defined by a number of crises – economic, energy, ecological, COVID-19, etc. The politically united Europe faces a choice whether to become a transmission for neoliberal global governance or to find its own unique way for solving the problems of the European citizens in an insecure world, defined by a wobbly world order due to a delineating decline of the American world hegemony. At this stage, the European Union (EU) is operating in post-democratic conditions, where contemporary capitalism does not act in synchrony with the liberal representative democracy. There is a change in the perspective of movement – from "the end of history" towards "the future of history" (Fukuyama, 2012). The various crises that circulate across the EU member-states and the EU as a whole are caused to a great extent by the dominating influence of the global firm in the political process by the implementation of the New public management (NPM).

[1] *Ivka Tsakova, D.Sc. in Political Sciences, Associate professor at the Department of "Political Science", Faculty of "International Economics and Politics", UNWE, e-mail: itsakova@unwe.bg.*
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A theoretical base outlining the negative impact of big companies and banks on the socio-economic development of national states (predominantly Western ones) at the beginning of XXI century is presented by Colin Crouch in his books: "Post-Democracy" (2004), "The Strange Non-Death of Neoliberalism" (2011) and „Post-Democracy after the Crises" (2019). I uphold his conceptual framework explaining the alarming processes and phenomena in the EU and the member states alone in times of dominating neoliberalism, consisting of four, not three powerful actors. According to Crouch, the contemporary neoliberal world consists of an apparent "Quadrilateral of forces": state, market, civil society and big companies. The "two biggest dichotomies" used until recently by social sciences, namely "state-market" and "state-civil society", are no longer suitable for the analysis of current events, because they omit one of the important powerful actors – the big corporations (Crouch, 2011, p. 143). The power of the latter (power of Big Money, Big Business) has often had a disastrous impact on the state (failed states), market (market-failures) and civil society. The global firm is a "key institution of the post-democratic world" (Crouch, 2012, p. 40), which imposes redefinition of some concepts such as democracy (liberal) and state government by introducing new terms such as post-democracy and New public management.

The main aim of the article is to disclose some of the consequences of the dominating influence of Big companies in the post-democratic EU and its member states. The key role of global firm/bank in the NPM produces at least three post-democratic consequences, analysed in the article, namely: a) emptying political institutions of their democratic content; b) defective market economy due to existing monopolies; and c) attempts to privatisation of civil society.

This aim is achieved with the help of the methodological instruments of the political economy and the critical theory (respectively, the political and economic and the critical approach). Through the prism of political economy, the article explains the transition from the politicisation of economy during the "three gold decades" after the Second World War in the form of democratic capitalism towards the economisation of politics and "de-democratisation of capitalism" (W. Streeck), especially since the 2008 crisis up until today. This transition has been accompanied by multiple crises, which the critical theory, created by representatives of the Frankfurt school, is able to explain as causes and effects.

The outlined consequences from the dominating impact of Big companies in the post-democratic EU are bound together in the collapse of the democratic capitalism regime in the rich Western democracies that "buy time", in order to evade financial and budget crises by transiting from "tax states" to "debt states" (Streeck, 2017a, p. 83). The NPM allows big corporations and banks to play a dominant role not only in the economy and the politics on European and national levels, but they also attempt (and to a great extent succeed) in dictating what happens in society. Consequently, I will analyse the above-listed damages to democracy, by providing several examples. Before that, however, I will clarify the essence of the two basic concepts – post-democracy and new public management.

1. Clarifying the Basic Concepts

Post-democracy is a neologism, created by Colin Crouch in his homonymous book published in 2004, describing post-industrial society, in which the industry has its own share; however, the main efforts and innovations are focused in other areas. In this society, the institutions of democracy formally do exist, although gradually, they are being emptied of content. The political elites are becoming less related to their societies, rather than to the global economic elite. Namely, this explains the prefix "post" in front of the democracy – i.e. it is speaking of something that is post-industrial, post-modern, post-liberal, something mobile and dynamic. The basic accent in the idea of post-democracy is that it represents "something beyond the government by the people". The democracy corresponds solely to the conduct of elections, while the pre-election debate is a "strictly controlled spectacle" by specialists in political persuasion, using rather skillfully marketing technologies and political PR. Although there are publicity and different opinions across the public, the latter does not control the political processes, as well as the public is no longer a synonym for people. This new concept includes elements of "pre-democracy" (re-feudalisation), expressing an alarming tendency in Western states, such as politics and the government tend to be under the control of the privileged elites (Crouch, 2012, p. 28).

Lately, Crouch has developed and specified further the term post-democracy as "a dystopia" – a direction in which the western states are moving, one that does not look good (Crouch, 2020, p. 16). This directly relates to undermining (emptying of content) the institutions considered to be pillars of democracy (the rule of law, independent judicial system, separation of powers, etc.). Thus, the institutions are present (there are elections, governments are changing, there is a fierce public debate among various political parties, etc.); however, "the real energy of the political system has been transferred to the hands of a few elites consisting of politicians and corporative rich people" and the key political decisions are made to the advantage of the wealthy, and not in the interest of the majority. In addition, Crouch also renders the widely spread delusion across the western states at the beginning of the XXI century that the constitutional order is considered a given fact, while in reality, it masks post-democracy as democracy (Crouch, 2020, p. 13).

In my opinion, this means that key decisions made on the national and EU level are not to the advantage of the majority of the citizens, but in the interests of the wealthy and empowered minorities. Therefore, in post-democracy, the political institutions make both democratic and oligarchic decisions (policies). Rather vivid examples of oligarchic policies are the decisions to deregulate the financial markets, the financialisation of economies, saving banks with taxpayers' money, austerity politics, outsourcing some public services to big private companies, creating monopolies, etc. These key decisions protecting the interests of big companies and banks (their owners, shareholders and managers) facilitate the oligarchic state capture and the capture of its three powers – legislative, executive and judicial (Tsakova, 2020, p. 256). The situation is rather similar in the European institutions that have legislative, executive and judicial functions.

The **new public management** facilitates the above-mentioned decisions. In general, this term stands for Global Governance without Government (state government) or Stateless Global Governance according to the imperatives of the Washington Consensus. During the last few

decades, the European countries alone and on the EU level have implemented the terms Public Affairs management and European Public Affairs management. According to Encyclopaedia Britannica, the new public management originates in the wave of reforms in the public sector, inspired by neoliberalism and the Public Choice theory in the Anglo-Saxon countries, related to the names of R. Reagan and M. Thatcher. Subsequently, despite some resistance, it has spread in other European countries, as well as in the countries in transition (new democracies such as Bulgaria).

NPM has two main strands: marketisation and corporate management. The most extreme form of marketisation is privatisation, expressed in the transfer of assets from the state to the private sector. Industries subject to extreme privatisation included telecommunications, railways, electricity, water, and other public services. Other forms of marketisation remain far more common than privatisation. These other measures typically introduce incentive structures into public-service provision by means of contracting out, quasi-markets, and consumer choice. Corporate management expresses the introduction of good ideas and practices from the private into the public sector. The main ideas and techniques involved are management by results, performance measures, value for money, and closeness to the customer – all of which are tied to various budgetary reforms (Britannica, 2022).

For years on end, there has been a discussion about the effectiveness of the NPM for the public sector. Lately, most of the well-educated audience and researchers understand that the ones that profit from the NPM are not merely private companies (amongst the middle and small businesses), but big corporations and banks that derive huge profits at the expense of the prosperity of the majority of the citizens. The new governance "beyond the state" increases the role of certain markets, networks and non-state actors, thus obliterating the difference between public and private – to the advantage of the private. The political sphere is losing its independence from the economic one, because in times of global neoliberal capitalism, the big capital (mostly financial) dominates the European public affairs management and the new public management in the EU member-states. Therefore, the current crisis processes cannot be explained neither in the framework of the political system, nor by the instruments of neo-institutional economics, but rather in the framework of the political-economic system.

The neoliberal version of globalisation is one of the main reasons for the transition from democracy rooted in the national states to post-democracy, where transnational corporations (predominantly American) dictate appropriate for them policies in certain states. The governments strive to attract investments by providing these companies favourable fiscal and regulatory regimes at the expense of equal access for more small and medium-sized companies in a competitive market economy. Neoliberalism, as a dominant ideology, transforms the weakening of the national state into a virtue (Crouch, 2020, p. 25) and facilitates the transition to Global Governance without Government.

2. Emptying the Political Institutions of Democratic Content

The EU political system and the political systems in the member-states are democratic in their form, but not in their content. This crisis of the liberal democratic content, expressed in

the loss of the representative nature of the political institutions (national and European), can be explained by the specifics of contemporary capitalism or in the frames of a political-economic system. In times of the current global neoliberal capitalism, the political institutions consider predominantly the interests of a limited number of rather wealthy people – big companies and bank owners, managers and shareholders. The democratic achievements from the period of state-regulated capitalism in Europe after the Second World War – such as procedures, attitudes, and values – are still present; however, most of the functions of the political institutions that serve the public interests are subject to privatisation. Therefore, C. Crouch considers the "EU is a clumsy dwarf compared to the flexible corporative giants, while the EU democratic quality, although well advanced and developed compared to all the other alliances in the world, is weak" (Crouch, 2020, p. 25).

The collapse of the regime of democratic capitalism and the transition to the de-democratisation of capitalism, especially after the 2008 world crisis, has been accompanied by a political and economic crisis in the wealthy western democracies, whose core lies in the financial and budget crises. The deregulation of the private financial markets is one of the aspects of the policy for the privatisation of some state functions, which explains the transformation from a tax state to a debt state (Streeck, 2017a, pp. 10-13). This transition includes the move from the state government to new public management. This deepens the tendency to "suspension of the parliamentary democracy", "institutionalisation of oligarchy and expertocracy on national and European level" and "moving from state governments to central banks" – the main government burden falls upon the banks, which play the role of the "government of last resort". This is valid for the European Central Bank in relation to the European Commission (Streeck, 2017a, p. 220, 233).

The formal-democratic political regime is becoming rather oligarchic (mostly in the USA, but also to some extent in the European countries), rather evident from the unprecedented growth in social and economic inequality. The top of the social pyramid is preserved for the so-called 1% of the super-wealthy people, the "upper-middle class" represents about 20% of the people is situated in the middle, while the base of the pyramid is occupied by the majority of the people – most of whom with stagnating, insecure incomes coming from the circles of the reducing former middle class (the so-called precariat) and an increasing Under-Class. The reason for this drastic inequality lies in the politics of the European counties, being both post-democratic and "techno-economic sub-politics", accompanied by an alarming loss of some functions of the political system, thus undermining the state by private interest groups of quasi-public nature. In such sub-politics, "the political becomes more and more shifted from the official arenas – parliament, government, political administration towards the grey zone of corporatism" (Beck, 2013, pp. 329-331).

Therefore, the political system in the European states is losing a great number of its functions, because the state is no longer its core and main subject of political power. The New public management gradually takes its place. The state (and European) institutions are slowly emptying of their democratic content, because not all policies are democratic and public, but rather there are a lot of them that are oligarchic, therefore, they are not public and remain in the shadows. The institutions of the legislative, executive and judicial power often make decisions under the influence of big companies and banks – thus, democracy slowly withers, deteriorating into corporatocracy and bankocracy.

The transition from the state government to new public management during neoliberal cultural hegemony (according to Antonio Gramsci) is eased due to the imposed belief that the state should be governed as a company. The company's expertise is considered to be better than the one of the state, even when it comes to the solely relevant expertise for solving different societal issues. In the public sphere, there is a talk about business and companies, and not about big business (big capital). Therefore, the relations between the public principal and the private agents in the NPM result in the "loss of the idea about public power" (Crouch, 2012, pp. 107-111). There is a new interpretation of the idea of state intervention in the economy. Since the 2008 crisis, western countries have begun to intervene in the market not to provide the citizen with social prosperity, but to save big companies and banks from bankruptcy. The political institutions are empty of democratic content, because they have blocked the principle of separation of powers and executed a unilateral control by the "big money" on the legislative, executive and judicial powers. The rule of law has been infringed due to the existence of "oligarchs above the law" that are not only too big to fail, but too big to indict. There is a process of oligarchization of politics, using mechanisms as: lobbying, political party financing by big donors, capturing the regulators by the regulated, revolving doors, etc. (Tsakova, 2020, p. 276).

Neoliberalism, as a dominant ideology, legitimises the political use of wealth in the NPM, stimulates crises in both political parties and ideological representation and fuels a transformation from the representation of broad group interests by the political parties towards a representation of interests by small, but powerful lobbies. The crisis of the political parties has led to the advance of lobbies on European and nation-state level, but not all lobbies, and solely the ones with "special interests" of the big capital, ones that left/right ruling political parties and coalitions take into consideration. The traditional difference between left and right (accordingly the class axis between labour and capital) is obliterated by the achieved consensus on neoliberal policies during the transition from political representation to political communications. The empty ideological niche is filled by new, mostly populist political parties, engaged with political spectacles and shows. In Europe, a lot of the populist politicians are financed by billionaires, because in times of chaos and collapsed institutions, they manage to distract and entertain the public, diverting the public opinion from the rich and directing the mass anger to immigrants, Jews, Muslims, etc., blaming them as scapegoats for the various crises. Each crisis, however, offers new opportunities for seizing more and more assets from the population…

The traditional political parties are in decline; therefore, they are calling for an increased role of experts in legislation and its implementation. The political parties tend to transform into trade companies (political parties- Ltd.), in "cartel parties", keeping their positions in the state apparatus meanwhile seeing a decrease in their members and voters. Citizens' demobilisation regarding their participation in politics became something normal. The neoliberal twist has led to "institutional and political regress", thus creating the foundation for "post-factual politics". The European politicians offer prosperity to the citizens, however, this is not happening; rather, the income inequality among the individuals, families, regions and states is constantly increasing. The promised service and knowledge-based society compared to the declining industrial society did not result in prosperity – the number of unnecessary (repressed) people constantly increases – leaving them feeling defenceless, helpless, and redundant, despite all the rescue measures and support on behalf of the state,

aiming to tame the different crises. The majority of the people (demos) cannot understand what happens when the „tax state" transforms into a „debt state", or what is the meaning of the transformation of the "national democratic statehood" with Global governance. All this proves the necessity of "refined methods for the creation of neoliberal consensus and disorganised resistance" (Streeck, 2017b, p. 287-288).

To a great extent, big companies are able to control the political process by lobbying. This lobbying of big capital dilutes the lines between the public and private sphere, benefiting the powerful private interest, by making official the discourse about the "stakeholders" – public and private organisations. They participate together in European public affairs and in their management. In a recently published book "Stakeholder Capitalism", the company (without mentioning it is a company – giant) is represented as "a centre for its stakeholders" in a specially elaborated for this purpose figure. Among the stakeholders of the company are state and society, altogether with customers, shareholders, suppliers, etc. (Schwab, 2021, p. 228).

Big private companies exert solid lobbyist pressure on the European institutions when making common European decisions, participating in different European forums and roundtable talks for a dialogue with the Commission. They create European trade associations, the European roundtable of industry, the Transatlantic business council, etc., but they are also lobbying individually. The big transnational companies such as Bayer, Siemens, Philips, Ericson, Boing, Xerox, etc., enjoy favourable European legislation. The lobbying of big companies and banks is institutionalised in the European political process, although many of them are not on the list of the EU Transparency Register. The register is still voluntary, although, for many years, a number of European politicians have appealed for its transformation to an obligatory one. However, the obligatory register is not happening, because the EU institutions cannot force the giants to register.

Three are the main lobbies in Brussels (financial, carbon and agrarian); of them, the financial one is the most powerful. The interests of big companies are served by lobbyists of the "European Financial Services Roundtable", London City, the US Trade Chamber, British petroleum, Schell, etc. Rather influential are the Euro Banking Association, the European parliamentary financial service forum, the International Swaps and Derivates Association, Deutsche Bank, etc.

Another example of emptying the institutions of their democratic content is the revolving doors, a mechanism for oligarchization of politics in the EU. The revolving can be both in and out – on the one hand, after leaving office, European politicians and key administrative figures usually start working in big banks and corporations; on the other hand, some important European positions are taken by people, who work on important managerial positions in corporative and financial giants. However, it is also possible to witness, the so-called double-revolving from the same person. Rather an indicative example of this is the former president of the ECB Mario Draghi, who initially worked for the big bank group Goldman Sacks – responsible for its European portfolio; after that, he became a president of the ECB, and, thereafter – prime minister of Italy. The former president of the European Commission, Jose Manuel Barroso, soon after his mandate ended, became a member of the management at Goldman Sacks. After leaving the office of the premier, Tony Blair began working for J.P. Morgan and Zurich Financial Services. The examples can be numerous.

The dominating role of big capital (mostly financial) in politics caused a collapse of the liberal representative democracy in the EU, which, step by step, is transforming into neoliberal expertocracy. By using big money, it is easily implanted to the citizens that they live in democracies, despite it being imperfect. Lately, a number of warnings about the threat of authoritarianism have been brought out. In fact, this is a mere oligarchic democracy and post-democracy, evolving rather intensively in the post-factual era (the era of post-truth and fake news since 2016), when neoliberal experts distribute narratives/stories that all of us are winning from globalisation and the low taxes.

3. Defective Market Economy Due to Existing Monopolies

I uphold Fernand Braudel's idea, that capitalism and market economy (as concepts) are not synonymous. Capitalism is "a way of ruling, assuming the creation of monopolies that limit the action of the entrepreneurship market activity". As a concept, the market economy has positive connotations – such as the existence of different markets with horizontal relations of demand and supply, competitive price determination, etc. Defined as an "anti-market zone" (zone of secrecy, where rules the right of the strong, zone of monopolies and vast privileges), capitalism is seen as a threat to the market economy, that can emerge, develop and collapse (Braudel, 1988, p. 5-6, 220). Therefore, the current global neoliberal capitalism alone creates monopolies and oligopolies that are considered as a threat to the mere existence of capitalism.

The neoliberal transformation in Europe during the last decades provoked rejection of the Keynesian economy of mixed-ownership and the generous welfare state in favour of monetarism, privatisation, low taxes for the wealthier people and a reduced social state. The new public management encourages the privatisation of public property in the industry and services, imitating the methods of the private business in the sphere of social services and attracting private capital in governing of public infrastructure objects under the form of public-private partnership and concessions. In deregulated economy (mostly in the financial sector), the competition (market competition) is no longer seen as a process that sustains the existence of multiple companies, but rather is examined from the point of view of its outcome – such as destruction of small and medium-sized companies due to the dominance of gigantic corporations (Crouch, 2011, pp. 16-17).

The existence of monopolies and oligopolies obstacles to the functioning of the market economy, by causing defects not only to the different markets, but also to the competition. Lately, in times of various crises (energy, health, ecological, etc.), it is becoming rather clear that the demand and supply of goods and services cannot be determined by price mechanisms without state interference. Everywhere in the EU and the European states, there is an increased need for the existence of certain state regulations – especially anti-monopoly legislation and regulatory bodies to protect competition. The act of these regulations is rather difficult, because of the „corporate take over of the market" (Crouch, 2011, p. 49) and the oligarchic state capture, accompanied by the undermined rule of law.

The current markets are becoming less inclusive due to the reduced participation of small and medium companies at the expense of the big ones. Therefore, instead of many competitive economic players, contributing to economic growth, there are a few players with

monopolistic market power, whose actions cause economic stagnation and mass poverty. The market economy does not function effectively in most of the European countries – especially the ones in the European periphery. The reason for this is "the disintegration of the contemporary state to three ingredients": a) a limited number of activities transformed into market forms; b) a number of burdening left-over obligations, the private sector is not interested in; c) image creating, entirely political ingredient. The left-over of the state government is seen as "a mixture of incapability to offer services and electoralism". This "belittling of the state" is due to the privatisation of public services and the erased difference between public and trade services. The main culprit and beneficiary of this "belittling" are the big corporations, that "use the state as their own cash cow" (Crouch, 2012, p. 28, 53). Using this logic, we can conclude that the culprits for the 2008 financial crisis, actually profited from it.

We should take into consideration, that despite the limited functions, the state still has a number of judicial levers to change the nature of the market deals. The states can create or abolish monopolies using legal measures by competent authorities. Along with the monopolies, there are also various administrative agencies/commissions for competition protection. Monopolies, however, can be created by other not-so-obvious means, which in the end, deform the market economy. This is done by European and state subsidies, preferences, and quotas, including resources by European funds for financing infrastructure projects using the system of public procurements. The most widely spread practice of public-private partnership and concessions is a form of state negation of its own "natural monopolies" when supplying public goods and services for the population by offering them to big private companies. Such monopolies and oligopolies destroy the market economy, causing market failures, oligarchic divergence and state failures.

Neoliberal economic policies cause great damage in relation to the supply of public services (public services, not material goods) to the citizens by private providers on market principle. The state providers of public goods such as education, healthcare, social cares, etc., gradually concede their position to private suppliers that derive profits on the markets of educational, healthcare and social care services. The "public services" usually include services that are of fundamental to personal life chances (health, education) or are consumed collectively rather than individually by the entire society (defence, public health) (Crouch, 2011, p. 20). Not all private suppliers are monopolies – therefore, there is a possibility for consumers' choice. The neoliberal logic of the NPM, however, unfolds in cases when the government negotiates the supply of public service from external companies (big transnational companies); thus, the government itself becomes their client (governments, not citizens, are clients to the big transnational companies). Another technique used by the NPM is the public-private partnership in the field of public services, where the consumers of certain services relate to it as buyers on the market. Such expanding privatisation of the social/public sector is followed by appeals for "corporate social responsibility". These, however, are appeals rather than real actions because after the governments desert their social purpose and engagements to protect the public interest, someone should take responsibility for the citizens-customers; namely, these are the corporations.

Such examples of monopolies can be found out in the book: "Giants: the global power elite", where for the first time, people and companies from the so-called 1% have been identified.

The giants are 17 transnational investment companies (bank groups), whose financial assets are more than 41.1 trillion dollars. This extreme wealth has been invested by 199 CEOs in favour of approximately 2000 billionaires and 6 000 000 millionaires across the world (Philips, 2018).

The existing off-shore zones and tax havens allow the super-rich individuals (owners, shareholders and managers of big companies) to evade tax payments in contrast to the rest of the citizens. This hidden, black money, is used to corrupt statesmen, politicians and top managerial administrative staff. This is the so-called "grand corruption" occurring at the high level of national and European governments. Despite the vastly proclaimed aspiration for limitation of the off-shore wealth on European and global levels, there are no visible results for now. We also observe a lack of organised public (civil) pressure for the abolishment of off-shore zones, if we do not count the journalistic investigations and information leaks such as: the Panama papers, Paradise Papers, Luxembourg leaks, and Pandora papers.

The implementation of the NPM in some European countries, allows us to argue that if an important segment of the economy is off-shore, a certain share of politics can also be considered off-shore, especially when it comes to the so-called "stealth politics" by the billionaires (Page, Seawright, Lacombe, 2019). It is possible for super-rich individuals (respectively, big companies) to use their off-shore wealth to try to commercialise state sovereignty, binding the power with some secret, exterritorial space outside the control of the states or supra-state institutions. This is one of the explanations for the deterioration of the rule of law in the EU.

Another explanation lies in the existence of so-called legal corruption. This term was introduced in 2005 (Kaufmann, Vicente, 2005), aiming to differentiate the administrative (bureaucratic) corruption in the public sphere in the form of a bribe (illegal corruption) and corporative corruption (legal corruption), indicated by state capture. The latter refers to "corruption on high levels of the administration". The difference between both types of corruption is rather visible in the case of public procurements. When different companies aspire to secure a contract with the state in an auction, they often resort to bribes (illegal corruption). However, when some monopolistic companies succeed in securing all public procurements in a certain sector of the economy, we talk about state capture (legal corruption). Therefore, this is not merely captured, but oligarchic state capture.

Each European country has a Competition Act, however, these acts are often circumvented, thus allowing the existence of monopoly companies in given sectors of the economy. The free market competition is just a good wish, but in reality, the regulators (European and state) rarely impose fines on monopolies, and even if such are imposed, their amount is insignificant compared to their profits. Thus, the regulators are captured by the regulated. Most often, the monopolies have their own representatives as members of the regulators. This regulator's capture obstructs the entrance of new players on the market. For example, the pharmaceutical giants use patents in drug production, thus, they do not allow cheaper alternatives to be produced by potential rivals. The most striking examples are the new digital giants such as Google, Apple, Facebook, Amazon and Microsoft. Not a single anti-monopoly legislation can regulate their activities. These corporate mastodons not only capture, but control the regulators, which means that their economic power, transformed into a political one, is way bigger than the power of the states themselves. The EU attempts to introduce possible

sanctions to giants such as Google and Amazon in relation to their monopoly share on the European market, the introduction of digital taxes is also being discussed.

An example of the capture of the European regulators by big companies is the approved by the European Commission in 2015 "Package for Better Regulation", which stipulates the creation of a new regulatory body and adopts the Communication "Better regulation for better results – an EU Agenda". Consequently, it turned out that despite the good intents of scrutinising the existing regulations about occupational health safety and the regulation about the protection of the birds and food quality, in reality, these "better regulations are, in fact, deregulations", favouring big companies, thus reducing the implication of basic regulations regarding the protection of workers, consumers, citizens and environment (CEO, 2016).

Another example for damages to the market economy and competition in the EU is the corporate capture of the European central bank. It has been done by lobbyist-consultants, representing the interests of the financial sector in the bank consultative groups. Similar to other European institutions, the ECB use external expertise in different aspects of the EU monetary policy in 22 consultative groups. Out of 517 councillors – 508 of them represent the bank sector. Thus, the regulated banks (Deutsche Bank, BNP Paribas, Societé Générale, Citigroup and UniCredit, Commerzbank, etc.) capture the European regulator. The rest of the consultants represent organised business interests (small and medium businesses) and civil causes (Haar, 2017). These and some other disclosures about the participation of big companies and banks in European Public Affairs are made by European civil platforms – part of the European civil society.

There are also a number of examples for monopolies (domestic and foreign), defecting the market economy in the EU member-states. This is possible because the political institutions of the "neoliberal state" (Harvey, 2005) do protect the individual freedoms of all citizens solely on paper, in reality, their main concern are the interests of the owners (including managers and shareholders) of big capital. On European and nation-state levels, the NPM offers a fundamental advantage to the market in solving different problems, in comparison to the state. The market itself is also free solely on paper; however, in reality, some of its sectors are monopolised by big companies and banks, acting on the principle of "The winner-takes-all".

The dominating impact of big companies and banks on EU economic policies, as well as the ones elaborated by the EU member, states governments in the framework of the NPM, causes the outbreak of various crises with a negative effect on the welfare of the European citizens and is lowering their standard of living. The World financial crisis from 2008 has also spread across the EU, accompanied by rescuing big companies from bankruptcy by European taxpayers' money. This rescue can no longer be explained by the "trickle-down theory", but by the "trickle-up theory" – explaining the trickle-up of wealth and incomes from the base towards the top of the social pyramid. Although, it is considered that in Europe, the concentration of wealth in the so-called 1% of the population is not that drastic, compared to the one in the USA, the thesis of the young Dutch historian Rutger Bregman, that the wealth of the 1% is not created on the top of the social pyramid (by talented inventors, entrepreneurs and visionaries), but rather are tackled up by the ones on the top, is also valid in Europe. The

cases of the technological giants (Apple, Google, Microsoft, Facebook…) that are getting richer at the expense of all of us are rather illustrative (Bregman, 2017).

The outbreak of the crisis in 2020 in relation to Covid-19, also revealed some defects in the functioning of the market economy in the post-democratic EU. The relationship between the public and private sectors is seriously disturbed – the private sector, in the form of big companies, becomes profitable at the expense of the public sector. There is a danger that states' efforts to deal with the pandemic will be in vain, because the governments provide funds without any conditions aiming to protect the public interest. According to Mariana Mazzucato, the state should act as an „entrepreneurial state", thus implying a change in the way governments think, a change of the neoliberal paradigm. States should not only invest, but make "the right deals" to protect the interests of the majority. Unfortunately, this does not happen, because, under the pressure of big companies, risks are socialised, and profits are privatised with the imposed discourse of "public spending" rather than "public investments". The example of the development of the Covid-19 vaccines, which should be available to everyone, is eloquent. The state funds scientific researches, but big pharmaceutical giants privatise the fruits of this research through skilful handling of patents, licenses, etc. At the same time, social programs, education and healthcare are underfunded, while the big companies (the so-called digital, technological, pharmaceutical and other giants) avoid paying taxes. Meanwhile, off-shore areas continue to exist (Mazzucato, 2020).

The conclusion is that not only the political institutions (European and national) lose their democratic potential, but contemporary capitalism is neither democratic (democratic capitalism in the form of "end of history"), nor social (social market economy), but it is rather neoliberal. The market economy and competition between more economic players from the environment of small and medium-sized businesses is greatly hampered by the existing monopolies in the face of big companies and banks, which dictate some of the key decisions of the state institutions and cause various crises.

4. Attempts to Privatisation of the Civil Society

The last post-democratic consequence of the negative influence of global forms on European and state-national public affairs is expressed in the exercised "soft power"/thought control aiming at public opinion forming by neoliberal propaganda. This is possible in a civil society, where the democratic logic is replaced by a market one. The market principle (approach) is applied in all the spheres of human life, while the public goods (education, public health, social care, etc.) are predominantly seen as social services in the frameworks of different markets.

The idea of the free market and free trade, perceiving the state as an obstacle, caused serious damages to the people's consciousness in European countries and provoked increasing social polarisation during the last decades. However, lately, especially with the spread of the COVID-19 pandemic, the citizens tend to feel that big personal wealth is not deserved; it is not a result of hard work, education and talent, but is rather a result of inheritance and opportunities to obtain personal incomes due to monopoly market positions. In fact, the illusion of the free market diverted public attention from the necessary political measures for

an effective market economy in the interests of the majority. The deregulation of the financial sector and the increasing collapse of the real economy in the EU and the member states in the XXI century are usually accompanied by promises from the political institutions for transition to a "service society" and "knowledge-based economy" aiming to achieve economic growth. However, the outcomes of this growth (such as wealth and incomes) usually benefit the "ones on the top" of the social pyramid (Stieglitz, 2015, p. 113), combined with a decrease in taxes for the wealthier (regressive scale) and cutting the social costs. The growing inequality between super-rich people and a huge mass of poor is becoming particularly visible and cannot be hidden despite the created image of multi-billionaires as philanthropists.

Today, the feeling of social injustice is widespread. After the Second World War, during the democratic capitalism in the European states, there were two simultaneous principles for the distribution of goods and incomes – „social justice" and „market justice". Nowadays, during neoliberal capitalism (with flawed and dysfunctional democracy), market justice is the leading principle in collapsing social state and declared by the European institutions' aspiration for social cohesion. During the transition „from tax to debt state", the inequality among people, regions and states in Europe increases enormously… The market justice is implemented in the European states in the interest of the creditors and (big) investors at the expense of the majority of the citizens, which according to Wolfgang Streeck, can be explained by the presence of "two people in the democratic debt state" – "state people" (national, consisting of citizen and voters) и "market-people" (international, consisting of creditors and investors) (Streeck, 2017a, p. 83, 124).

The increasing democratic deficit in politically united Europe, accompanied by the widely spread feeling of social injustice and extreme inequality, is compensated by the neoliberal upbringing of the citizens. The latter is under neoliberal indoctrination, in order to perceive social justice as "political"- in a way that the political decisions favour different groups of interests, related to nepotism and corruption, while market justice is perceived as "non-political" due to "its seemingly un-subjectiveness and ascribed price calculation" (Streeck, 2017a, pp. 94-102). The aim of this purposeful depoliticisation is to tame the popular resistance. Achieving the neoliberal consensus (with the financial help of the owners of "big money") is done by refined methods of political persuasion. In everyday citizens' discourse, there are specifically constructed patterns of thinking under the form of biases that political decisions are bad, the market decisions are good. Citizens do not understand that justice interpreted in this way ensures corporate welfare for the few instead of social welfare for the majority.

Neoliberalism is perceived simultaneously as economic theory, political agenda and ideology (Harvey, 2005). In the light of dominating neoliberalism, the citizens are considered rational economic actors, individual entrepreneurs and consumers, which are responsible for their personal success or failure. There is a thinking day by day, financialisation of everyday life, consumerism, hedonism, hyper-individualism and, in the end – depoliticisation and alienation from politics as a public affairs sphere. The essence of neoliberalism is "a program for methodological destruction of collectives" (neoclassical economics solely acknowledges the individuals). All the collective structures such as nations, syndicates, cooperatives,

associations of companies, different groups, and even the family are an obstacle in front of the pure market logics, therefore, they should be destroyed (Bourdieu, 2008, pp. 96-97).

The civil society (on European and member-state levels) as a network of various organisations, voluntary associations and forms of collective action, during the last few years, has limited its scope to project-oriented non-governmental organisations (NGOs), whose main donors (sponsors) are mostly big companies and banks. Along with the authentic, Grass-roots advocacy citizen organisations, strong support is given to Astroturf or Quasi-NGOs – BONGOs, GONGOs (business and government-organised NGOs), BINGOs (business-interested NGOs), GINGOs (government-interested NGOs) (Van Schendelen, 2005, p. 39). There are many cases, when big transnational companies side with these causes, as stakeholders in the European Public Affairs Management.

Big companies not only create NGOs, think-tanks, and universities alone, but lately even directly (by its own foundations) finance activities, considered as noncommercial in the field of science and culture, that fortifies the "power of the super-rich people" (Crouch, 2020). The public legitimisation of political decisions in favour of a privileged minority is achieved by the introduced discourse for public policies (considered as democratic), although some of them seriously harm the interests of the majority.

The media in Europe (public and corporate), as an important institution of civil society, mostly use the "propaganda model" for manufacturing consent around neoliberalism as a dominant ideology (Herman & Chomsky, 1988). A lot of private corporate media are owned by the super-rich and powerful people, whose investments aiming for profit are done not on the economic/financial market, but also on the political and media market. We are talking about activities, that are financed in order to manufacture opinions (not knowledge) and beliefs among the citizens that they are living in liberal democracy, rather than oligarchic neoliberal democracy. The political coverage in the media is processed by different instruments of neoliberal propaganda, news management, spin politics, framing of the public debate, etc. Since 2016, the situation has become even more alarming with the surge of post-truth and fake news.

Civil society, as an arena of democratisation (political, economic and social-cultural), is losing its democratic characteristics, thus becoming a market society. Most of its structures operate on a market basis, by elaborating and the realisation of projects, financed by big donors. The neoliberal experts ("organic intellectuals" according to Gramsci) have a key role in civil society, because, for solid remuneration, they propagate neoliberal illusions and narratives about "the beautiful new world of globalisation". The aim of these propaganda efforts is disorganisation and breaking down the resistance of outsiders and losers from the very same globalisation in a "post-factual epoch". The spiritual situation of the time is a signal for "The Great Regression" in the western world (Geiselberger, 2017). Imposing "a cosmopolitan-oriented industry of the consciousness" (Streek, 2017b, p. 293) benefits the so-called 1% of the world population.

A clear example of an attempt to privatisation of civil society (the phrase is used by Colin Crouch) is related to social networks/media. At the beginning of the XXI century, the Internet economy created its own colossal companies in the face of the digital giants (Google, Facebook, Amazon, Microsoft…). Initially, social media have been perceived as a possibility

to create digital communities including more people in collective initiatives. However, subsequently the technological giants (owners of big wealth and power) are able to access the preferences of millions of people and address them with different messages, thus manufacturing the relevant public opinion. The source of the seemingly different opinions of millions of people is one or a few hidden sources. Thus, the lobbying of special interests (big capital) on different institutions (national and European) reorients to "a secret manipulation of the public opinion". The Internet can be used to send targeted messages, often presented as mass civil movements, but in reality, they are controlled and initiated by some of the richest people in the world (Crouch, 2020, pp. 44-45, 182).

Social networks have actually provided for the factual privatisation of civil society, because its space is owned by the super-rich people (Crouch, 2020, p. 47). In my opinion, however, we are still talking solely of attempts to privatisation, because European citizens see a light of hope for exiting the neoliberal trap once again in civil society by its redefinition and reconstruction as a "space for value criticism" of the emptied of democratic essence political institutions and malfunctioning market economy through big companies-monopolies fault. The public patience is expiring, because big companies make huge profits at the expense of all of us.

Big companies (transnational corporations and transnational banks, etc.) are one of the main culprits for the crisis situation in the EU as a whole, as well as for the various crises in the EU member states (political, socio-economic, energy, financial, environmental, etc.) at the beginning of the third decade of the 21st century. Their domination as a power player over state institutions, markets and civil societies inflicts greater and greater damage on the standard and quality of life of European citizens with each subsequent crisis. Along the overlapping crises, the dominant neoliberalism (with its dogmas of individual freedom, free market and free trade) is exhausting its persuasive potential.

Neoliberal experts cede leading positions in the public sphere to critical public intellectuals, such as, e.g. "the three dangerous French economists" Thomas Piketty, Gabriel Zucman and Emmanuel Saez – authors of serious researches on world inequality, hidden off-shore wealth, etc., as well as of well-reasoned proposals for an annual progressive tax on the wealth of all multi-millionaires, which would make capitalism in the XXI century to work better. The above-mentioned young scholar Rutger Bregman brings out and argues the thesis that the neoliberal era is ending and "neoliberalism is gasping its last breath" (Bregman, 2020).

A sign of the decline of the dominant neoliberalism is an editorial article in the Financial Times (4 April 2020), which concludes that a wealth tax is not such a bad idea and that governments should treat public services as investments, rather than liabilities. Furthermore, countries should look for ways to reduce uncertainty in labour markets. This means that a discussion has been launched that foregrounds the issue of income redistribution, including a necessary increase in taxes on high incomes and wealth. An ideological turn (neoliberal paradigm shift) is brewing, as the idea of a free market is being challenged. Governments (through their own decisions) will find it difficult to turn any sector and sphere of human life into a market (health care, education, etc.) due to the shaky belief that the market can handle any problem and the state is an obstacle to solving it. Until recently, such neoliberal dogmas have determined the thinking of journalists, politicians and ordinary citizens, infected with

the "virus of neoliberalism", but an alternative is already being sought (Bregman, 2020). The neoliberal value system in the form of "market fundamentalism" can no longer be propagated as a credo in the public sphere despite the efforts (and money) of the super-rich (Reich, 2020).

Therefore, all this gives me a reason to talk about attempts to privatise civil society by owners and shareholders of big companies, and at the same time, we conclude that at the moment, these attempts are successful, but in the foreseeable future, their failure is looming.

Conclusion

In conclusion, we can share some ideas about the rehabilitation of EU politics and the affirmation of a new role of the state in Public Affairs management by restraining the power of the big corporations and banks. These ideas are derived from the harsh critique of neoliberalism, provoked by the "The Great Regression" in the western world. The democratic optimism and hope are seen in civil society (European and nation-state) as "space for value criticism" of big companies, that cause market failures and failed states. For the time being, it is high time we stop the discourse about the business as a whole and stop saying that "Everything is business", but to start differentiating large, medium and small businesses.

The new actors**,** in civil society, in large part driven by values (Crouch, 2011, pp. 154-161), are replacing the so-called NGOs – a product of social engineering. These are the new social movements and protests, aiming to increase social prosperity among the majority by anti-oligarchic resistance. The redefinition of the new left and the new right, can happen with the emergence of new political parties, that won't consider their electorate as objects of political marketing and PR; won't be political Ltd (trade companies), protecting the interests of a limited circle of party functionaries. The new left and right political parties, united with the social movements, should emancipate from the financial resources of the big donors, in order to gain the trust of the citizens. Otherwise, European countries will sink into a debt crisis and soaring inflation of basic goods and services. There are some "groups of civil activists", engaged in prolonged grass-roots campaigns for solving important issues (social, health, ecological, etc.) by pressure "from below" targeting political institutions and big companies. Voluntary and charity organisations should count on their own efforts to solve the problems of the citizens. Due to the renaissance of religions, in addition, these collective efforts are fortified by different religious organisations. Rather productive in the process of democratisation are "the groups for expert pressure", that perceive their professional activities in the spheres of science, education, etc., as a vocation, based on collective values, rather than solely as a source of incomes. The mission of these professionals is to challenge the market logic, proposed by neoliberal experts. They proceed from the assumption that not all in human life can be measured by the earned amount of money (money as overvalue); rather the mutual life is based on shared values. Thus, the collective actions of the new actors in civil society will become the essence of politics, as a sphere of *res publica*.

The New public management that has replaced the State government, has contributed not only for the crisis of the liberal democracy (in the EU and the member states), but also for the neoliberal capitalism under the American world hegemony. For the time being, there is no other vital alternative of capitalism, but this does not mean that one is not searched for.

There are different post-capitalist projects, that persistently construct a "post-neoliberal narrative" (Mason, 2016) regarding the necessity of re-industrialisation and de-financialisation of the economy, re-nationalisation of key public services, abolition of the off-shore zones, forcing big companies to undertake social obligations by increased corporate taxes, including the wealth tax. These and some other future public policies can become a reality after prolonged discussions and political mobilisations and battles in a re-defined and based on collective values civil society as an arena of democratisation.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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Milena Angelova[1]

FACTORS FOR BOOSTING THE GREEN TRANSITION OF THE EUROPEAN MICRO, SMALL AND MEDIUM-SIZED ENTERPRISES[2]

Micro, small and medium-sized enterprises, be they traditional enterprises, family businesses, traders, social economy enterprises, crafts or liberal professions (referred to hereafter as MSMEs), are an essential part of the solution towards a competitive, climate-neutral, circular and inclusive European economy, provided that the right conditions are created and prevail. The positive impact is generated by MSMEs through improving their own environmental performance and through providing expertise and solutions to other enterprises, citizens and the public sector. While acknowledging and highlighting the diversity and different needs of the European MSMEs, the current paper focuses on identifying factors for boosting their green transition and mapping out the effects of the recent multiple crises on this process.
Keywords: micro enterprises; small and medium-sized enterprises; MSMEs; sustainability; digitalization; support policies; social responsibility
JEL: D83; H12; L25; M38; P18; Q56

Introduction

Tackling climate change is the biggest challenge that mankind faces nowadays. There is no doubt about how serious the situation is – as we are evidencing extreme weather phenomena and natural disasters, biodiversity loss, environmental pollution, and degradation of natural resources (EESC, 2022b). A positive and pragmatic approach suggests that ways shall be found to *turn these challenges to opportunities* by uptaking the green transition, and thus – moving the whole economy and society towards climate neutrality, circularity and overall sustainability.

On aggregate MSMEs contribute significantly to emissions and pollution and there are clear data on the contribution of MSMEs to pollution in its different forms (Aragón-Correa et al., 2008). While there are different methods applied to estimate the environmental footprint of SMEs and entrepreneurs (OECD, 2021b, p. 10), there are clear data showing that MSMEs

[1] *Milena Angelova, PhD, is Chief Assistant Prof. in Economic Research Institute at the Bulgarian Academy of Sciences.*
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contribute to 64% of industrial pollution in Europe, with differences in sectors between 60% and 70% (Calogirou et al., 2010). This makes it clear that realising the goal of climate neutrality is not possible without the active involvement of the MSMEs and their commitment to sustainability. While 'sustainability[3]' as a term supports a three-dimensional approach, i.e. economic, social and environmental, this paper focuses mainly on the environmental and economic dimensions, exploring the green transition (environmental sustainability) in the context of the current economic conditions. The social aspects are actually addressed too, e.g. in the context of corporate responsibility, skills development and response to stakeholders' expectations.

Contributions of MSMEs towards Achieving Climate Sustainability

Positive impacts are generated through improvements in the performance of the MSMEs, and also through their actions – e.g., when providing expertise and solutions to other enterprises, citizens and the public sector. They have a unique role to play, being grass-rooted at each and every corner of the European Union (EU) and especially in the remote and rural areas, where quite often they are the only economic-activity-generating factor – especially for vulnerable communities in low-income countries (Dougherty-Choux, 2014). MSMEs form the overwhelming majority of European business. They are 99.8% of all non-financial enterprises in the EU-27, and 80-90% of them are micro companies (EC, 2022).

Recently, there has been an increasing appreciation of the role of MSMEs in contributing to climate neutrality, as the European Commission (EC) is undertaking a more ambitious approach towards accelerating the green transition, also embedded in the European SME Strategy (EC, 2020a), and consecutively translated into national strategies by many Member States (MS). Most of these documents highlight the vulnerability and special need for extra support for MSMEs, which was also underlined by the negative effects caused by the COVID-19 pandemic (EC, 2022) and aggravated further by the harmful direct and indirect effects of the Russian invasion of Ukraine.

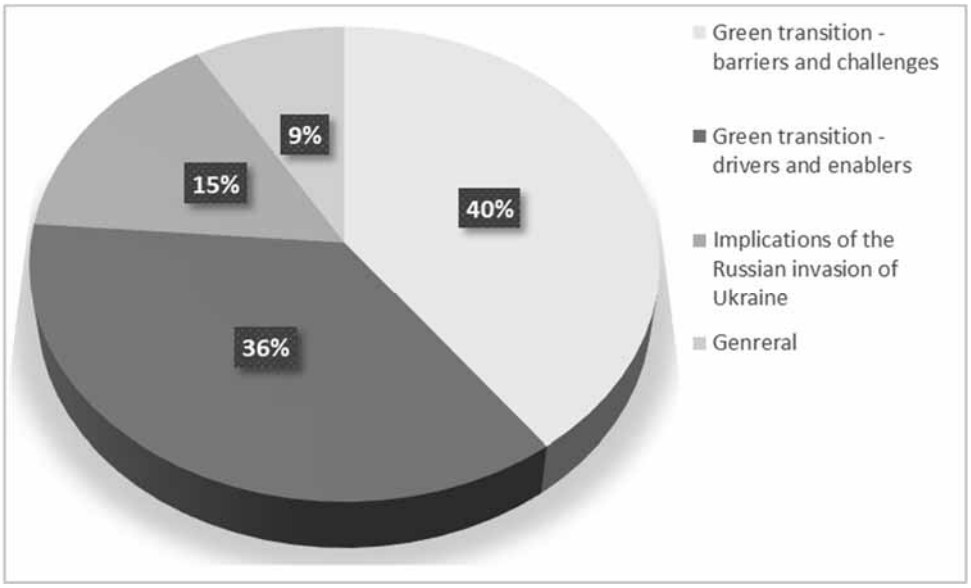
MSMEs with a business value proposition in the European Green Deal (EGD), such as: circular economy, climate, biodiversity, renewable energy, etc., have an inherent incentive to explore, invest and pursue new business opportunities in those areas. They have many opportunities, e.g., in the renovation of buildings, in the planning and construction of infrastructure, in industrial production and maintenance of equipment, in providing legal and accounting services, and in developing digital solutions. The transition process is, to a high degree, dependent on smart solutions, generated by the MSMEs. High-quality and relevant education, vocational education and training (VET) and constant upskilling are key for maintaining and increasing the skills and competencies of the human resources, who contribute for speeding up the green transition.

[3] In 1987, the United Nations Brundtland Commission defined sustainability as "meeting the needs of the present without compromising the ability of future generations to meet their own needs." The Sustainable Development Goals form the framework for improving the lives of populations around the world and mitigating the hazardous man-made effects of climate change.

Smaller firms, and especially start-ups, are in the best position to initiate radical and disruptive innovations by exploiting the market opportunities neglected by larger firms (OECD, 2013). Thus, they can lead to incremental changes and serve as a catalyst for radical eco-innovations. Therefore, disruptive or radical innovations tend to be pioneered by entrepreneurs, especially in smaller firms, or new entrants to a market, which often exploit technological or market opportunities that have been neglected by more established firms. Green innovation can give access to new and emerging markets, increase profitability along the value chain, help firms stay ahead of standards and regulations, help attract investment, and increase productivity and technical capacity (UNEP, 2014).

Climate- and environment-related issues are not only sustainability matters but are also, to a great extent, an essential part of the competitiveness, profitability and overall economic performance of enterprises. To effectively support MSMEs being successful in the transition towards climate neutrality, it is vital to help them addressing in the best possible way eventual challenges and overcoming potential barriers, while strengthening the effects of possible ***drivers and enablers***. To achieve this goal, a devoted desk research was conducted, comprising nearly a hundred literature sources shedding light on different aspects of the theme (Figure 1).

Figure 1. Literature sources – relative share by covered aspects



Source: Desk research

Barriers and Challenges the MSMEs Face on the Way towards Achieving Climate Neutrality

Taking account of the *heterogeneity of the MSMEs*, an increasing number of scientific studies nowadays are focused on what *barriers and challenges* MSMEs face on their way towards successful green transition (Horbach, 2008; Montalvo, 2008; Horbach et al., 2012).

The size-related resource constraints are originating from the fact, that, because of their smaller size, MSMEs encounter specific difficulties, such as skills, investment capital, and information and knowledge deficits, and their operations are quite often limited in economic or geographic niches. Many recent studies focus on the resource-related barriers as they impede the environmental innovation for MSMEs more often and to a greater degree than when it comes to other types of innovation (OECD, 2018; Pinget IREGE, Bocquet, 2014; EC, 2020b; EC, 2022; Del Brio, Junquera, 2003; Revell at all, 2010; Garcia-Quevedo et al., 2020; De Jesus and Medonça, 2018; Rizos et al., 2015). Moreover, there is a risk that the limited size presupposes or requires too multi-level expertise. Because of their smaller size, MSMEs may be less able than larger firms to:

1) access environmental technologies to reduce emissions, including because of imperfections in capital markets, or because of difficulties in achieving economies of scale;
2) have the expertise or information on such new technologies;
3) access government policy support for the transition to more climate and environment-friendly societies;
4) find skilled labour and funding. It shall be noted that for the MSMEs, the lack of financial recourses is a more important constraint for greening than for larger firms (OECD, 2018; Fleiter et al., 2012);
5) communicate and cooperate with each other.

Many MSMEs lack *knowledge* on the continuously evolving legislative requirements, established to deliver on achieving climate neutrality, and on how to respond to them. Furthermore, they have *difficulties in identifying potential business benefits and opportunities* provided by the green transition. These types of constraints are well documented in recent studies. Many of them (OECD, 2018; Fleiter et al., 2012) focus on *lack of information and awareness* of MSMEs on current and upcoming policy requirements, possibilities and opportunities to reduce resource use and available financial or advisory support measures to assist them. Other studies (Bodas-Freitas, Corrocher, 2019) focus on the *lack of knowledge and external advice*, or stress on the fact that *lack of cooperation* among MSMEs can represent a barrier to improving environmental performance (Triguero, Moreno-Mondéjar, Davia, 2013). *Lack of technology and/or technical expertise* is also seen as an important barrier (EC, 2019; EREK, 2019; Ormazabal et al., 2018; Rizos et al., 2016), together with the *organisational constraints* (De Haas et al., 2021).

MSMEs, in general, are not fully aware neither of the impacts of specific climate and environmental policies and requirements on their businesses and their supply and value chains, nor of how to adapt or convert products and services at an early stage to prevent later

losses or even market exclusion. A remarkable share of enterprises faces *difficulties due to the complexity of continuously evolving pieces of legislation, administrative burdens* (Garcia-Quevedo et al., 2020), *frequent changes in financial rules and high costs of funding, lack of specific environmental expertise and knowledge of how to choose the right actions* (EC, 2022), accompanied by *difficulties in accessing new value chains and new business models*, among others.

Green transition requires *large-scale adoption of clean technologies, which are currently not competitive* (Cecere et al., 2018). An important challenge is related to the *uncertainty* MSMEs face – stemming, for example, from technology: about the feasibility of adopting green technologies, while answering to the needs of the markets, complying with policy and regulations, and coping with the impact of climate itself (ITC, 2021; Brammer, Hoejmose, Marchant, 2012; EC, 2022). While the lack of awareness of requirements and ways of responding to them is an important challenge, so too are the *difficulties in identifying potential business benefits and opportunities* such as: reduced energy and material costs, improved access to finances, higher demand, entry into new markets, and an improved image among stakeholders. The green transition is more complex for MSMEs, because *financing the green economy is more capital intensive and/or risky* (EC, 2022; Demriel, Danisman, 2019), because the return on green innovation, in general, is risky, uncertain and skewed and information about inputs and outputs can be asymmetric (Randa, Kerr, 2015; Aghion et al., 2009; Ghisetti et al., 2017; Cuerva et al., 2014).

Although there is a general understanding that the MSMEs ***finance gap for net zero is quite large, it is difficult to quantify its precise size***. Based on the estimates of MSMEs' greenhouse gas emissions share of between 50 and 70%, of their energy consumption share between 10 and 30%, of the fact that MSMEs worldwide account for 13% of total energy use, and assuming constant investment costs per unit of energy, it can be projected that MSMEs energy use conforms to net zero could amount to between USD 550 and 650 billion per year (OECD, 2021b). MSMEs face a wide range of ***difficulties related to access to finance***, such as (McDaniels, Robins, 2017; EC, 2022; Kapoor, Oksnes, 2011; Ghisetti et al., 2017; Demirel, Parris, 2015; Mina et al., 2013; Randa, Kerr, 2015; Hall et al., 2916; Cuerva et al., 2014; De Jesus, Medonça, 2018; Rizos et al., 2015):

- insufficient data on what they need;
- information asymmetries between MSMEs and financial institutions that make risk-assessment complex;
- insufficient availability of financial products for MSMEs in different stages of their development;
- institutional barriers;
- lack of awareness and capacity;
- payment delays;
- constrained liquidity;
- difficult access to loans.

Further, there are some specific elements regarding the required capital for MSMEs to finance their green transition, such as large upfront costs of changing to resource efficiency processes as to reduce environmental footprint by taking resource efficiency actions and low return in the short term when shifting to produce sustainable goods and services (EC, 2018, Fleitera, Schleich and Ravivanpong, 2013).

Effects of the Recent Crisis

During the last couple of years, *the COVID-19 crisis* (and its continuation) *has had a double knock-out effect on the global economy, conditioning both a crisis of supply and demand*. This is also complemented by *new disruptive impacts of the Ukrainian crisis* on businesses (e.g., steep raise of the inflation rates, a tangible increase of energy and fuel prices, higher cost of and barriers for accessing raw materials, further disruptions in certain supply chains). High energy prices and the lack of supply of materials and products are among recent issues that have significant negative impacts on MSMEs and their business. Their competitiveness, as well as the overall competitiveness of the EU economy, is further jeopardised by the sudden moves of China and other emerging markets, which also benefit from avoiding sanctions on Russia and following lower climate and environmental requirements.

The European MSMEs are exposed to a large degree to the economic consequences of the Russian invasion of Ukraine, which affect them through a number of channels, directly as well as indirectly. European MSMEs are likely to feel the effect more strongly than larger companies that often have higher overseas export intensity. They also tend to be more dependent on the domestic European market, which is more severely affected by the economic fallout from the Russian invasion, due to its close proximity.

It is evident that the above developments will cause ***significant economic damage to the EU economy and thus will hit the MSMEs.*** Particular estimates are highly uncertain and contingent on the future trajectory of the war and further sanctions or other steps that may be taken by the EU (EC, 2022; OECD, 2022), but their negative effect is clear and it seems inevitable that European MSMEs will experience a gloomier economic outlook than expected before the war. ***MSMEs with exposure to the Russian and Ukrainian markets will be affected disproportionately by these adverse developments. Being less export-oriented than large companies*** (that often have more diversified sales)***, and having fewer resources and know how needed to establish alternative supply links or to expand into alternative markets, MSMEs are left with less possibilities to find ways out of the current difficulties.*** In addition, financial and trade sanctions imposed on Russia, threaten to increase business bankruptcies of MSMEs, particularly in Europe, also due to its high reliance on Russia for energy and fuel. A prolonged escalation of the crisis will hurt businesses that are vulnerable to commodity shocks and it is likely to increase bankruptcy risks. This will require keen political attention and potentially new policy measures in response to the situation as it unfolds.

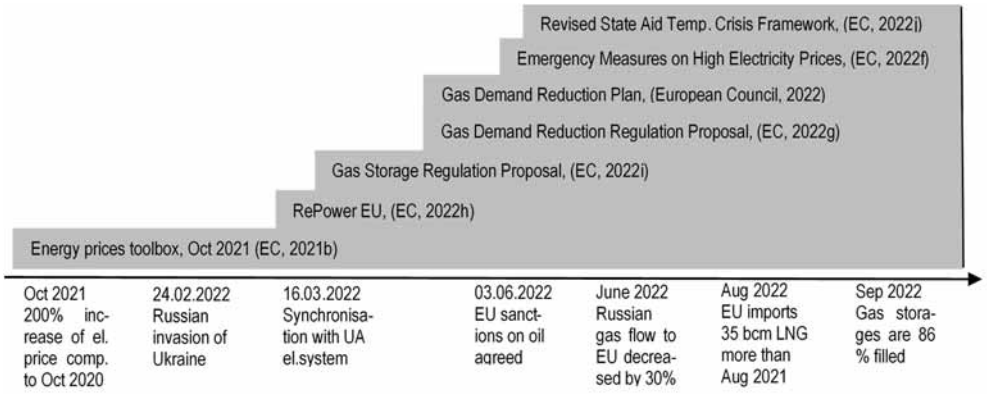
Whilst the Russian invasion of Ukraine has had immediate direct effects on trade, its indirect effects will probably have the largest impact on the EU economy and on the MSMEs. There have been steep increases in commodity prices, which in turn raise costs for businesses and

households (Kehayova-Stoycheva, Ivanov, 2022), as well as pronounced shortages of materials and labour, alongside other disruptions in global value chains (OECD, 2022). All these cause passing on higher costs to the European MSMEs through supply chains, and they find themselves having limited bargaining power to readjust. They also tend to have fewer resources and less global outreach and presence to identify alternative sources of supply. Finally, MSMEs find it harder than their larger peers to hedge against prolonged periods of high inflation as they often lack the financial acumen and resources of larger corporations.

Data illustrate further the negative indirect effects imposed on MSMEs because of the Russian invasion of Ukraine:

- ***Energy price hikes –*** some forecasts predict (World Bank, 2022) a 50% overall energy price increase in 2022, with natural gas prices in Europe set to rise 111%. Such energy price hikes will impose significant burdens and will, in turn, result in a relative loss of competitiveness for the EU. There is a clear risk that these soaring prices will be disproportionately harmful to MSMEs in comparison with larger enterprises, since MSMEs often lack the resources and global reach to seek out alternative suppliers and diversify their inputs, and have less bargaining power than bigger companies. Europe has done a lot so far (Figure 2), yet more efforts are urgently needed;

Figure 2. Political measures to address the energy crisis



Source: Desk research.

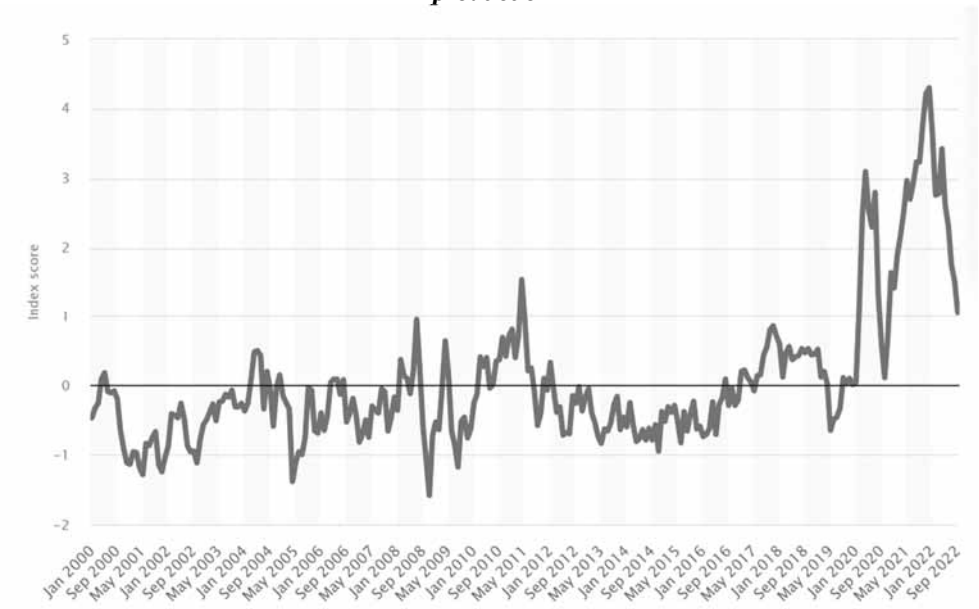
- ***Unpredictable price fluctuations in key commodities –*** from energy to agricultural products such as wheat and corn, to raw materials such as zinc, platinum, palladium, and various minerals such as phosphate and potash that are used to produce fertilisers. In general, prices are expected to increase further (World bank, 2022). This causes massive ripple effects across industries. Higher input prices also spread downstream throughout value chains, as price hikes are passed on, fully or partially, to other sectors that then experience higher costs for various inputs, transportation and other services, energy consumption and other expenditures that they incur for their own production;

- ***Labour shortages due to Ukrainian workers' mobilisation.*** Many of the 1.35 million Ukrainians that were residing and working in the EU prior to the outbreak of the war (Eurostat, 2022) have returned home to join the war efforts. The negative effect has been

particularly pronounced in a number of male-dominated sectors such as construction and transportation (truck drivers), as well as ICT activities and outsourcing of software developments;

- ***Bottlenecks, material shortages and global supply chain disruptions.*** Before having the chance to recover from the bottlenecks and other disruptions caused by the COVID-19 pandemic, the MSMEs have now been put under increased strain due to the Russian aggression of Ukraine. Another negative factor is the reimposition of the pandemic lockdown in a number of Chinese provinces, including Shenzhen and Shanghai, that constitute key arteries in the world economy (Figure 3[4]).

Figure 3. Global Supply Chain Pressure Index (standard deviations from average value) and percentage of companies that report the following as a factor constraining their production



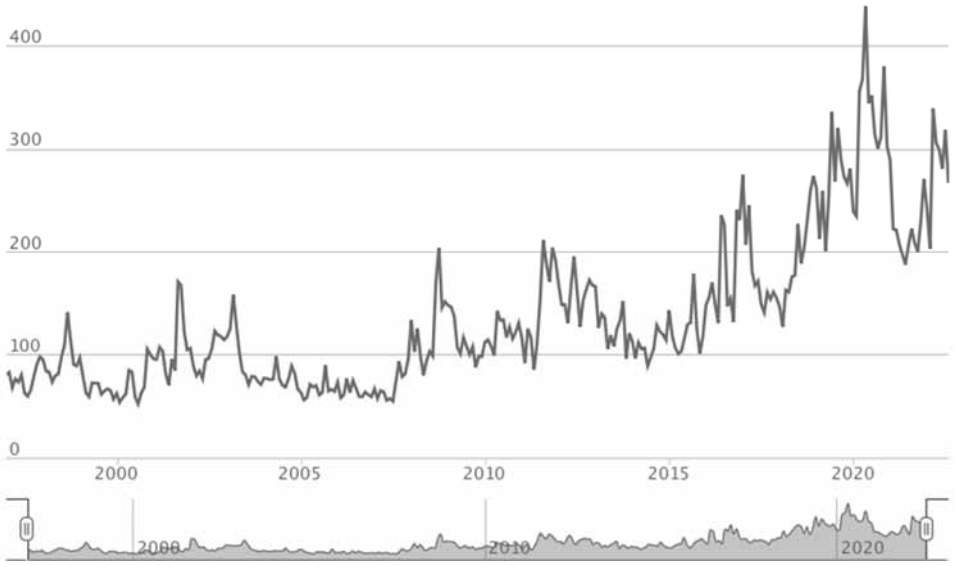
Source: Statista.

The macroeconomic environment was already precarious before the beginning of the Russian invasion, as central banks, including the European Central Bank (ECB), were preparing to tighten monetary policy in 2022 to combat unsustainably high inflationary pressures. Amid elevated uncertainty, high energy price pressures, erosion of households' purchasing power, a weaker external environment and tighter financing conditions are expected to tip the EU,

[4] The Global Supply Chain Pressures Index measures global shipping costs and airfreight costs, delivery times, backlogs and purchased stocks from seven large economies including the Euro Area. The steep rise, as shown in the graph below, indicates a number of problems affecting large companies and SMEs alike.

the euro area and most MS into recession in the last quarter of the year. Higher-than-expected inflation readings throughout the first ten months of 2022 and broadening price pressures are expected to have moved the inflation peak to year-end and to have lifted the yearly inflation rate projection to 9.3% in the EU and 8.5% in the euro area. Inflation is expected to decline in 2023, but to remain high at 7% in the EU and 6.1% in the euro area, before moderating in 2024 to 3% and 2.6%, respectively (EC, 2022).

Figure 4. Economic Policy Uncertainty Index, 31.12.1996 – 31.07.2022



Source: https://www.policyuncertainty.com/index.html.

Global uncertainty is high, although lower than during the outspread of the COVID-19 crisis, but still, current levels of economic and political risk are well above other previous periods of significant economic stress, such as the Financial Crisis and EU Sovereign Debt crisis[5] (Figure 4).

Drivers and Enablers of the Green Transition of MSMEs

It is evident that the MSMEs nowadays face an unprecedently turbulent, uncertain and challenging business environment. In order to support them in finding the best avenue leading them towards accomplishing swiftly and successfully the green transition, the *drivers and enablers* of this process shall be identified and triggered. On the basis of their sources of origin, these drivers and enablers can be systematised as being induced by the:

[5] Economic Policy Uncertainty Index.

- Consumer demand and influence from external stakeholders;
- Economic factors, efficience gains, cost reduction;
- Access to finance;
- Policy and regulatory initiatives, modern business responsibility;
- Diversity and association.

Consumer demand pulls the green transition (EC, 2018; Nielsen, 2015; Koirala, 2019), as the majority of consumers are willing to pay more for green products (OECD, 2021b). To be able to benefit from this, competitive intellectual advantage in the green marketplace, created through developing green products or services, shall be secured via defending property rights (Horbach, 2008; Montalvo, 2008; Horbach et al., 2012). ***Reputation and external pressure*** – from employees, investors, legislators, environmental groups, suppliers, financial institutions, customers in the supply chain and the local communities in which MSMEs operate, also strongly motivate the green transition (Walker et al., 2008; Gadenne, Kennedy, McKeiver, 2009; Olmos et al., 2012; Veugelers, 2012; Horbach, 2008; Montalvo, 2008; Horbach et al., 2012). ***Cooperation and participation in eco-systems, clusters and value chains*** help limiting resource use, enhance by-products exchange (including waste heat), and enable infrastructure sharing and joint purchase (OECD, 2021b).

Although they cause a smaller effect for MSMEs than for larger entities, ***high energy prices are a strong driver of eco-innovation*** (OECD, 2013; Dussaux, 2020; Siedschlag, Yan, 2021). ***Costs savings*** potential of MSMEs is estimated to be between 10% and 30% of their energy demand and serves as the primary motivator for resource efficiency actions for 68% of MSMEs (OECD, 2021b; EC, 2015). These ***cost reductions may be achieved by*** (IEA, 2015; OECD, 2019):

- Increasing the process efficiency by minimising inputs and waste production;
- Improving the product design in order to reduce the required inputs;
- Optimising the waste disposal – by reducing waste and reusing already-generated waste or identifying other firms that may be able to use it;
- Using recycled materials to limit the need to purchase new raw materials and decrease the pressure coming through the supply chain;
- Using more energy-efficient technologies to improve infrastructure efficiency;
- Reducing the volume of packaging and shortening supply chains to reduce shipping and delivery costs.

Return on investment is a key driver for all size categories, but for MSMEs, the existence of public subsidies and financial support for technical assistance is far more important than other factors. In order to make the most of this enabler, the MSMEs need to have access to ***quality advice*** (EEFIG, 2015; Fleiter et al., 2012; Bodas-Freitas, Corrocher, 2019). The probability of eco-innovation increases with firm size and the expected increase in energy price (Cecere et al., 2018).

Easier access to financial resources, a combination of technical assistance, awareness-raising and advisory services, and proper public funding accelerate sustainable transition (EC, 2022; Popp et al., 2009; Olmos et al., 2012; Chatzistamoulou, Tyllianakis, 2022; Ghisetti, Montesor, 2020; Dulia et al., 2021).

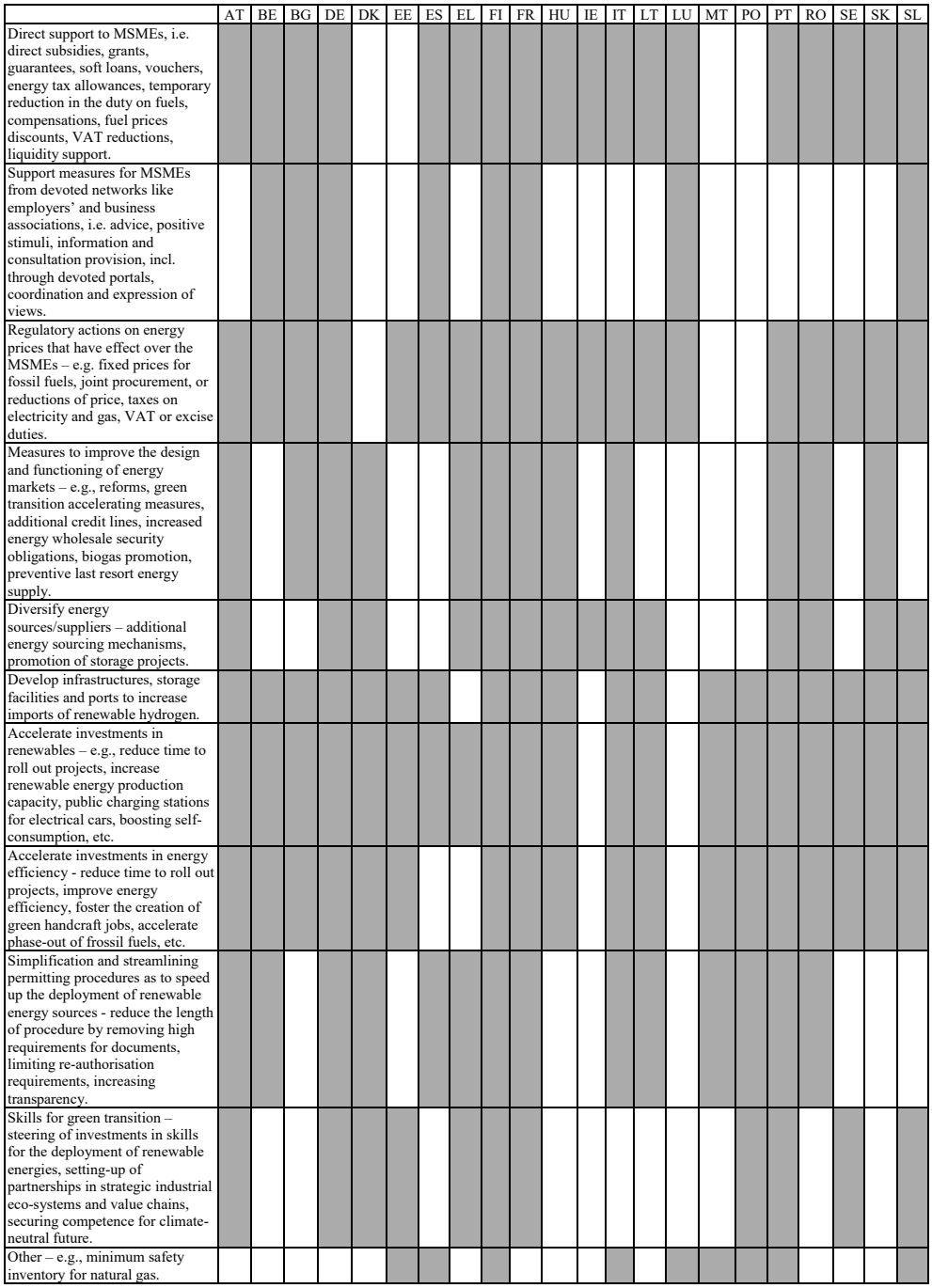
Policy and regulation, initiatives in the field of ***corporate social responsibility (CSR), responsible business conduct (RBC) and environmental and social governance (ESG)*** are changing business behaviour at a fast pace (OECD, 2021b; EC, 2022b; Horbach, 2008; Montalvo, 2008; Horbach et al., 2012). The Porter Hypothesis asserts that firms can benefit from environmental policies, arguing that well-designed environmental policy and regulation can stimulate innovation, which will, in turn, increase the productivity of firms or the product value for end users (Porter, 1991; Porter, Linde, 1995). While acknowledging the importance of the policy-induced drivers, it is vital to prevent MSMEs from being unfairly exposed by indirect effects through the supply chain to burdensome reporting obligations that are imposed on large enterprises. As a general rule, MSMEs shall be exempted from some specific obligations in justified cases, and it is necessary to offer them simplified voluntary tools and measures that allow them to demonstrate in a comfortable manner their sustainability commitments (EC, 2022b). ***Positive stimuli and incentives*** – such as green prizes and certification for MSMEs, can help them tapping into green markets through innovative products and services (EC, 2022b).

Adoption of good practices such ***as quality control management and product differentiation*** can further accelerate the green transition (Cuerva et al., 2014; Metcalfe, Ramlogan, 2005), alongside ***promoting industrial symbiosis***. The latter can be achieved by: valuing the 'waste' of some companies as resources for others, creating joint value between companies, strengthening trust and transparency between potential partners, belonging to an industrial association, or other organisation, sharing infrastructure or services with industrial neighbours (Peitro-Sandoval et al., 2018).

The green transition is closely linked to digital transformation (EIB, 2021; Kesidou, Ri, 2021). ***Digitalisation serves as a tool for making business operations more efficient,*** **helping new market expansion and internationalisation, and has the considerable potential to decrease emissions, waste and the use of natural resources. But digital services and equipment also cause environmental impacts which need to be managed simultaneously. Hence, MSMEs need to manage both parts of this twin transition – a very demanding double challenge because of the substantial need for resources.**

The availability and development of new technologies, for instance, in digitalisation, may affect the barriers that MSMEs face in environmental issues and their ability to address them (OECD, 2018). Not only can digital solutions, in some cases, support environmental practice, but they also may, in other cases, be a source of high-energy use (OECD, 2021b). For example, among the smart solutions suitable for MSMEs are microgrids that incorporate renewable sources of energy into conventional electricity grids with the help of information and communication technologies (ICT) for management and control purposes and enable small-scale energy production and management (OECD, 2021a).

Figure 5. Measures adopted by member states to cope with the energy prices spikes



	AT	BE	BG	DE	DK	EE	ES	EL	FI	FR	HU	IE	IT	LT	LU	MT	PO	PT	RO	SE	SK	SL
Monitoring energy prices – e.g., observatories, statistical information collection, price surveillance, monitoring of energy excahnges.		■		■				■	■	■			■		■	■	■	■	■	■		■
Improving transparency of the energy bills.		■						■	■		■				■	■			■		■	■
Enhancing construction of micro grids, removing obsacles of investment process in renewables.		■		■					■												■	
Insolvency measurement and prevention, consulting MSMEs in financial difficulties.		■	■	■					■						■							
Capital liquidity for green investments – e.g., green supporting factors introduction, green credit offerrings.	■					■			■													

Source: Desk research

While activating drivers and enablers of the green transition can be expected to produce results over a longer time span – more likely in a medium, even in a long run, it is still important to focus on the ***immediate response*** options and, most urgently – to help MSMEs dealing with the energy price spikes. Such immediate measures will not only support MSMEs directly, but also will help getting control over the rising inflation, where energy prices skyrocketing is one of the most important inflation-inducing factors. Most European MS adopted measures, as to support the MSMEs to cope with the skyrocketing energy prices (Figure 5). Although such measures, certainly help many MSMEs to avoid being pushed into insolvency, a recently growing number of voices also raise concerns about the risk of distorting competition, because of the different ability of MS to fund them.

Proposal for a Holistic Strategic Approach to Measures for Supporting the Green Transition of MSMEs

Based on the analysis of the challenges, barriers and opportunities that MSMEs face while endeavouring towards green transition and while suggesting how the drivers and enablers of this transition can be unleashed, it is also interesting to take a more holistic and strategic perspective, looking at medium and long time span. Such a perspective aims at allowing MSMEs to be aware of what the future might bring to them and be better prepared to actively manage their future path, so that they do not run the risk of failure and even being pushed out of the market. Therefore, the current paper suggests ***seven building blocks of a holistic strategic approach to measures for supporting the green transition of MSMEs***.

First, to help MSMEs to understand and embrace the modern business responsibility, that is built on economic, social and environmental grounds. A successful MSME shall incorporate all these dimensions in its business strategy and everyday operations. Responsibility stems from companies' own values and consciousness and is further shaped by external influences linked to the overall role of enterprises in the economy and society – such as: direct or indirect requirements of the regulatory framework, demands by market players (e.g., business partners, consumers, investors and financiers), as well as expectations by employees and citizens at large. There is thus a wide variety of aspects and topics to be considered today, let alone to be anticipated for the future, all of which require different

professional expertise. This is often very demanding, especially for smaller enterprises, and it is also demanding for policymakers to find the right ways to enhance business responsibility.

Second, acknowledging and highlighting the diversity and different needs of MSMEs, it is necessary ***specific attention to be paid to the smallest and most vulnerable ones***, so that no one is left behind. In what concerns the states' role to motivate and promote the green transition, it is recommended to maintain direct support to MSMEs regarding the fixed costs they endure on energy, fuel and raw materials increasing prices, through tax reduction or direct subsidies. In this context of policy making and devising support measures, the policymakers should work around a better definition for MSMEs (including diversification by typology) regarding different industrial strategies and eco-systems as shown by these new productive crises. Potential suggestions include a revised category with differentiated criteria for specific typologies, such as traditional/family-owned businesses and a differentiation based on productivity and services.

Third, wide-ranging and targeted information and awareness-raising measures, delivered in a coordinated and complementary manner by the state, regional and local authorities, together with business organisations, chambers, social partners and other relevant stakeholders, are vital to help MSMEs navigate successfully through current troubled waters. To that end, the states and public sector are recommended to stimulate the promotion of further associationism, networking and cooperative partnerships for MSMEs across various industry sectors. ***Associationism and networking*** are meant as participatory instruments for closing the gap between policymaking at the international and national levels and business realities. Cooperative partnerships (particularly in times of crisis) can act as gatekeepers for prices and value chain efficiency and availability, and also can help elaborating clear strategies to restore a sustainable post-crisis economy based on innovation, skills and competition, that are so badly needed.

Fourth, MSMEs need targeted recommendations, that can help them planning actions towards energy security and addressing all kinds of conflict-derived trade disruptions, especially on operational limitations in Russian markets (i.e., luxury goods, high-quality exports). Specific actions to be implemented include policy measures to control the current crisis, such as the employment of methods to control speculation and demand transparency on prices, namely on energy and raw materials.

Fifth, an essential component of MSMEs recovery and boosting also lies in delivering on the ambitions of the green and digital transitions through ***improving MSMEs' human resources training and skills***. For a necessary approach to workforces, it shall be suggested to the European institutions and MS to promote an increased revision of VET practices specifically designed to reinforce the twin transition. However, it is also requested not to forgo specialised training for employers (also including digitalisation) with a particular outlook on more traditional sectors. These should be aimed at promoting diversity and creativity in European entrepreneurship by tapping the potential of all prospects, and especially of women, third-country nationals or even social economy models (i.e., worker-owned cooperatives). Further assistance could be provided through the training of specialised mentors and intermediaries

of MSMEs innovation siding the businesses or even the promotion of business transfer-specific training dedicated to the pick-up of small and medium businesses in risk of closure.

Sixth, a set of recommendations can be focused ***at interconnections across processes of (digital) innovation, sustainability and European cohesion for MSMEs***. From this point of view, MSMEs are in greater need of advanced technical and logistical support for awareness-raising, application and implementation of European regulation and funding. This holds multiple implications for the increased participation of MSMEs in EU-funded projects and for obtaining guidance on compliance with the new climate and environmental policies (i.e., EGD and Fit for 55 packages). On the other side, improvements to these processes are also strictly connected to further digitalisation. To face such a challenge, additional investments will be required both for closing national gaps among digital levels (i.e., physical infrastructure and digital services) and to enable the development of a specific EU fund for broad SME digitalisation capacity. Of special interest may be the use of "one-sheet" application procedures for EU funds and the employment of different criteria according to the level of desired upscale in digitalisation. To enhance the successful implementation of such a digital capacity-building plan, it may well be necessary to consider the creation of a new generation of Innovation hubs – embedded not only at the national, but also at a regional and local level. These would not only be dedicated to digital and start-up services, but rather connected to the practical implementation of technological innovation in traditional MSMEs settings and will require joint commitment by employers' and business associations and relevant stakeholders.

Seventh, the current trying times, characterised by multiple crisis, underline once again the importance of human inspiration and leadership. This recalls the Schumpeterian concept of entrepreneurship, which is focused on the innovation as "the introduction of something new – a new idea, method or device", that is invented, implemented and diffused by the entrepreneur, who is characterised by "...the will to conquer, the impulse to fight, to prove oneself superior to others, to succeed for the sake, not of the fruits of success, but of success itself… or simply of exercising one's energy or ingenuity" (Schumpeter, 1969). Therefore, it is important that the overall business environment is made attractive and supportive for entrepreneurship, innovation, investment and trade (EESC, 2022a) and the role of entrepreneurs is recognised and respected in the society. And above all, in order to have a successful transition tomorrow, the MSMEs have to survive today.

Conclusion

The MSMEs form the overwhelming majority of the European business community. They are the genuine engine and determinant of the success of so badly needed radical transformation towards climate neutrality – being both parts of the problem causes and of its solution. Therefore, their commitment to net zero is vital for its success – embracing all aspects of modern responsibility and embedding the holistic concept of green and sustainable business in each and every aspect of their operations.

The motivation and stimuli that were identified and mapped to incentivise the MSMEs to embrace the green transition and to communicate their efforts and achievements can speed

up the process and serve as avenues for boosting the transition to the sustainability of the European MSMEs. To that end, it is vital to help them to grasp the opportunities offered by the green transition and overcome the barriers and challenges they have to cope with on the way to achieving climate neutrality. Provided that the relevant motivators and enablers are unleashed – and while respecting, acknowledging and highlighting the diversity and different needs of MSMEs, the transition towards climate neutrality can be accelerated. And it will also provide a timely answer to the additional challenges brought about by the invasion of Russia of Ukraine, that now seems to be serving as a catalyst of the green transition, by forcing businesses to search for alternative, not fossil based sources of energy and for alternatives of row materials.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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Todor Krastevich[1]

RETARGETING CUSTOMERS USING UPLIFT MODELING[2]

"Traditional" digital marketing campaigns are based primarily on a priori geotargeting, augmented with profiling of potential consumers based on language, sociodemographics, interests and preferences. A step ahead is when experimental results from A/B testing are used for more precise retargeting, in order to prove in a statistically significant way the direction and size of the effect of a potential communication marketing impact. Through the application of uplift modelling, it is possible to complement the experimental data from A/B testing by identifying the effect of specific marketing treatments (e.g. a specific message, alternative display ad design, web page layout and/or change in price offer) on specific individuals as opposed to an overall increase or decrease in conversion rates caused by the impact. This technique can help evaluate and predict their responses through supervised machine-learning classification algorithms. This nuanced analysis allows for personalized targeting of marketing communication to only leads who are likely to respond positively to an impact. This paper proposes and demonstrates a prototype model for optimal retargeting of customers based on machine learning algorithms and open-source programming.
Keywords: Uplift models; predictive modeling; retargeting; supervised machine learning
JEL: M37; C35; C55; C63

1. Introduction

Any personalized marketing communication campaign can be viewed as an analytical task whose solution supports specific decision-making. Most often, the campaign aims to exert an influence on the customer, prompting him to behave in a way that benefits the advertiser – for example, to unlock some behavioural change with beneficial consequences for the business, the environment and/or society. Achieving these objectives is done by engaging the customer (e.g. by serving information about the benefits of the product offered, offering them

[1] *Todor Krastevich, PhD, Associate Professor in Marketing Department at D. A. Tsenov Academy of Economics, e-mail: krst@uni-svishtov.bg.*
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special price discounts, some kind of giveaway or involving them in a cause) through direct contact in selected communication channels (e.g. phone calls, personalized emails and text messages, personalized display advertising, etc.). Such campaigns can be seen in virtually all industries, with the most common occurring in high-tech sectors of the economy, such as telecommunications, the financial sector, and commerce. However, it is possible to plan and run campaigns related to sustainable consumption (e.g. self-control and self-restraint in the use of non-renewable natural resources or products whose consumption leads to negative social consequences). Such campaigns do not aim at profit maximization, but are likely to be planned and optimized with the same analytical tools and predictive models typical of digital marketing in a business context.

In what follows, we first consider the "classical" way of applying predictive models using machine learning algorithms, revealing some of its limitations. We then attempt to justify the possibility of improving results by identifying the truly "optimal" target group of customers using incremental models and machine learning algorithms. Although the purpose of this paper is rather methodological, we would also like to focus the reader's attention on the positive financial impact of incremental modelling and the possibility of increasing the ROI of digital marketing campaigns through customer selections based on net scoring.

2. On the Limitations of "Traditional" Predictive Modelling

"Traditional" digital marketing campaigns[3] typically target potential consumers based on their attributes and recorded responses to previous campaigns. Those whose profiles most closely match those who have responded positively in the past are selected. In practice, the causal relationship between stimulus and response is not examined, but profile similarity is sought. However, in order to selectively and personalize the influence on consumer behaviour, it is interesting to evaluate precisely the mechanism of formation of the expected causal effect of the communication impact. Predictive modelling of the net effect of user-level influence could serve as a basis for machine learning algorithms for classifying, selecting, and remarketing to the right people at the right time in the right place on the Web.

The causal links between communication marketing influences and consumer responses are clearly more difficult to empirically assess and model than simply predicting future customer behaviour. Classical predictive models focus on predicting events from an individual consumer's future behaviour. Most analytical approaches and tools still focus on making predictions instead of profitable targeting. Consider the fact that prediction tools based on

[3] We use the term "traditional" marketing campaigns to refer to those that, in response modeling, typically take a group of treated customers and attempt to build a predictive model that separates likely responders from non-responders using some predictive modeling technique such as decision trees, random forest, or logistic regression. In this approach, only the responses of the treated customers are considered for building the model. The traditional approach to response modeling is training a predictive model on only the treatment group (those who received the promotion). This model will separate those who are likely to respond (purchase the product) from those who are less likely to respond (did not purchase the product). In contrast, incremental modeling uses both treatment and control customer groups to build a predictive model that focuses on incremental response.

machine learning algorithms only predict momentum (i.e., the customer behaviour that is observed with the usual influencer marketing tools, which would mean keeping the usual communication mix). Such an approach relies more on the identification of correlation or hypothetical dependency, but not causality. For example, it is possible to use some form of regression to predict consumption or customer revenue, considering the influence of a range of uncontrollable factors (such as seasonality, trend, some discrete events, etc.). The objective of such an approach is to produce as accurate a forecast of the expected outcome as possible, subject to the maintenance of previously observed behaviour and/or circumstances. Such an approach to building predictive models can only inform what would happen if customers whose expected behaviour would lead to a positive effect on observed economic indicators (e.g., profit or sales revenue for the company) were not targeted. It is not particularly informative and useful for deciding whether or not a personalized impact should be exerted on a particular customer and whether or not the desired behaviour would be observed without an exerted impact. Using it in a practical context can lead to targeting the wrong people, resulting in both wasted resources and possibly negative reactions. However, what would happen if we shifted the focus from predicting expected behaviour in the usual marketing mix to assessing the difference in an individual consumer's behaviour in the future if personalized influence is or is not exerted on them? To justify a logically correct answer to this question, we advocate and share the following theses (Vittal, 2006, p. 2):

- Direct marketing impacts different customers with different effectiveness. For some of them, it can even trigger negative reactions. These are most evident in some customer retention activities falling within fixed-term contractual relationships (e.g. with telecom operators running customer retention campaigns), but can also be 'hidden' in marketing campaigns that are generally successful[4]. They both reduce revenues and increase costs for the proposing company and therefore deserve special attention.

- There is no doubt that some marketing actions have a negative impact on some customers. This is most clearly illustrated by the surprisingly common view of mobile telecommunications operators who run customer retention campaigns that apparently increase the total number of customers. These are actually quite easy to understand, as we will explain below. Less clear is how campaigns with a positive overall result often contain significant segments within which there is a negative effect. Where this not only increases campaign cost effectiveness, but actually results in a lower campaign gross result that could be achieved by targeting a lower volume.

[4] It is not difficult to understand why negative effects often occur in customer retention activities. The traditional approach of modelling customer churn first identifies those at high risk of churn. Generally, these are people who are already dissatisfied in some way. Intervention, especially over the phone, is associated with a high risk of the customer responding with a request for immediate cancellation – i.e., provoking a preemptive decision to drop out that might not otherwise have happened. due to customer apathy. Also, intrusive mechanisms for unsolicited commercial messages and communications, such as phone calls or pop-up advertisements, are often received with negativity. Niche-oriented communications designed to appeal to a specialized group can backfire on people who do not belong to that group or do not fit the stereotype of that group.

- Customers who buy or consume the most when they are the target of targeted communication are not necessarily the best targets for marketing interventions. Some of them would consume or spend in the same way, even if they were not targeted.
- Since desirable customer responses for the company may or may not be due to the direct marketing interventions (some of them will surely be observed even without a specific targeted communication impact), in order to empirically measure the net effect of the marketing impact, it is necessary to design, organize and conduct an experiment with a control group.

Can the theses put forward be empirically justified and pragmatically defended? Typically, products are promoted by communicating with the customer through various channels: SMS, push, chatbot messages on social networks and many others. The formation of segments for personalized targeting is usually solved using three types of predictive models based on machine learning: models predicting similarities based on past behaviour (Propensity modeling), models predicting certain reactions (response modelling), and models predicting the net (a.k.a. incremental) effects (uplift modelling).

Propensity models (also sometimes referred to as `lookalike` models) estimate the probability that a customer will perform some desired action (Radcliffe & Surry, 2011, p. 2). To train such models, sample observational users data containing past unprompted desired (or undesired) actions (or non-actions) – e.g., registered sale, subscription, installation of a trial version of an application, or other actions as a result of an inaudible or direct request (resp. refusal) by the user to the content creator. The goal of the model is to identify users similar to those who have taken the target action desired by the proposer (i.e., inclined to purchase). The marketing problems addressed by such models are related to the generation of a list of consumers with a high probability of performing the expected action (e.g., purchase), provided they are not subjected to a targeted marketing influence.

Response models aim to estimate the probability that a customer will perform some action desired by the proposer, given some targeted communication (Javaheri, Sepehri, & Teimourpour, 2014, p. 154). A training sample of data collected after some interaction with the customer is used to train such models. In contrast to the first approach, here we have the results of provoked reactions (e.g. the customer was offered a higher subscription plan and accepted it or refused it). Typical problems that can be solved with such models are related to the generation of a list of customers with a high probability of response (e.g. conversion to purchase) if they are subjected to targeted personalized marketing treatment.

In the uplift models, the goal is to estimate the probability that a customer will perform some desired action only if exposed to a targeted communication exposition. The idea is to use a model to assess the difference in customer behaviour when a personalized targeted communicational influence is exerted versus in the absence of such an influence. Formally, this means finding the difference between the probability of purchase with communication and the probability of purchase without communication (also called `net` of `incremental` effects of personalized targeted communication).

Technically, incremental or uplift modelling should produce identical results to models predicting response if the response rate in the control group tends to zero. This is a

hypothetical situation in which consumers would not change their behaviour if they were not targeted by communication. Such scenarios are possible, for example, for products or services that are in the late maturity phase of their lifecycle, as well as market-new products that are completely unfamiliar to the consumer and which he would not risk buying without significant stimulation. In addition, products and services that are primarily sold by invitation (e.g. accepting a webinar invitation via email) may have very low response rates without targeted communication and incremental modelling would not bring any significant advantages over traditional modelling.

Optimizing a digital communications campaign using the first two types of models can lead to missed opportunities to increase the effectiveness of marketing spend. Why do we think this statement is reasonable? When the data used to develop a predictive model is in some way influenced or subject to change due to the interaction between the organization's business and its customers, net (incremental) effect modelling may be a more valid approach to reach unbiased conclusions. Incremental modelling allows the effect of these interactions to be extracted in a 'pure' form from the data, as well as accounting for the effects of interactions between predictors within the model (Verbeke, Baesens, & Bravo, 2018, p. 157).

The first two types of models, which we define as "traditional", predict the outcome y based on a set of variables X). In the third type of models, the goal is to determine the impact of the communication influence t on the change in the outcome Δy, i.e., to provide a metric probability estimate of the increased chance of achieving the outcome with the influence, compared to the chance of the outcome without the influence. This effect cannot be directly observed empirically as it is the result of causal dependence. Hence the key methodological problem associated with the evaluation of incremental models, which consists in the impossibility of simultaneously implementing and not implementing personalized communication with the same individual and, thus, of observing differentially customer reactions. The only adequate empirical approach for collecting the data necessary for evaluating incremental models is the experimental one, in particular, following an adequately chosen experimental design to track marketing campaign information at the customer level. The purpose of the experiment is to measure the difference in consumer response in the presence and absence of communication, respectively. This difference can be interpreted as a causal effect. If we score it with τ_i for the i-th respondent, the expression would hold:

$$\tau_i = Y_i(1) - Y_i(0) \quad (1)$$

in which with $Y_i(1)$ we express the potential reaction of the respondent if he/she was subject to a personalized communication impact (e.g. via SMS, personalized banner ad, email), with $Y_i(0)$ the potential reaction of the same respondent if he/she was not (Gutierrez & Gerardy, 2016, pp. 2-3).

In the presence of some descriptive attributes X_i associated with respondent i (e.g., gender, age, geolocation, prior behaviour, etc.), it is possible to infer a so-called conditional average treatment effect CATE[5] (Abrevaya, Hsu, & Lieli, 2014).

[5] The acronym CATE was first introduced by Hahn (1998) and popularized by Heckman, Ichimura, Todd (1997; 1998).

$$CATE = E[Y_i(1) \mid X_i] - E[Y_i(0) \mid X_i] \quad (2)$$

However, such a model does not lend itself to optimization because either the causal effect τ_i nor the conditional mean effect of the impact on individual respondents can be the objects of empirical observation. For this reason, it is necessary to acquire the data in a controlled experimental order in which respondents are randomly subdivided into a target (experimental) group on which personalized communication is exerted and a control group whose behaviour is only subject to observation but not to communication influence. If we introduce a dichotomous variable D taking values 1 when communication is exercised and 0 when it is not, the observed response Y_i of the i-th respondent can be expressed as:

$$Y_i = DY_i(1) + (1 - D_i)Y_i(0) = \begin{cases} Y_i(1), \text{if } D_i = 1 \\ Y_i(0), \text{if } D_i = 1 \end{cases} \quad (3)$$

Hence, the estimate of the average conditional effect of the communication impact could be expressed as:

$$\widehat{CATE} = E[Y_i|X_i = x, D_i = 1] - E[Y_i|X_i = x, D_i = 0] \quad (4)$$

The latter expression represents the general form of an incremental predictive model if conditional independence holds. Conditional independence can only be ensured if respondents from the target audience are randomly assigned to experimental and control groups and this assignment does not depend on the values of any of the observed attributes X. This means that the possible response of a given user $\{Y_i\ (0/1\}$ is solely and exclusively a consequence of the characteristics of user X_i, but not of its membership in an a priori distribution across the groups observed during the experiment. In general, this condition can be expressed as (Hahn, 1998, p. 322):

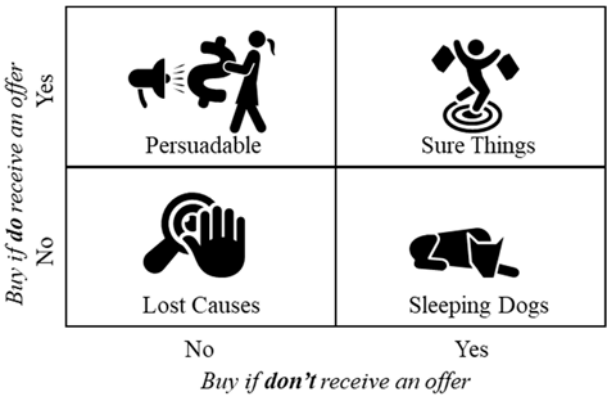
$$\{Y_i(0), Y_i(1)\} \perp D_i|X_i \quad (5)$$

If this condition is met, then we can assume that the observable response of respondent Y_i over the course of the experiment will depend solely on whether or not a personalized communication influence is exerted on the user.

3. Uplift Modelling Framework

As already mentioned, the purpose of the modelling is to distinguish responders from non-responders, and additionally to distinguish within the experimental and control groups those who respond as a result of the impact from those who respond without being impacted. In fact, within the group of non-responders, a further similar segmentation needs to be made based on the observed responses in the presence and absence of a targeted impact. Vittal (2006), Radcliffe (2007), Siegel (2011, p. 8; 2016, p. 270), and Kane et al. (2014) assume that four non-overlapping customer types are likely to exist in any personalized marketing campaign (see Figure 1).

Figure 1. Four customer types identified as a purchasing behaviour function when treated or not treated



Source: Adapted from Sigel (2016, p. 270) and Radcliffe (2007, p. 3).

The first supposed type of potential consumers are individuals who react negatively when they are the target of a marketing campaign. They will not buy if they are treated unless they react positively or do nothing. Some authors call this type of consumers "sleeping dogs" (Radcliffe, Generating incremental sales: Maximizing the incremental impact of cross-selling, up-selling and deep-selling through uplift modelling, 2007, p. 2). Obviously, customized targeting of such individuals would provoke the opposite of the desired effect and instead of the campaign generating additional revenue, it would provoke unjustified costs. Where the relative proportion of such individuals is relatively high in the target audience, it would be prudent from a cost-effectiveness perspective not to run a campaign as it would result in a net loss.

The second presumed type of potential customers are individuals who respond positively or buy, regardless of whether they have been the target of personalized communication influence. Quite conventionally, this type of consumer could be defined as "loyal" or "sure things". Marketing to such individuals does not generate additional revenue, but it does generate additional costs (these are the fixed costs of contacting the potential customer). These additional costs can of course have a secondary communication effect of strengthening the relationship with the customer and hypothetically reducing the likelihood of churn. However, such effects are difficult to monetize and are ignored in incremental modelling.

The third potential customer type is non-responders (i.e. non-buyers), regardless of whether or not any personalized communication influence is exerted on them. They can be conventionally referred to as "indifferent", although some authors define them as "lost causes" (Verbeke, Baesens, & Bravo, 2018, p. 159) or "invulnerable" (Radcliffe, Generating incremental sales: Maximizing the incremental impact of cross-selling, up-selling and deep-selling through uplift modelling, 2007, p. 2). Like "loyalists", targeting "indifferents" does not generate additional revenue, only additional costs. However, these additional costs are generally lower compared to the additional costs of targeting 'loyal' customers, as "indifferents" do not respond and take advantage of the incentive offered, whereas 'loyal'

do. Therefore, as objects of the campaign, the "loyals" are 'more expensive' than the "indifferents".

The fourth possible type of potential customers are those who react positively (i.e. buy) when they are influenced by personalized communication and do not react if they are not influenced. Such 'persuadable' respondents are essentially those who should be the target segment of the campaign. They only buy (either more or earlier, depending on the context) if they are contacted. Targeted communication to those susceptible to persuasion generates additional revenue and once the costs of targeting other types of customers are deducted makes the campaign profitable. The incremental modelling aims to generate a list of exactly this type of customer to target for the campaign.

It goes with no doubt that the actual behaviour of the consumer in the presence or absence of a communication impact depends on the characteristics, channels, tools and incentives used in the marketing campaign itself, as well as on their personal characteristics. While the latter are independent variables that cannot be controlled, the tools used for the campaign can be optimized and personalized (even at a customer level) in order to maximize financial returns.

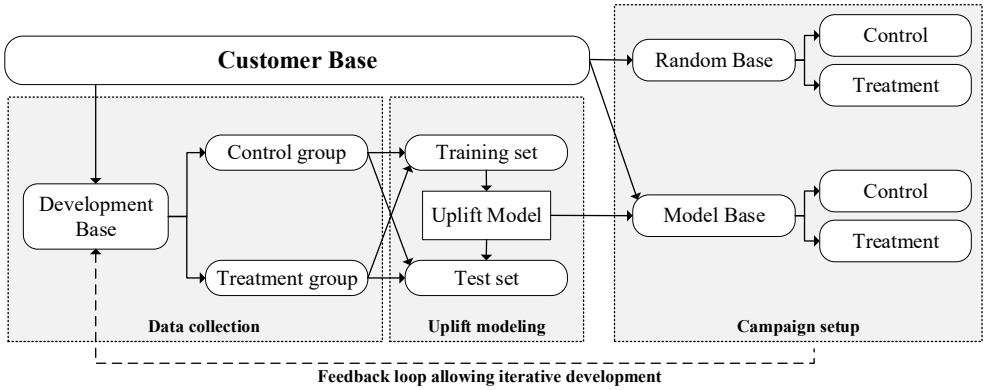
We also draw attention to the fact that the availability of the four described types of leads is not guaranteed in every available customer database used to model and optimize personalized marketing campaigns. In other words, any combination of proportions of the four customer types is possible within a given customer base. The exact proportions of these combinations depend on both the characteristics of the target audience and the characteristics of the campaign type. It is possible, for example, that there are no individuals described as 'sleeping dogs'. In such a constellation, there is no risk of adverse impact. However, there may be no 'persuadable' customers. In such a scenario, a 'red' light should be given before launching a campaign, as no net revenue would be generated. Although these are hypothetically extreme scenarios, it should be borne in mind that, in general, the relative proportion of persuadable customers is almost always very small. This implies a very precise ex-ante analysis of the expected benefits and costs associated with the campaign (Verbeke, Baesens, & Bravo, 2018, p. 161).

But how do we identify these four types of leads? What data and methods of collecting it are applicable and adequate? How do we identify those who are susceptible to persuasion? This is a relatively complex process, and perhaps because of this, there are relatively opaque, fragmented and incomplete data collection methodologies in the research literature that are suitable for modelling the net effect of personalized marketing campaigns. However, they all agree that the main empirical challenge begins with the collection of appropriate data.

Since the purpose of the modelling is to assess the difference between two random events that are essentially mutually exclusive at the respondent level (in the sense that a particular user cannot be and not be both the target of a targeted communication effect and have customer reactions observed), the only possible way to collect an adequate set of baseline data is to conduct an experiment. The design of the experiment involves randomly dividing a representative portion of the target audience (e.g., a client base or a list of registered households) into two subsamples, a treatment subsample and a control subsample (for reference). Representatives of the treatment group receive the communication influence, while representatives of the control group do not receive the communication. Their reactions

are observed and recorded over a period of time. Figure 2 illustrates a possible conceptual scheme for designing an experiment in order to collect the data needed to construct and evaluate an incremental model. Based on these data recorded during the experiment, a classification model measuring the net effect is constructed and estimated. Using this model, other members of the target audience are estimated and targeted.

Figure 2. Experimental design to collect the required data for uplift modeling



Source: (Verbeke, Baesens, & Bravo, 2018, p. 162)

This scheme can also be followed iteratively, with the selection of respondents into the experimental group after each run of the experiment now a combination of both new randomly selected respondents and individuals predicted by the model. This violates the principles of randomization but provides more efficient training of the final model.

However, it should be kept in mind that if the actual communication campaign relies on a different communication message (or an instrument of influence) than the one used during the experiment, the model will have a lower predictive ability.

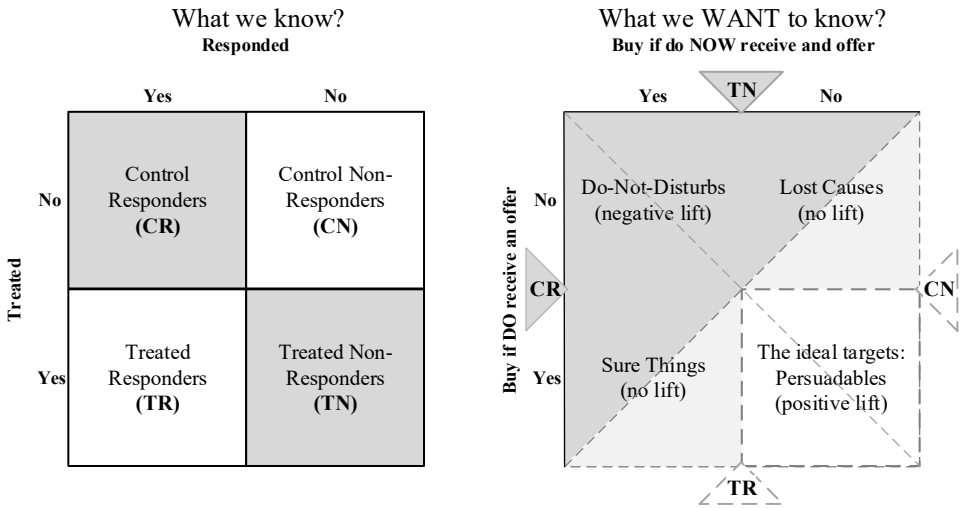
As a result of the data collected, it is possible to make the following hypothetical designations (Kane, Lo, & Zheng, 2014, pp. 222-223):

- Responders in the control group who responded (see (CR) left side illustration in Figure 3) were either in the "Loyal" or "Sleeping Dog" category, but in an unknown proportion - we only know of this fuzzy set as being composed of individuals who responded to being exposed to a communication impact. In these, both reaction and non-reaction can be observed if they are acted upon. It is logical to avoid them from personalized communication targeting in the future to save costs or to avoid provoking possible negative reactions.
- Respondents from the control group who did not respond (CN) were in unknown proportion from the neutral group of "Lost Causes" and from the group, "Persuadables". They did not respond during the experiment, but could theoretically both respond and not respond if a personalized influence were applied to them. It is very important to identify

the group of persuadables so that they can be included in the list for personalized targeting during the campaign.

- Respondents from the experimental group who responded (TR) were likely to be from either the loyal or the persuadable segment. The proportion between these two hypothetical classes is unknown to the researcher. The goal during the campaign should be related to targeting consumers susceptible to persuasion and avoiding the loyal group.
- Respondents who did not respond despite the treatment during the experiment (denoted by TN) represented a fuzzy set of neutrals and sleeping dogs. Hypothetically, those we define as sleeping dogs are also likely to respond if they were not targeted. The goal during the campaign should be related to avoiding sleeping dogs, as the associated costs are counterproductive and could even provoke negative reactions.

Figure 3. Customer types identifiable by their reactions



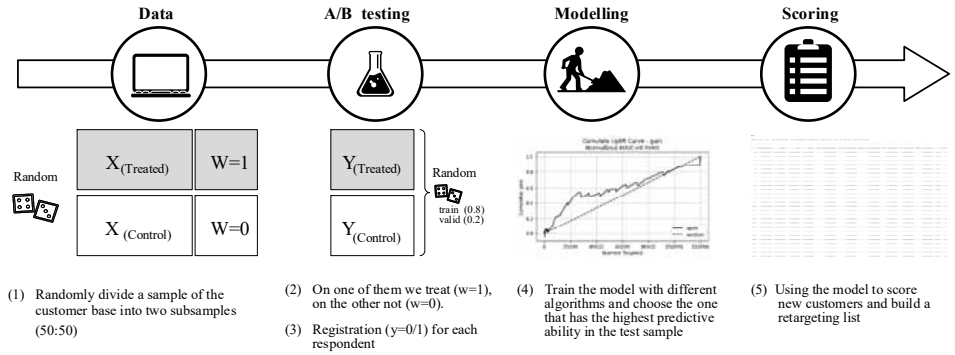
Source: Adapted from Kane, Lo, & Zheng (2014, p. 222).

Starting from the insight that the only important group to target is the persuadables (see Figure 3, right matrix), we come to the main technical problem related to their identification. The problem is clearly a classification one, since the dependent variable (consumer response) is logically viewed as dichotomous. Figure 4 illustrates schematically the conceptual logic of standing the classification model.

To train the model to predict the incremental score (net effect) of the campaign as accurately as possible at the individual respondent level, different approaches are possible. The first is indirect and is based on the use of two separate models, one predicting the probability of respondents responding without being influenced and the second predicting the probability of responding when influenced. This approach is intuitive, easy to follow and implement, and possible to implement without a full A/B test. The problem is its predictive ability. When using two parallel models, we effectively have two independent sources of systematic error,

which hypothetically leads to a reduction in predictive accuracy. Furthermore, in this approach the net effect (the uplift) is not a target variable.

Figure 4. A conceptual scheme for building a predictive uplift model

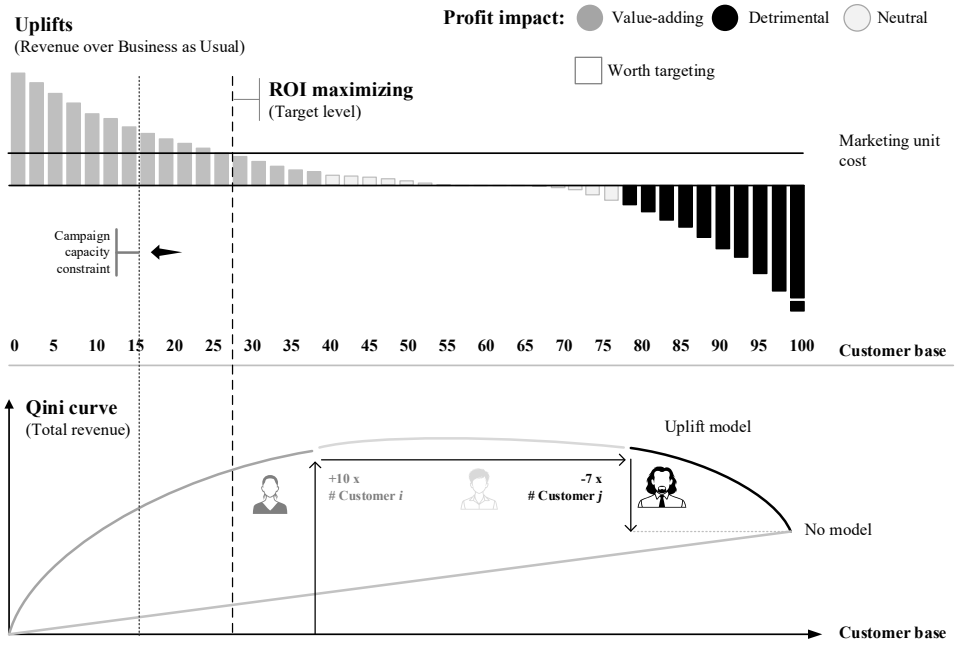


The second approach involves building and training a general model in which the target variable is precisely the net effect. In theory, this approach should be more accurate, but it is more difficult to train and in some algorithms is susceptible to overfitting. Recognizing these risks, we follow this approach when programming a prototype incremental model to predict the behaviour of consumers.

And we come to the core of the predictive model – its training algorithm. In practice, it is possible to apply all known supervised machine learning algorithms that predict the probability of occurrence of categories of a dichotomous variable as an algorithm for estimating and training such models. In this list, we can include purely statistical methods based on regression with nominal dependent variables (Lo, 2002; Lei & Wu, 2007; Kane, Lo, & Zheng, 2014), methods based on classification trees with different separation criteria, such as, e.g. CART (Breiman, Friedman, Olshen, Stone, & Olsen, 1984) or CHAID (Kass, 1980), as well as a number of modern ensemble methods, such as the random forest method (Guelman, Guillen, & Pérez-Marín, 2012; Guelman, Guillén, & Pérez-Marín, 2014; Soltys, Jaroszewicz, & Pzepakowski, 2015). Although it is not possible to claim a priori which of these methods provides the highest predictive ability of models, most practical applications are based on ensemble methods in particular. For the development of the proposed prototype, we step, namely, on the random forest method.

Each incremental model "produces" estimates of the net effect at the user level. These estimates can be interpreted as an absolute change in the probability that someone will respond if they are communicatively influenced instead of not. Based on these estimates, it is possible to sort potential customers in descending order and derive a list of those who have a positive net effect or a net effect above a certain threshold. This estimation concept and illustrated on the top of Figure 5. Starting from the assumption that communication is associated with a single variable cost for each contact, it is easy to derive a list of top-n users whose net effect would provide a positive campaign effect.

Figure 5. A conceptual framework for estimating the predictive ability of uplift models



Source: Adapted from Reinert & Zawisza (2020).

Since the choice of training algorithm as well as the tuning of the chosen algorithm itself affects the predictive ability of the model, it is possible to use some accompanying metrics and tools to evaluate the predictive accuracy of different variants of the classification model. Among the most popular are, for example, the cumulative incremental effect function (Uplift-curve) and the area under the uplift curve (AUUC), as well as its variant known as the Qini-curve and the area under this curve (AECU) (Radcliffe, 2007; Radcliffe & Surry, 2011). The higher an incremental model's predictive ability, the higher the maximum of these curves and, consequently, the larger the area under them. For comparison, a so-called "random" model is always used – i.e. if users are randomly selected up to a certain threshold – see the straight line in the bottom graph of Figure 5.

4. Prototyping Uplift Models

The practical deployment of the methodology described above faces a number of challenges. Firstly, the need for large data sets. For the machine learning of an incremental model, it is advisable to work with tens or even hundreds of thousands of records of recorded behaviour, and within a controlled experimental order of magnitude. Any A/B testing platform on the Internet or popular social networks could be used. The challenge is the computational power as well as the relatively complex programming code required to process the data. Various open-source programming libraries are known, such as `Tools4uplift` (Belbahri, Gandouet,

Murua, & Nia, 2021), `grf` (Athey, Tibshirani, & Wager, 2019; Tibshirani, et al., 2022), `randomForest` (Breiman, Cutler, Liaw, & Wiener, 2022), and no longer maintained `uplift` package (Guelman, Guillén, & Pérez-Marín, 2014) using the R programming language. From our research and experimentation, we found that a much better environment and functionality is currently offered by incremental modelling libraries written for the Python programming language. Definitely, one of the most complete is the CasualML package (Uber Technologies, Inc, 2019), as well as `scikit-uplift` (Shevchenko , 2021). Trying to use the best of "both" worlds, for the practical implementation of the developed prototype, we used the Distributed Random Forest (DRF) package developed in Java for the open-source machine learning platform H2O.ai (Ambati, 2014). The advantage of this platform is the convenient interface and libraries to work directly with R (R Core Team, 2022) or Python (Python Software Foundation, 2022).

Of course, the choice of programming environment depends on many factors, but from our experience running intensive tests with an anonymized set of 150000 customer response records we could not find any significant advantages or disadvantages of the two programming environments.

The full Python code and all relevant instructions and outputs can be found on **Appendix A**. The complete R programming language code to perform the analogous procedure with the same data is provided in **Appendix B**.

5. ROI Impact of Customer Selections Based on Net Scoring

Compared to traditional digital marketing campaigns pursuing demand generation and/or retention, incremental modelling can provide a higher return on marketing investment because the focus is only on incremental responses. By targeting only the customers that can be persuaded through treatment within a campaign, the cost per contact, and therefore the return per unit spent, can be significantly improved.

In theory, customers can be divided into different types according to their behaviour with and without campaigns. Classical gross scoring using propensity modelling, on the one hand, and uplift modelling, on the other, have different capabilities to identify these customer types. In incremental modelling, the purchase or non-purchase of a product is no longer assumed for all customer types. Rather, there are different levels of random noise (i.e., purchase rate) that can be raised or lowered by campaigns to a certain degree (Michel, Schnakenburg, & von Martens, 2019, p. 256).

Assuming the hypothesis that the current customer base includes all four possible customer types (Sure Things, Persuadables, Sleeping Dogs, and Lost Causes), a reasonable assumption can be made that the positive financial impact of incremental modelling can be obtained both as a consequence of cost-cutting by not targeting Sure Things and by prompting additional purchases by targeting Persuadables (Radcliffe, 2007).

Michel, Schnakenburg, and von Martens (2019, pp. 256-284) consider several hypothetical scenarios, depending on the level of the purchase rate among the four types of customers, and prove that when selecting customers based on an uplift model, the total profit

outperforms the total profit gained by the best classical scenario due to the fact that only those customers are targeted where a campaign provides an additional benefit in comparison to not targeting them. They also concluded that campaign net ROI is only influenced by the uplift and downlift but not by varying random noise (i.e., purchase rate) differences between different customer types (Michel, Schnakenburg, & von Martens, 2019, p. 284). Baier and Stöecker (Baier & Stöcker, 2021) also report similar conclusions after reproducible empirical experiments with publicly available datasets.

6. Limitations and Conclusion

When building uplift models, there are often hundreds of available features (predictors) for building such models. Maintaining all the features in a single model can be expensive and inefficient. Feature selection is an essential step in the modelling process for multiple reasons: improving the accuracy of estimates by removing irrelevant features, speeding up model training and prediction speed, reducing the workload of monitoring and maintaining the feature data pipeline, and providing a better opportunity for model interpretation and diagnosis. However, feature selection methods for elevation modelling are rarely discussed in the literature. Although various feature selection methods exist for standard machine learning models, these methods are not optimal for solving the problem of feature selection for modelling ascent processes. Research and development to solve this problem is still ongoing and some promising solutions are already available (Zhao, Zhang, Harinen, & Yung, 2022).

As a conclusion, we should emphasize that, unlike traditional models that solve the accuracy-maximization problem, incremental modelling is a much more reliable analytical approach to solve the performance-maximization problem of digital marketing campaigns. Of course, this approach should not be seen as a silver bullet. A number of pitfalls, such as choosing the right model estimation algorithm or the quality and balance of the data, can significantly impact the predictive ability of the model. Perhaps most relevant here would be the statement by John Tukey, one of the greatest statisticians of modern times, stating that „Far better an approximate answer to the right question, which is often vague, then an exact answer to the wrong question, which can always be made precise“ (Tukey, 1962, p. 13).

Of course, the frontiers of incremental modelling research have not been reached. Constantly evolving and emerging machine learning algorithms are constant challenges for new and novel experiments to train predictive uplift models and deploy them in marketing practice. One of the promising but not yet fully developed fields for experimentation and research is, for example, the non-parametric bayesian approach to estimate the incremental impact of a treatment (Rafla, Voisine, Crémilleux, & Boullé, 2022) and its application for optimizing direct marketing campaigns.

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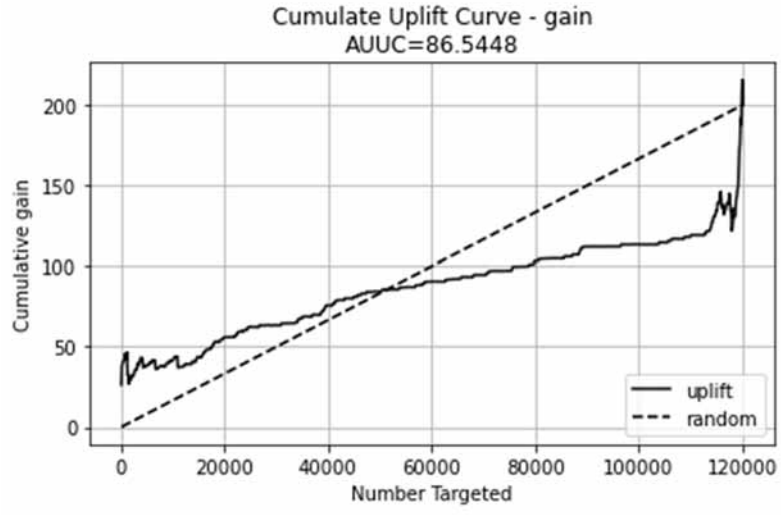
Appendix A: Uplift model estimation using random forest with Python

```
# [1] Install required Python libraries
import h2o
from h2o.estimators import H2OUpliftRandomForestEstimator
h2o.init()

# [2] Data preparation¶
# Importing the dataset into H2O:
data = h2o.import_file("https://krst@data.eacademybg.com/varna2022/campaign150k_data.csv")
# [2.1] Viewing the data frame
data.head(6)
```

V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	treatment	conversion
24.618	10.0597	8.21438	4.67988	10.2805	4.11545	-1.28821	4.83381	3.97186	13.1901	5.30037	-0.168679	1	0
12.6164	10.0597	8.91077	4.67988	10.2805	4.11545	0.294443	4.83381	3.9554	13.1901	5.30037	-0.168679	1	0
22.0088	10.0597	8.21438	4.67988	10.2805	4.11545	-5.98767	4.83381	3.97186	13.1901	5.30037	-0.168679	1	0
22.174	10.0597	8.21438	4.67988	10.2805	4.11545	-1.28821	4.83381	3.97186	13.1901	5.30037	-0.168679	0	0
23.0819	10.0597	8.21438	4.67988	10.2805	4.11545	-1.28821	4.83381	3.97186	13.1901	5.30037	-0.168679	1	0
24.5316	10.0597	8.21438	4.67988	10.2805	4.11545	-4.59546	4.83381	3.97186	13.1901	5.30037	-0.168679	1	0

```
data.shape
(150000, 14)

# [2.2]  Set predictors (Xi), reponse (yi) and treatment (wi)¶
# Choosing predictors
predictors = ["V1", "V2", "V3", "V4", "V5", "V6","V7", "V8"]
# Set the response variable (yi) as a factor
response = "conversion"
data[response] = data[response].asfactor()
# Set the treatment (wi) as factor
treatment_column = "treatment"
data[treatment_column] = data[treatment_column].asfactor()

# [2.3] Split the dataset into a training and validation subsets: (80:20)
train, valid = data.split_frame(ratios=[.8], seed=5250)

# [3] Build and train the model
# [3.1] Model construction:
uplift_model = H2OUpliftRandomForestEstimator(ntrees=100, max_depth=10,
                                  treatment_column=treatment_column,
                                  uplift_metric="KL", min_rows=10,seed=5250,
                                  auuc_type="qini")
```

```
# [3.2] Training the model
uplift_model.train(x=predictors, y=response, training_frame=train,
                   validation_frame=valid)
...
...
...
# [4] Evaluating predictive performance of the model
# Performance evaluation:
perf = uplift_model.model_performance()
perf

ModelMetricsBinomialUplift: upliftdrf
** Reported on train data. **

AUUC: 73.61579189051791
AUUC normalized: 0.43332750179173507

AUUC table (number of bins: 1000): All types of AUUC value
          uplift_type          qini       lift       gain
0         AUUC value           73.615792  0.003023   86.544773
1         AUUC normalized      0.433328   0.003023   0.433183
2         AUUC random value    85.026676  0.000833   99.993177

Qini value: -11.410884352633914


# [5] Make predictions on validation subset
pred = uplift_model.predict(valid)
pred.head(6)
uplift_predict       p_y1_ct1             p_y1_ct0
0.000833997          0.00159892 0.000764924
0.000855111          0.00163856 0.000783453
0.000859351          0.00164198 0.000782633
0.000694148          0.00141544 0.000721296
0.000694148          0.00141544 0.000721296
0.000706745          0.00141739 0.000710649

# Plotting Uplift-curve from performance
perf.plot_uplift(metric="gain", plot=True)
```




```
# Get Qini AUUC
print(perf.auuc())
73.61579189051791
```

```
# Get all AUUC values as a table
print(perf.auuc_table())
```

```
AUUC table (number of bins: 1000): All types of AUUC value
           uplift_type           qini       lift       gain
0          AUUC value 73.615792  0.003023   86.544773
1          AUUC normalized       0.433328   0.003023   0.433183
2          AUUC random value     85.026676  0.000833   99.993177
```

```
# Get thresholds and metric scores
print(perf.thresholds_and_metric_scores())
Metrics for Thresholds: Cumulative Uplift metrics for a given percentile
```

	thresholds	qini	lift	gain	qini_normalized	lift_normalized	gain_normalized	qini_random	lift_random	gain_random	n	idx
0	0.021879	23.833333	0.218654	26.457187	0.140291	0.218654	0.132426	0.171186	0.000002	0.201319	121	0
1	0.007815	32.457143	0.157559	37.971706	0.191054	0.157559	0.190060	0.340958	0.000003	0.400974	241	1
2	0.004210	34.530612	0.110675	39.953689	0.203259	0.110675	0.199980	0.510730	0.000005	0.600629	361	2
3	0.003049	35.460317	0.084833	40.804815	0.208731	0.084833	0.204240	0.680502	0.000007	0.800284	481	3
4	0.002468	36.513514	0.069286	41.640648	0.214931	0.069286	0.208424	0.850273	0.000008	0.999939	601	4
5	0.002092	36.850575	0.058124	41.907357	0.216915	0.058124	0.209759	1.020045	0.000010	1.199595	721	5
6	0.001855	39.264151	0.053421	44.926736	0.231122	0.053421	0.224872	1.189817	0.000012	1.399250	841	6
7	0.001696	40.000000	0.047790	45.925926	0.235454	0.047790	0.229873	1.359588	0.000013	1.598905	961	7
8	0.001583	36.724138	0.039235	42.413240	0.216171	0.039235	0.212291	1.529360	0.000015	1.798560	1081	8
9	0.001480	40.041916	0.038725	46.509034	0.235700	0.038725	0.232792	1.699132	0.000017	1.998215	1201	9
10	0.001399	28.016216	0.024662	32.578716	0.164913	0.024662	0.163066	1.868903	0.000018	2.197870	1321	10
11	0.001341	28.553922	0.023083	33.262895	0.168078	0.023083	0.166491	2.038675	0.000020	2.397525	1441	11
12	0.001286	23.200000	0.017288	27.003279	0.136563	0.017288	0.135160	2.209862	0.000022	2.598844	1562	12
13	0.001249	24.983051	0.017277	29.060506	0.147059	0.017277	0.145457	2.379633	0.000023	2.798499	1682	13
14	0.001227	26.124031	0.016920	30.489316	0.153775	0.016920	0.152608	2.549405	0.000025	2.998154	1802	14
15	0.001206	25.626866	0.015494	29.779224	0.150848	0.015494	0.149054	2.719177	0.000027	3.197810	1922	15
16	0.001189	25.680702	0.014616	29.846325	0.151165	0.014616	0.149390	2.888948	0.000028	3.397465	2042	16
17	0.001177	27.661238	0.014912	32.239135	0.162823	0.014912	0.161367	3.058720	0.000030	3.597120	2162	17
18	0.001166	27.654321	0.014124	32.230419	0.162783	0.014124	0.161323	3.228492	0.000032	3.796775	2282	18
19	0.001155	27.482353	0.013328	32.013876	0.161770	0.013328	0.160239	3.398264	0.000033	3.996430	2402	19

```
See the whole table with table.as_data_frame()
```

```
# Get Qini value
print(perf.qini())
-11.410884352633914
```

```
# Get AECU values as a table
print(perf.aecu_table())
AECU values table: All types of AECU value
           uplift_type           qini       lift       gain
0          AECU value -          11.410884  0.002191   -13.448404
```

```
# [6] Generate a targeting list ...
import pandas as pd
import numpy as np
retarget = pred.as_data_frame()
print(retarget)
       uplift_predict  p_y1_ct1  p_y1_ct0
0            0.000834  0.001599  0.000765
1            0.000855  0.001639  0.000783
2            0.000859  0.001642  0.000783
3            0.000694  0.001415  0.000721
4            0.000694  0.001415  0.000721
...               ...       ...       ...
29916        0.000711  0.001409  0.000698
29917        0.000855  0.001639  0.000783
29918        0.000710  0.001407  0.000697
29919        0.000834  0.001599  0.000765

[29920 rows x 3 columns]

retarget.sort_values(by="uplift_predict", ascending=False)
           uplift_predict       p_y1_ct1   p_y1_ct0
27156      0.348100             0.737838   0.389738
3951       0.258166             0.646571   0.388405
10159      0.196595             0.513095   0.316500
283        0.177039             0.516372   0.339333
23119      0.155474             0.457569   0.302095
...        ...          ...                 ...
16988      -0.265292            0.325839   0.591131
3108       -0.279841            0.356671   0.636512
21128      -0.287042            0.362041   0.649083
19369      -0.287148            0.355435   0.642583
26857      -0.289549            0.347701   0.637250
```

```
29920 rows × 3 columns
```

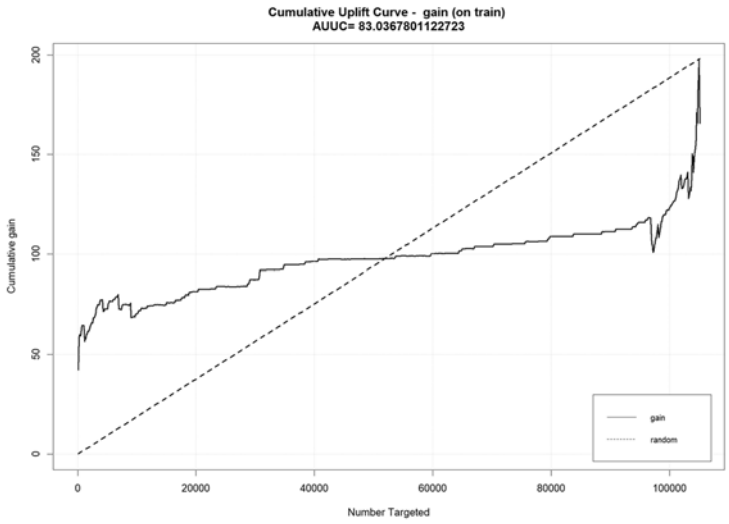
```
# Filter users with an uplift score above 0.3
print(retarget.query("`uplift_predict` > 0.1"))
       uplift_predict  p_y1_ct1  p_y1_ct0
283          0.177039  0.516372  0.339333
1457         0.154484  0.404246  0.249762
3951         0.258166  0.646571  0.388405
8245         0.116092  0.411742  0.295650
8316         0.137342  0.444509  0.307167
10159        0.196595  0.513095  0.316500
14691        0.137385  0.404885  0.267500
17646        0.123868  0.422574  0.298705
18728        0.141731  0.504136  0.362405
19072        0.121187  0.448187  0.327000
19319        0.122234  0.481234  0.359000
23119        0.155474  0.457569  0.302095
24615        0.143553  0.387815  0.244262
27156        0.348100  0.737838  0.389738
27726        0.107917  0.443774  0.335857
```

```
# List of the Top-100 customers with the highest uplift
retarget['uplift_predict'].nlargest(n=100)
27156    0.348100
3951     0.258166
10159    0.196595
283      0.177039
23119    0.155474
           ...
18445    0.002946
5711     0.002795
28534    0.002773
4133     0.002738
Name: uplift_predict, Length: 100, dtype: float64
```

Appendix B: Uplift model estimation using random forest with R

```
# (1) Loading R packages ----
library(h2o)
h2o.init()
library(tidyverse)

# (2) Data preparation----
Uplift  <- h2o.importFile("https://krst@data.eacademybg.com/varna2022/campaign150k_data.csv")
h2o.head(uplift)
h2o.str(uplift)
dim(uplift)
colnames(uplift)
h2o.mean(uplift$treatment, na.rm = TRUE)
h2o.mean(uplift, return_frame = TRUE)

# (3) Set predictors (Xi), reponse (yi) and treatment (wi)----
predictors <- c("V1", "V2", "V3", "V4", "V5", "V5", "V7", "V8")

# (4.1) Set the response variable as factor----
uplift$conversion <- as.factor(uplift$conversion)

# (4.2) Set treatment variable as factor....
uplift$treatment <- as.factor(uplift$treatment)
h2o.str(uplift)
```

```
# (5) Split the dataset into a training and validation subsets: (80:20)----
data_split <- h2o.splitFrame(data = uplift, ratios = 0.7, seed = 5250)
train <- data_split[[1]]
test <- data_split[[2]]
h2o.head(test)
dim(train)
dim(test)

# (6) Build and train the model----
uplift.model <- h2o.upliftRandomForest(training_frame = train,
                                       validation_frame = test,
                                       x=predictors,
                                       y="conversion",
                                       ntrees = 100,
                                       max_depth = 10,
                                       treatment_column = "treatment",
                                       uplift_metric = "KL",
                                       min_rows = 10,
                                       seed = 5250,
                                       auuc_type = "qini")

# (7) Evaluating predictive performance of the model ----
perf <- h2o.performance(uplift.model)
perf
H2OBinomialUpliftMetrics: upliftdrf
** Reported on training data. **
** Metrics reported on Out-Of-Bag training samples **

Default AUUC:  83.03678
All types of AUUC:
AUUC table (number of bins: 1000): All types of AUUC value
        uplift_type      qini     lift      gain
1        AUUC value 83.036780 0.005005 97.472329
2   AUUC normalized  0.589343 0.005005  0.588269
3 AUUC random value 70.518418 0.000789 82.928738
Default Qini value: 12.51836
All types of AECU values:
AECU values table: All types of AECU value
  uplift_type      qini     lift      gain
1  AECU value 12.518362 0.004216 14.543590
# (8) ] Make predictions on test subset ----
predict <- h2o.predict(uplift.model, newdata = test)
predict
> predict
  uplift_predict    p_y1_ct1     p_y1_ct0
1   0.0007126356 0.001567692 0.0008550563
2   0.0007409614 0.001568139 0.0008271779
3   0.0007246861 0.001534196 0.0008095104
4   0.0007126356 0.001567692 0.0008550563
5   0.0006557158 0.001450066 0.0007943504
6   0.0006612131 0.001458709 0.0007974959

[44875 rows x 3 columns]

# (9) Ploting Uplift Curve ----
options(scipen=999)
plot(perf, metric="gain")
```




```
# Get Qini AUUC
print(h2o.auuc(perf))
[1] 83.03678

# Get all AUUC values as a table ----
> print(h2o.auuc_table(perf))
AUUC table (number of bins: 1000): All types of AUUC value
        uplift_type      qini     lift      gain
1        AUUC value 83.036780 0.005005 97.472329
2   AUUC normalized  0.589343 0.005005  0.588269
3 AUUC random value 70.518418 0.000789 82.928738

# Get thresholds and metric scores
> print(h2o.thresholds_and_metric_scores(perf))
Metrics for Thresholds: Cumulative Uplift metrics for a given percentile
  thresholds      qini     lift      gain qini_normalized lift_normalized
1   0.027349 37.000000 0.397849 42.172043        0.262603        0.397849
2   0.002585 50.000000 0.274725 57.967033        0.354868        0.274725
3   0.001873 53.000000 0.189964 60.028674        0.376161        0.189964
4   0.001558 53.000000 0.141711 59.660428        0.376161        0.141711
5   0.001325 53.000000 0.113006 59.441365        0.376161        0.113006
  gain_normalized qini_random lift_random gain_random   n idx
1        0.254519    0.142070    0.000002    0.167072 106   0
2        0.349845    0.282800    0.000003    0.332569 211   1
3        0.362288    0.423530    0.000005    0.498065 316   2
4        0.360065    0.564259    0.000006    0.663562 421   3
5        0.358743    0.704989    0.000008    0.829058 526   4
# Get Qini value
> print(h2o.qini(perf))
[1] 12.51836

# Get AECU values as a table
> print(h2o.aecu_table(perf))
AECU values table: All types of AECU value
  uplift_type      qini     lift      gain
1  AECU value 12.518362 0.004216 14.543590
```

```
# (10) Get list of the Top-n customers by different criteria
> head(predict)
  uplift_predict    p_y1_ct1     p_y1_ct0
1   0.0007126356 0.001567692 0.0008550563
2   0.0007409614 0.001568139 0.0008271779
3   0.0007246861 0.001534196 0.0008095104
4   0.0007126356 0.001567692 0.0008550563
5   0.0006557158 0.001450066 0.0007943504
6   0.0006612131 0.001458709 0.0007974959

df <- as.data.frame(predict)
library(plyr)
> head(arrange(df, desc(uplift_predict)), n = 10)
   uplift_predict  p_y1_ct1  p_y1_ct0
1       0.3874419 0.7321086 0.3446667
2       0.3874419 0.7321086 0.3446667
3       0.3561692 0.6545026 0.2983333
4       0.3541946 0.5996946 0.2455000
5       0.3293510 0.6260177 0.2966667
6       0.3130664 0.5585664 0.2455000
7       0.3085958 0.5540959 0.2455000
8       0.2569252 0.6004252 0.3435000
9       0.1723426 0.5340092 0.3616667
10      0.1642396 0.5255729 0.3613333

# Filtering of customers with uplift score above 0.15
library(dplyr)
> df %>% filter(uplift_predict >0.15)
   uplift_predict  p_y1_ct1  p_y1_ct0
1       0.3085958 0.5540959 0.2455000
2       0.1642396 0.5255729 0.3613333
3       0.1723426 0.5340092 0.3616667
4       0.3293510 0.6260177 0.2966667
5       0.3541946 0.5996946 0.2455000
6       0.3874419 0.7321086 0.3446667
7       0.1639728 0.5368062 0.3728333
8       0.3130664 0.5585664 0.2455000
9       0.3561692 0.6545026 0.2983333
10      0.2569252 0.6004252 0.3435000
11      0.1568397 0.5094349 0.3525952
12      0.3874419 0.7321086 0.3446667
```

ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
ECONOMIC STUDIES

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Igor Britchenko[1]
Oksana Polinkevych[2]
Viktor Trynchuk[3]
Inna Khovrak[4]

THE IMPACT OF COVID-19 ON THE PHILOSOPHY OF DOING BUSINESS IN A SUSTAINABLE ENVIRONMENT[5]

The article presents the results of the analysis of business philosophy changes under the influence of COVID-19 in the context of sustainable development. The aim of the article is to study the change in the philosophy of doing business under the influence of COVID-19 consequences and to highlight the main features of the philosophy and vectors of development. In the process of describing the business philosophy, the authors proposed an approach based on the criteria of sustainable development. The methodological basis of the study were methods of comparison, generalisation, analysis and synthesis, scientific abstraction, and expert evaluation. Characterisation of certain business philosophies was based on open public information on certain sectors of the economy, according to GICS. This approach enabled international comparability of research results. The authors found that the business philosophy has changed under the influence of COVID-19 and received an ecological, socio-psychological focus. Analysis of business philosophies allowed us to identify new slogans in the philosophy of generalised enterprises by sectors of the economy (industrial and consumer). The hypothesis that the business philosophy should be simple and customer-oriented has been confirmed. At the heart of this philosophy are social responsibility, economic aspects, corporate culture, and the goals of sustainable development.
Keywords: business philosophy; sustainable development; COVID-19; business concepts; business relationship styles; customer behavior
JEL: M21; M14; O1; L21

[1] *Igor Britchenko, professor, Doctor of Economics, State Higher Vocational School Memorial of Prof. Stanislaw Tarnowski, Poland, https://orcid.org/0000-0002-9196-8740, e-mail: ibritchenko@gmail.com.*
[2] *Oksana Polinkevych, professor, Doctor of Economics, Lutsk National Technical University, Lutsk, Ukraine, https://orcid.org/0000-0001-6924-7296, e-mail: Kravomp@gmail.com.*
[3] *Viktor Trynchuk, professor, PhD. (Economics), Luhansk Taras Shevchenko National University, Poltava, Ukraine, https://orcid.org/0000-0001-7435-0159, e-mail: wiktor.trynczuk@gmail.com.*
[4] *Inna Khovrak, professor, Doctor of Economics, State Tax University, Irpin, Ukraine, https://orcid.org/0000-0002-0352-4374, e-mail: inna.khovrak@gmail.com.*
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1. Introduction

The economy of sustainable development affects the conduct of business. And approaches to the principles of doing business are changing. The modern world poses new challenges for people in terms of worldview and value formation of its personal and social essence. The super-fast dynamics of information civilisation force a person to include in the structure of his own phenomenology such an element as entrepreneurship, without which it is impossible to acquire socio-cultural subjectivity in the complex information world. In today's business environment, it is necessary to understand the essence of how society and the individual function, as well as what are the additional competitive advantages. The creation of philosophy requires the time and perseverance of business leaders. In the process of forming philosophy, leaders should ask themselves: "What is the nature of my business?" "Who is my client?" "What values are important to me?" and "What is the general vision of the company?". The answers to these questions form the basis of business philosophy. Business philosophy contributes to the improvement of the quality of life, attracts business people who have similar views; creates conditions for trustworthy, equitable, and fair relations; shapes the creative atmosphere around the business. In 1936, Dale Carnegie wrote: "A person's success in his financial affairs depends 15% on his professional knowledge and 85% – on his ability to communicate with people." Accordingly, the philosophy of doing business is important. There is also currently a paradigm shift in global ESG regulation, with stronger disclosure obligations to prevent negative impacts on both human rights and the environment (McGarry, 2022). This requires companies to adjust existing strategies, policies, procedures and tools.

2. Materials and Methods

The aim of the article is to study the change in the philosophy of doing business under the influence of Covid-19 consequences. To achieve this goal, we define two complementary goals: (1) defining the philosophy of doing business in Ukraine before the Covid-19 pandemic and (2) the vector of changes in the business philosophy under the influence of Covid-19 in the context of sustainable development.

There are three main concepts of business: positive, critical, and pragmatic (Shamkhalov, 2010). The critical concept of business is based on the fact that the concept of business combines a set of actions of different subjects of market relations, which have the same tendency to get rich at the expense of other people. There are many modifications of critical ideas about business, but in general, for all of them, there is a thesis about contradiction and even the inconsistency of interests and goals. The critical concept of business has been absolutised in the past and continues to absolutise the contradictions inherent in the market economy. Their interpretation was and is from the position that contradictions always exist. Therefore, in the nineteenth century, the theory of scientific communism was formed, according to which the market economy and business are historically doomed to decline and must eventually give way to a communist system free of contradictions. In the communist system, there is no private ownership of the means of production, and therefore there is no competition of interests. It is conflict-free or low-conflict, and the motives for the

development of the communist economy are conditioned by the desire of the people not to make a profit, but to collectivism and general prosperity on the basis of comradely cooperation and mutual assistance.

The positive theory is the complete opposite of the critical concept of business. Its essence lies in the fact that the business is understood and evaluated as a socially important activity of people, which is carried out in the order of personal initiative, the purpose of which is the production (Moroz et al., 2021) of goods and services for other people. This concept in different periods of time was based on many ideas and theories that depicted people's lives in a market economy, ideally, in isolation from any prototypes. Modern society, according to the supporters of such ideas, does not have the social antagonisms and conflicts that shook the world in the eighteenth, nineteenth, and at the beginning of the twentieth century. These contradictions really had a place in the past, and therefore remained in the past. In countries with a market-oriented economy, people are gradually ceasing to compete with each other for access to industrial, material, and spiritual goods, which are converted into common property. In these circumstances, the state directs its creative activities to ensure the well-being of all and reopens it with the permission of social antagonisms, which are expressed in endless competitive clashes of entrepreneurs and the inevitable class struggle of employers (capitalists) with hired workers (proletariat). Welfare for all, in accordance with the above ideas, is achieved through the fair distribution of the benefits of life among members of society. Critical and positive concepts of business have the main difference in the assessment of the current system of economy. However, they become similar to each other in constructing an ideal model of the economy. Therefore, in one case, within the framework of the positive concept of business, such a model of the economy is correlated with the current system, and in another case, within the framework of the critical concept of business, it extends to further system (Polinkevych et al., 2021).

Both considered concepts of business are two extreme positions in the assessment of business as an objective phenomenon. The overcoming of these extremes takes place only in the framework of the third of the above-mentioned concepts, and in particular – the pragmatic concept of business. Under pragmatism, here and further will be understood the orientation of plans and the whole activity of people on achievement of practical benefits in the circumstances which have an objective and, therefore, independent of the desire of these people. The essence of the pragmatic concept of business lies in the fact that business is seen as a phenomenon inevitable in the context of the development of society. This phenomenon, on the one hand, is necessary, and on the other hand, is beneficial to people who are perceived by society as businessmen, who seek to satisfy their hostile (egoistic) interests, as well as other members of society, who, thanks to business, have the opportunity to constantly meet their needs with the help of created goods and supplies. The pragmatism of this approach is conditioned by the fact that the understanding of the contentiousness of business as an objective phenomenon is not combined with the requirements of legal, economic, and moral fulfilment of the mentioned contradictions. On the contrary, the contradictions and conflicts of interest that arise in connection with the actions of people who are engaged in business are not seen unequivocally negatively. The importance of competition as a positive factor lies in the fact that the aggravation of competition to reasonable limits stimulates the development of the economy. On the one hand, business is essentially someone's property, and therefore its owners have the right to dispose of it at their discretion, within the law and morality. So

workers or consumers haven't special property rights. In this concept, employees voluntarily exchange their labour for wages from the business owner; they no longer have the right to tell the owner how he will dispose of his property, just as the owner must not tell them how to spend his salary, which is the property belonging to the workers. Similarly, assuming that a business procures its goods honestly and with full disclosure, consumers do not have an inalienable right to regulate a business that belongs to someone else.

Hongwei & Lloyd note that the Covid-19 pandemic offers a great opportunity for businesses to move to more real and genuine corporate social responsibility and help address pressing global social and environmental issues (Corpgov, 2022). Scientists have proved that «after Covid-19 the world will not be the same and notwithstanding numerous apocalyptic movies, conspiracy theorists, and political opportunists, we cannot but help to hope that future pandemics can be avoided if we learn the lessons, we cannot help but think should have been learned before COVID-19 (Hongwei, Lloyd, 2020). There has been a significant transformation of technology in the context of the pandemic (Dankiewicz et al., 2021; Volosovych et al., 2021). The pandemic gave consumers the opportunity and time to reflect on the basic meaning of consumption and the impact of their consumption not only on themselves but also on other people, as well as on society as a whole and the environment. Prior to the pandemic, consumers in developed countries perceived needs such as food and housing as appropriate. Such needs can be easily met through the wide availability of a variety of products and services. This was also facilitated by the trade policy of enterprises in terms of trade credit in group procurement (Zimon, Dankiewicz, 2020). The pandemic shocked consumers with the idea that their basic needs might not be met in the sense that food and basic necessities might not be available to them. While in developed countries the basic needs of consumers will still be met, there will be some shift in how consumers assess these needs. At the same time, it changes consumers' views on how to meet higher social needs and the need for self-realisation (Kravchenko et al., 2021). Consumers consciously think about how to consume and choose a product/brand to be more responsible to themselves, others, society, and the environment (Bosovska, 2013; Kaigorodova et al., 2017).

Investment activity and economic growth of the state are interrelated. Sustainable entrepreneurship is the engine of economic and non-economic development, a driver of job creation, and a provider of innovative products and services (Klapkiv et al., 2019; Klapkiv et al., 2020; Achkasova, 2020; Danylkiv et al., 2021; Sotnyk et al., 2022). Accordingly, there are two types of entrepreneurship: corporate and social. The second type of entrepreneurship refers to sustainable entrepreneurship but is not identical. Sustainable entrepreneurship means opening (Britchenko et al., 2022), creating and using entrepreneurial opportunities that promote sustainable development, creating social and environmental benefits for others in society (Nedelko, Potocan, 2021).

Elements of the development of sustainable entrepreneurship were studied by scientists who proposed to strengthen the development of social responsibility in general (Činčalová, 2018; Kiselakova et al., 2020; Činčalová, 2020) and in the public procurement system in particular (Bernal et al., 2019; Baranovsky et al., 2020), they noted the need for change in corporate governance (Polinkevych, 2016a; Polinkevych, 2016b).

Nedelko & Potocan determined that democratic leadership behaviour promotes sustainable work and the behaviour of organisations. These results have theoretical implications,

indicating how personal values influence the democratic behavior of leaders and contribute to the sustainable work and behaviour of organisations. Scientists proved the possibility of strengthening of democratic behaviour of leaders in Slovenian and Austrian organisations. Both universities and the experience of intersectoral cooperation contribute to the formation of socially responsible leaders (Calinescu et al., 2018; Sitnicki, 2018; Khovrak, 2019; Trunina et al., 2020). That is why the patterns of behaviour, that taking into account the values and norms of corporate social responsibility, can lead to the sustainable development of the company, region, and country (Kasych et al., 2019; Onyshchenko et al., 2020; Słomczyńska, 2020).

The UN says in a report on COVID-19: «Taking advantage of this moment of crisis, when conventional policies and social norms have been violated, bold steps can lead the world on the right path to the Sustainable Development Goal» (United Nations, 2020). Prior to the pandemic, a culture of courage and innovation characterised those organisations that had a firm commitment to sustainable development. In the post-pandemic world, this culture will become critical to meeting the new challenges of the new era. According to Henderson: «The crisis provides an opportunity for regeneration and fresh thinking: the ability to innovate and rethink the structure of new products and services that create wealth without negative externalities» (Henderson, 2020).

The methodological basis of the study were methods of comparison, generalisation, analysis and synthesis, scientific abstraction and expert evaluation.

The article promotes various discussions. First, it reflects the features of the business philosophy before COVID-19. Second, it provides an overview of the business philosophy of enterprises, including different sectors of the economy. Third, it discusses the factors that have changed the business philosophy in the industrial and consumer sectors according to the GICS classification.

3. Results

The main task of business philosophy is to learn the essence of economic work and economic mode of action in the broadest and deepest sense of these phenomena. In other words, the business philosophy is a set of certain requirements according to which enterprises, firms or companies perform their work together with others to achieve their goals. This is a group of issues that are related to socio-philosophical and socio-cultural, ethical norms that are part of an economic enterprise. The essence of business philosophy is to learn and consider the best reasons for the economic way of acting of an individual, to try to find an answer to the question of why a company is a subject of economic work in general, as well as his affairs in particular. The main essence of business in philosophy from a scientific point of view is to identify important features, main principles, hypotheses of organisation, and efficiency of the business world.

The business philosophy is a set of principles and beliefs that are owned by a company or every business actor [businessman] to move and navigate the company to achieve success. This navigation or worldview serves as a blueprint for the operation of the entire business,

which affects its vision-mission and objectives. A business philosophy might also list company values that are important to its founders, executives, and employees. The philosophy of the company reflects the values of its leaders, helping businesses to feel more personal and uphold collectivity. Business philosophy can also be understood as a motivational system or basic principles that serve as the basis for a company's beliefs or actions (Thahir, 2020).

A business philosophy is a set of principles and beliefs that a company uses to decide how to handle different areas of operation (Indeed, 2021). A business philosophy outlines the business's purpose and goals. It could also list the specific values that are important to the employees, executives or boundaries, which can help the business feel more personal to those individuals.

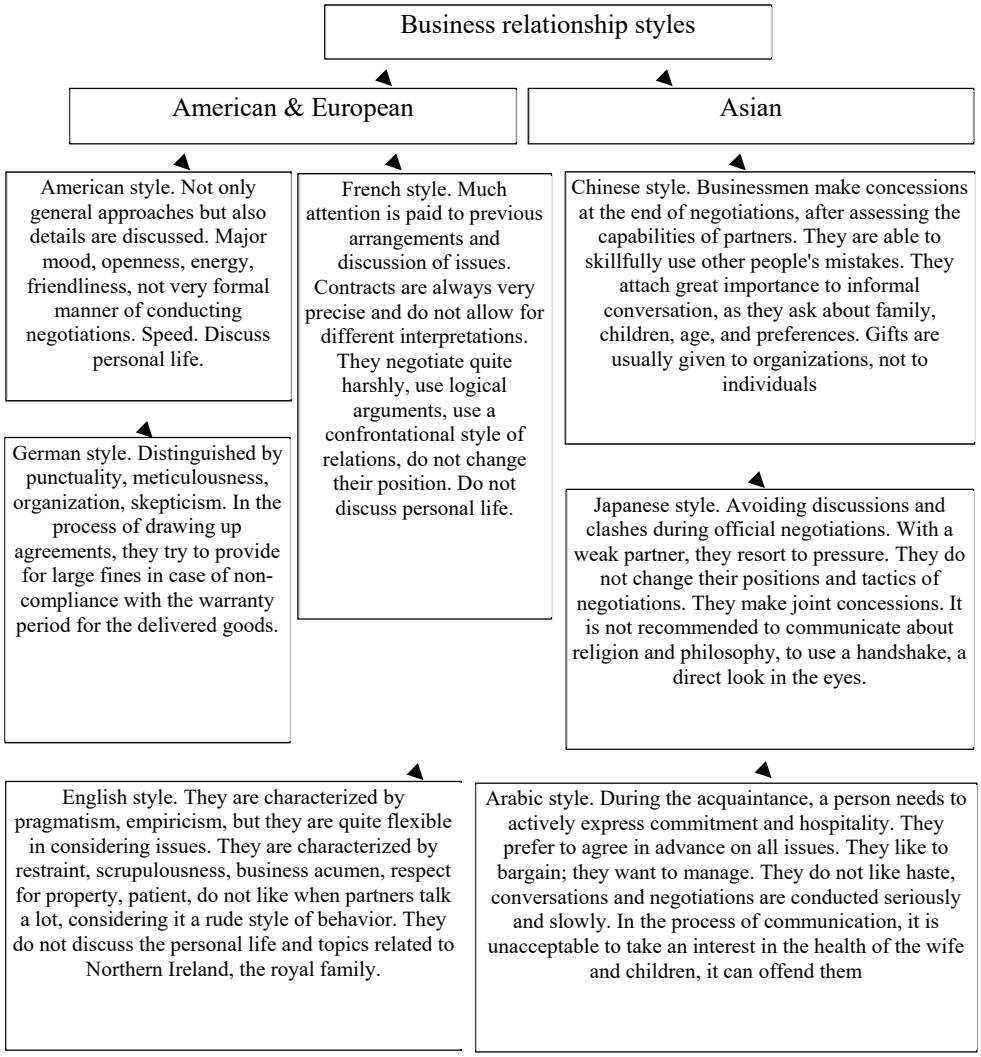
To a certain extent, it was the COVID-19 restrictions that became the catalyst for changing the business philosophy of many enterprises. If the mission of the company has not changed, then the vision has clearly changed.

The company's focus on values depends, in most cases, on business relationship styles. There are 2 groups of styles of business relations, including American-European and Asian, which are presented in Figure 1.

Creating a business philosophy takes place in 3 stages:

1. Determine the focus on the company's values. The business philosophy must coincide with other value-oriented parts of the business, positioning its identity in the minds of those inside and outside the organisation. The main features of the first stage are the presence of a code of ethics for the company, which is followed by employees and managers. The mission must be clearly defined.
2. View examples of business philosophy implementation. Understand the principles used by other companies and explore which ones are most appropriate for a particular company. It is necessary to use brainstorming in the formation of the concept of doing business, to involve customers in the formation of business philosophy.
3. The business philosophy should be simple. The business philosophy should be based on the principles which are related to the provision of exceptional customer service and change of the economic sector through innovation and entertainment. Signs of the implementation of this stage are the presence of a list of core values of the company.

Figure 1. Business relationship styles



Source: Stoyan, 2014, pp. 105-107, 121-125.

It should be noted that the vast majority of companies have formed a business philosophy taking into account the style of communication and national characteristics.

Examples of business philosophy before the influence of COVID-19 are shown in Table 1.

Table 1. Business philosophies before the influence of Covid-19

Company, slogan	The purpose of the business	Business principles
Panasonic «A better life, a better world» (Panasonic)	Progress and development can be achieved only through the joint efforts and cooperation of all employees of the company. The company's representatives, united by one goal, promise to fulfil their corporate obligations faithfully, carefully, and honestly.	Service for the benefit of society, justice and honesty, cooperation and team spirit, tireless efforts in self-improvement, politeness and modesty, adaptation, gratitude.
LLC «AMACO Ukraine» «A reliable partner that is always there» (LLC "AMACO UKRAINE")	Offer exactly those models of equipment that are needed by our customers and the market in general. A reliable partner that will be recognised as a benchmark in providing quality service and after-sales service in the field of agribusiness and commercial transport.	Responsibility in decision making, common sense, and logical approach, service, reliability, flexibility.
Ukroliya «Driver of the market of high oleic and organic oils in Ukraine» (Ukroliya)	Belief in value-added products, in a transparent mutually beneficial partnership, and the need to preserve traditions.	Customer orientation, innovation, professionalism, organicity, proactivity, partnership.
SAMSUNG «Get inspired by the life and stories» (Samsung)	Reliance on human resources and technology, creating the best goods and services, contributing to the development of society.	Compliance with laws and ethics, maintaining the purity of organisational culture, respect for the client, shareholders, employees, care for the environment, health and safety, corporate social responsibility.
CSR Ukraine «We create sustainable results of CSR projects for the better of the country» (CSR Ukraine)	Promotion of sustainable development goals, youth employment, healthy lifestyle, increasing the number of girls in STEM.	Innovation, partnership, professionalism, people, integrity, passion.
Constructive Lawyers «We create a constructive» (Constructive Lawyers)	Constructive solution of problems and possibility of their avoidance in the future in 12 spheres. Providing comprehensive advice, legal assistance, and protection of clients' interests. Reasonable conduct of affairs taking into account the interests of society, participation in social and economic processes of society, and Ukraine in general.	Efficiency, work for results, reputation, responsibility for each employee, observance of ethical standards, maintenance of high legal culture, improvement of the economic and political climate of the country.
Obolon Corporation «Good deeds for many years» (Obolon Corporation)	Produce healthy and safe drinks for people with maximum efficiency, concern for society, and responsibility for the environment. Ensure a balance of economic, social, and environmental benefits through the integration of sustainable development with the interests of the corporation.	Quality, professionalism, safety, efficiency, team spirit.
Organic Ukraine «Organic production does not exist due to subsidies» (Public Union „Organic Ukraine")	Promotion of organic production among Ukrainian producers through exhibition activities of online and offline formats, promotion, popularisation of organic consumption, as well as protection at the legislative level of organic producers. Create and develop the Ukrainian and international organic market together.	The strength of the Union, organic success in business, growth of the organic sector, political dialogue, integration into the international community, professional consulting.

Source: summarised by the authors.

For the analysis, the authors selected 8 enterprises that work on the market of Ukraine and are socially oriented. The selection was based on the criterion of the company's recognition on the market by consumers and the high level of negative consequences of the COVID-19 pandemic. The authors selected enterprises from each type of activity: processing industry (Ukroliya, Panasonic, Samsung, Obolon Corporation), agriculture (LLC "AMACO UKRAINE"), services (CSR Ukraine, Constructive Lawyers, Organic Ukraine). These sectors are the most vulnerable to the effects of the COVID-19 pandemic, and they are also expert-oriented. To combat the consequences of the crisis, the World Bank in May approved providing Ukraine with an additional 100 million dollars in assistance for lending to small and medium-sized businesses. Preference will be given to export-oriented enterprises (Kochmar-Tymoshenko, 2021). During the selection of enterprises, a survey of 86 respondents was conducted regarding the expediency of including certain enterprises in the sample. Respondents were offered 32 enterprises that are expertly oriented in Ukraine. Among them are the top 25 exporters of Ukraine in 2021 (Samborska, 2021). These enterprises are formed into the following groups: processing industry ("ArcelorMittal Kryvyi Rih", BAYADERA GROUP, "Biol", "Biosphere", "Darnytsia", "Interpipe", Carlsberg Ukraine, Kernel, "Kyivskyi BKK", LVR group, "Lukas ", "Metinvest", "Mondelis Ukraine", Nizhyn Canning Plant, Obolon Corporation, "TERRA FOOD", "Ukrptaha", "Farmak", Ukroliya, Panasonic, Samsung,), agriculture (Agricom Group, "Agroprosperis", "Agro-Ros", "Astarta-Kyiv", MHP, "Prestige-group", LLC "AMACO UKRAINE"), services ("Progrestech-Ukraine", CSR Ukraine, Constructive Lawyers, Organic Ukraine). From the proposed list, respondents believe that the most affected by the consequences of COVID-19 are: Ukroliya (45 respondents), Panasonic (43 respondents), Samsung (47 respondents), CSR Ukraine (50 respondents), Constructive Lawyers (51 respondents), Organic Ukraine (48 respondents), LLC "AMACO UKRAINE" (46 respondents), Obolon Corporation (49 respondents). On their example, it is worth conducting a study on changing business philosophy. Data on the business philosophy, purpose and principles of activity were selected from the enterprise websites (https://amacoint.com/ua/; https://www.panasonic.com/ua/; https://www.ukroliya.com/uk/; https://www.samsung.com/ua/; https://csr-ukraine.org/; https://c-lawyers.com/; https://obolon.ua/en; https:// organicukraine.org.ua/). Using the method of comparison and critical analysis, the direction of business philosophy in 2021 was determined and the direction of change in business philosophy was outlined (Table 1 and Table 2).

Examples of business philosophy after the impact of COVID-19 are shown in Table 2.

The effects of COVID-19 were diverse and often split over different or interdependent industries. Economies were hit top-down and bottom-up while businesses and individuals alike endured significant changes that altered national and international supply and demand trends for products and services. The primary and secondary sectors were especially influenced by supply shortages, while services and education were largely demand-driven. Monetary policies were specifically targeted to ease these disruptions, while protective measures for employees, in many cases, constrained business competitiveness (Delardas et al., 2022).

Table 2. Changing business philosophy after the impact of Covid-19

Company	Orientation of business philosophy	Element of change
Panasonic	Environmental responsibility of the company, the principles of honest activity, improving the level of quality and ensuring product safety	social
LLC «AMACO Ukraine»	Concentrate all possible resources of the company (time, money, people) on businesses that we know how to do better: service, spare parts, equipment	economic
Ukroliya	To form a new culture of consumption, to realise a high level for the client, to create effective innovative products for healthy food	psychological
SAMSUNG	The main values are people, environmental protection, ethics and morality	social
CSR Ukraine	Additionally, the platform "Catalog of actions of companies to combat Covid-19" was developed.	social
Constructive Lawyers	Invariable.	socio-psychological
Obolon Corporation	Responsible marketing, procurement, reduction of environmental impact are important priorities of the company, which it achieves through energy efficiency and waste recycling	socio-economic
Organic Ukraine	The online format of exhibition activities to promote organic production among Ukrainian producers	socio-psychological

Source: summarised by the authors.

The pandemic affected every sphere of life in society, forced to radically revise the usual rhythm of life and accept the fact that existence in the conditions of common restrictions are new conditions of life. The pandemic stimulated or accelerated some innovations and led to the introduction of new technologies, such as remote and telephone consultations in medicine (Płonka et al., 2022), customer service of insurance companies (Dankiewicz et al., 2020), video conferencing in education, remote work and the transition from significant use of cash to contactless payment systems. The Internet has democratised the market and created numerous opportunities for customer interaction, including intensifying the search for products that fit the market and the search for new business models that can survive and thrive in a world disrupted by COVID-19. Retail trade and the hotel business faced requests for the emergence of alternative mechanisms for the delivery or distribution of goods. The coronavirus outbreak not only revealed fundamental flaws in many business models, including faulty procedures and processes, but also accelerated the process of business collapse (Havrysh et al., 2022). The number of employees who work remotely has increased, which affected the sustainable development of cities (reduction of automobile traffic and improvement of the quality of life of the population (Almeida, 2022). COVID-19 and later war also provided an opportunity to understand that people and technology are much more powerful together (Polinkevych et al., 2022).

Thus, the most modified socio-psychological aspect of business philosophy. It is the most vulnerable to COVID-19. Prior to COVID, marketers focused on the efficiency and effectiveness of value from customers in the form of loyalty, market share, and equity. Under the influence of COVID-19, such indicators as customer life expectancy, customer share, and customer equity have changed. Marketers and customers began to cooperate in adapting and supplementing anti-crisis measures aimed at overcoming negative trends on both sides, the development of social responsibility. The COVID-19 crisis has exponentially accelerated

revolutionary change. Marketing is seen as an exchange based on mutual agreements, the perception of value, and communication through the Internet of Things, social networks and remote communication technologies.

The business philosophy has changed under the influence of COVID-19. It can be assumed that business has become more socially responsible, psychological and social aspects have become major, environmental protection and security of goods and services are dominant in development strategies. Figure 2 presents the understanding of business philosophy by world businessmen and top managers, including Louis Carter (CEO & Founder, Best Practice Institute), Richart Ruddie (Owner, Profile Defenders), Jessica Welch (Marketing Content Associate, BigSpeak Speakers Bureau), Bryan Croft (CEO & President, Holmes Custom), Tran Ngoc Tuan Anh (Founder & CEO, Meta Box), Radu Balas (Founder, ICO Battle), Taylor Toce (President & CEO, Velo IT Group), V. Michael Santoro (Co-founder, Vaetas), Damon Nailer (Consultant, Kitril), Jeffrey Deckman (Founder & President, Capability Accelerators), Xavier Parkhouse-Parker (Co-founder & COO, ZapHub), Ryne Higgins (Senior Manager of eCommerce, Peacock Alley), Veronique James (Founder & CEO, The James Agency), Lori Cheek (Founder & CEO, Cheekd.com), Olivia and Molly McShea (Co-founders, Livalit Travel), Jason Patel (Founder, Transizion), Paige NeJame (Owner, CertaPro Painters of the South Shore and Boston Rockland), Nancy Cramer (Leadership Consultant, NancyCramer.com), Pete Baldine (President, Moran Family of Brands), Harold Hardaway (Ph.D., Co-founder, Cardigan Communications Group) Jason Treu (Executive Coach, Jason Treu Executive Coaching), Michelle Bergquist (CEO & Co-founder, Connected Women of Influence), Dr. Froswa' Booker-Drew (Owner, Soulstice), Jeff Butler (Workplace Expert & Author, JeffButler.com), Kean Graham (CEO, MonetizeMore), Rifino Valentine (Founder, Valentine Distilling Co), Meg Schmitz (Franchise Broker, MegSchmitz.com), Kendra Prospero (CEO & Founder, Turning the Corner, LLC), Alexis Davis (Founder & CEO, Hoo-Kong.com).

Figure 2. The essence is the philosophy of business, outlined by famous businessmen and practitioners

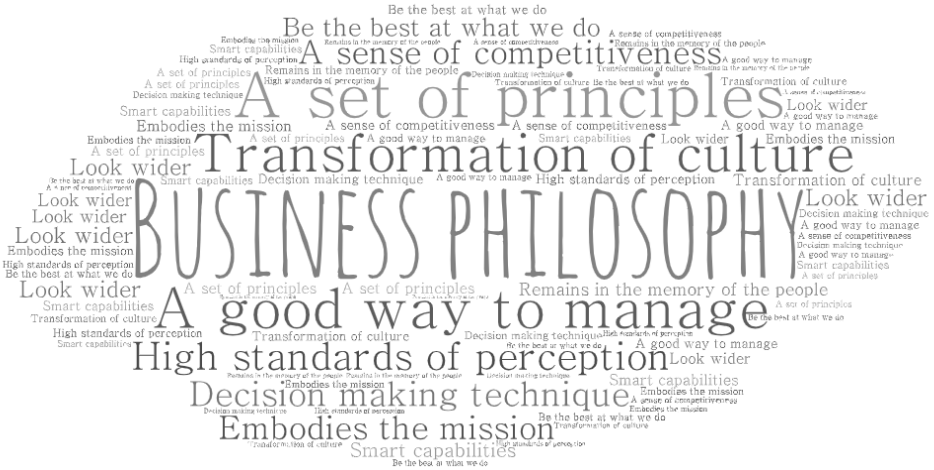
Source: Dizon, 2018.

The business philosophy is understood by world-renowned businessmen and practitioners as positive relationships with employees and customers, the success of their customers, innovation, the key to success, added value, big changes, learning, values, striving for perfection and thirst for work.

4. Discussion

Figure 3 presents the results of a survey of Ukrainian enterprises on the understanding of the importance of business philosophy. A survey of 86 respondents was conducted in May – July 2020, of which 45 were women and 41 were men (46% of senior management and 54% of lower managers). In the questionnaire, respondents were asked to answer the following questions: how do you understand the philosophy of business? Is the company's focus on values defined? Has the model of business philosophy changed under the influence of COVID-19? (Figure 4).

Figure 3. How do you understand the business philosophy?



Answering the question: "How do you understand the philosophy of business?" respondents said that it is a decision-making technique, cultural transformation, good management, set of principles, high standards of perception, a sense of competitiveness, it embodies the mission, thanks to it we become better at what we do, smart opportunities, look wider, stay in people's memory.

Examples of slogans in business philosophy after the influence of COVID-19 are the following groups:

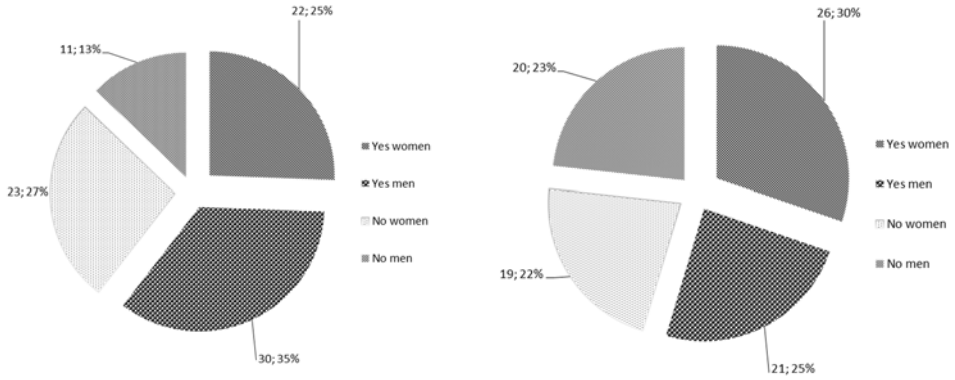
Customer orientation: meeting the expectations of consumers in everything and increasing responsibility at every step; coverage of change and innovation; our customers are at the heart of every decision we make; we strive to exceed their expectations at every step and create a

culture of giving; we focus on results to please our customers, constantly exceeding their expectations, creating attractive and functional products and forming a corporate culture that rewards innovation and creativity.

Socialisation and social responsibility: we innovate, create a culture of inclusiveness, and make quick decisions to benefit our customers; creating a culture of inclusivity and belonging, where all the desired team members are.

Economic aspects and corporate culture: we focus on delivering exceptional results in the shortest amount of time, taking into account trends and practices of sustainable development and changing the world; we focus on building long-term relationships both within our own team and with our clients; we strive to act as our partners as partners and combine traditional values with innovative ideas to provide unsurpassed service.

Figure 4. Changing the business philosophy under the influence of COVID-19 and focusing on the company's goals in Ukraine: (a) Is the company's value orientation defined?; (b) Has the model of business philosophy changed under the influence of COVID-19?



(**a**) (**b**)

Approximately half of the female respondents noted that in Ukraine, the philosophy of business is focused on goals. In particular, this conclusion was reached by 25% of women (22 respondents) and 35% of men (30 respondents). Only 27% of women (23 respondents) and 13% of men (11 respondents) disagreed with this answer. 30% of women (26 respondents) and 25% (21 respondents) of men believe that the business philosophy has changed under the influence of COVID-19. 22% of women managers (19 respondents) and 23% of men managers (20 respondents) do not state changes in business philosophy. It is worth noting that men's opinions are divided in half when women are unambiguous in their choices. And in the first and second cases, most men state changes in the philosophy of business under the influence of COVID-19 and focus on company goals. Women are more in favour of the fact that the philosophy of business has changed the vector of development from a purely economic plane to a socio-psychological one.

5. Conclusions

In this article, the authors offer some initial considerations on how the COVID-19 pandemic affects business philosophy. This pandemic offers great opportunities for companies. It has led to the emergence of new trends in development in the long run. The business philosophy has become aimed at achieving the goals of sustainable development. Such changes appear to have a positive effect on public welfare. Fundamental changes in our lives are associated with a shift in the focus of business structures to maximise economic profits to the socio-psychological aspects of business and environmental friendliness. However, questions remain about the duration of the revival of the concept of social partnership and social responsibility and the formation of positive environmental practices. We hope that the change in business philosophy will be sustainable and will draw attention to the global environmental and socio-psychological problems of mankind.

Issues of customer behaviour and mechanisms for achieving sustainable growth of economic performance remain unexplored. Changes in business philosophy are obvious (for example, in changing the slogan, mission, goals and objectives, corporate etiquette, choice of Internet of Things and entertainment). However, changes in attitudes, values, and beliefs are likely to be minor. Although COVID-19 has stimulated industry, brand, and organisational innovation, research needs to be conducted to identify long-term performance incentives.

The results of the report (Deloitte, 2021; Deloitte, 2018) confirm our hypothesis about the greater corporate social responsibility of business and a change in the business development strategy of post-Covid companies. The 2018 report observes the growing pace and scale of change driven by technological advances that are enabling more meaningful and bold transformations in shorter time frames. Issues related to new technologies and digital transformation have come to dominate the agenda of business leaders, but the needs of staff are seen separately from technological progress, or even as being in direct conflict with it. The 2020 report states that there is a "conflict" between humans and technology that can be resolved by finding ways to keep the focus on humans in a high-tech world. Such a focus, according to the authors, is increasing the social responsibility of business and changing the business strategy. COVID-19 has forced business leaders to do three things at the same time: develop a plan to return to business as usual, understand and apply lessons learned during the crisis, and define a plan for the next course of action. Thomas Friedman's statement is apt: "In order to adapt to changes in the era of acceleration, companies need to achieve 'dynamic stability.' It is necessary to become drivers of such changes, using them as a source of energy and inspiration, and create a platform of dynamic stability" (Deloitte, 2020). The business philosophy of post-COVID companies should be based on the following theses: 1) an organisation created and organised for the maximum disclosure of a person's ability to think, create and work in the world of machines; 2) knowledge management is the basis for sharing new opportunities; 3) system stability is the basis of future development; 4) the organisation should focus on creating future values, not current ones; 5) decisions in the organisation must be ethical and predictable.

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Herjuna Qobush Izzahdi[1]
Ani Wilujeng Suryani[2]

COVID-19 VACCINATION, GOVERNMENT STRICT POLICY AND CAPITAL MARKET VOLATILITY: EVIDENCE FROM ASEAN COUNTRIES[3]

The COVID-19 pandemic had a negative impact on the volatility of the stock market in the ASEAN region. Mass vaccination and strictness policies are government efforts to tackle stock market losses. Hence, this study aims to examine the effect of the COVID-19 vaccination and the stringent government policies on the volatility of stock markets in ASEAN countries. We collected the daily index prices, the number of vaccines, and the stringency index from 13 January 2020 to 31 August 2021. Using the GJR-GARCH model (1, 1) and Generalized Least Square regression, this study found that the mass vaccination had a negative effect on stock market volatility, whereas the government's stringent policies had a positive effect. Mass vaccination tends to increase the confidence of economic actors, impacting investors' confidence in the stability of the stock market. Meanwhile, the government's strict policies have caused uncertainty among economic actors and investors regarding the economic prospects during the pandemic, leading to high levels of volatility. Therefore, governments must promote more aggressive vaccination policies, thereby reducing stringent policies for economic agents.
Keywords: COVID-19; mass vaccination; stringency policy; stock market volatility
JEL: G14; G15; G18; I18

1. Introduction

The COVID-19 pandemic, which emerged in late 2019 in Wuhan, China and began to spread in early 2020, caused an unprecedented shock to the global economy. Initially, world stock markets were unaffected by the pandemic. However, the stock market began to react negatively as a result of a large number of confirmed victims of this virus's nationwide spread (Khan et al., 2020). This resulted in a decline in stock prices, especially after the World Health Organization (WHO) declared COVID-19 a pandemic on 11 March 2020 (AlAli, 2020). The global stock markets have been affected by the COVID-19 pandemic, with Asia experiencing more negative abnormal returns than other regions (Shaik, 2021). This is

[1] *Accounting fresh graduate at Universitas Negeri Malang, herjuna.izzady.1804226@um.ac.id.*
[2] *Corresponding author: Associate Professor at Universitas Negeri Malang, ani.suryani@um.ac.id.*
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because the Chinese stock market, which is representative of Asia's largest stock market, experienced a severe negative impact on their stock index returns (Liu et al., 2020).

In comparison to the effects of SARS in 2003 (Siu, Wong, 2004), the impacts of COVID-19 were much larger and lasted much longer (Mofijur et al., 2021). Previous research has demonstrated a negative relationship between stock returns and pandemic/epidemic outbreaks (Chen et al., 2009; Pendell, Cho, 2011). Prior research confirmed that stock price fluctuations due to the epidemic had brought significant economic losses to the stock market (Baker et al., 2012; Delisle, 2003; Nippani and Washer, 2004). In addition, since March 2020, when the epidemic became a global pandemic, the majority of global stock markets have experienced continued price declines and increased volatility (Li et al., 2021). Numerous studies have uncovered general evidence on the factors that influence stock market volatility, including the number of positive cases, deaths, government intervention (lockdown & stimulus packages), consumer behaviour, and investor fear (Al-Awadhi et al., 2020; Ibrahim, Kamaludin, 2020; Uddin et al., 2021; Zaremba et al., 2020).

The increasingly high spread of COVID-19 necessitates that countries implement lockdown policies to reduce the transmission rate (Reizer et al., 2022). This results in the closure of various commercial businesses, a decrease in purchasing power and consumption, and delays in investment activities (Mofijur et al., 2021). The impact of these activity restrictions has been detrimental to economic growth and even triggered a recession in several countries (Inoue et al., 2021). Negative economic growth and decreased business activity reduce investors' confidence in the stock market; consequently, investors tend to sell, resulting in a decline in stock prices (Engelhardt et al., 2021).

Vaccination is one of the good news that offers hope for mitigating the impact of COVID-19 on the global economy (Rouatbi et al., 2021). Vaccination is expected to positively affect economic activity in the community and foster investor confidence, thereby reducing stock price volatility. In addition, announcements regarding the emergence and development of new vaccines beginning at the end of 2020 have sparked optimism for the recovery of the global economy from the pandemic. Recent studies have investigated the effect of mass COVID-19 vaccination in stabilizing and reducing stock market volatility (Khalfaoui et al., 2021; Mofijur et al., 2021; Rouatbi et al., 2021). However, prior studies have only focused on the effect of vaccination rates on stock price volatility.

This study strengthens prior research by exploring the impact of vaccination and strict government policies on stock market volatility, especially in ASEAN countries. Important to consider are the tight policies from the government because they are closely related to restrictions on economic actors that have an impact on economic activity, thereby influencing stock market volatility (Bakry et al., 2021). Moreover, massive vaccination programs in various countries are currently being implemented, including in ASEAN.

Those policies are associated with the ASEAN Post-2015 Health Development Agenda (APHDA 2016-2020) initiative, which encourages regional capacity and collaboration in combating emerging threats, evaluating resilient health systems in response to infectious diseases and ensuring effective health in the ASEAN region (ASEAN, 2018). It was implemented in response to the most recent COVID-19 outbreak in Southeast Asia, which occurred in mid-January 2020. Despite the region's proximity to China, the number of cases

and deaths is significantly lower in this region than in other regions (Papageorgiou et al., 2020). This is evidenced by the fact that some countries, such as Thailand, Malaysia, and Singapore, have high scores on Global Health Security Index for health safety and capabilities (Bell, Nuzzo, 2021).

Singapore announced early nationwide measures to enforce social distancing from 7 April to 4 May 2020, which were later extended to 1 June 2020. Singapore's limited case fatality rate of 0.8% as of 21 October 2022 demonstrates the relative success of these early strict lockdown measures, as it is the lowest among all ASEAN countries (Mathieu et al., 2022). Based on the Global Health Security in the ASEAN region, Thailand is rated as the most prepared nation to mitigate the pandemic (Purnomo et al., 2022). This is shown in Thailand's readiness to mitigate the pandemic from their 2017-2021 Twelfth National Economic and Social Development Plan to build a combined control system for mobility response to pandemic disease and improve local production capability of disease vaccines (Potempa et al., 2022). This gives Thailand high vaccine doses given in ASEAN by 199.13 points and low new cases (per 1M) by 5.82 points as of 14 October 2022 (Mathieu et al., 2022).

This study contributes to the literature on capital markets by examining the effect of vaccination and tightening policies on stock index volatility during the COVID-19 pandemic. The results of this study may also be considered by the government in its effort to expedite the vaccination program and achieve immunity in the society. Thus, the purpose of this study is to examine the effect of COVID-19 vaccination and stringent government policies on the volatility of the capital markets in ASEAN countries.

2. Literature Review

The COVID-19 pandemic that has spread since December 2019 has affected all facets of life and created a great deal of interest among researchers to conduct academic research on the pandemic. Since the beginning of 2020, there have been more studies examining the impact of the pandemic on financial markets. At the onset of the pandemic, researchers reported the medical pandemic's impact on financial markets, where the increase in the confirmed positive cases and the high COVID-19 death rate had a positive effect on the volatility in world capital markets (Baker et al., 2020; Chatjuthamard et al., 2021; Cheng et al., 2021). As the number of COVID-19-positive victims outside of China began to rise, global financial market volatility was also rising (Albulescu, 2020). Volatility is the rate at which stock prices rise or fall over a given time period (Kyröläinen, 2008). Volatility is used as a barometer to measure uncertainty risk (Endri et al., 2021) and is the main influential factor in investment portfolio decision-making (Suryadi et al., 2021).

Since the COVID-19 case was made public, stock returns have declined in eleven stock market indexes in countries impacted by the virus (Khatatbeh et al., 2020). COVID-19 has also been found to influence markets for cryptocurrencies (Umar, Gubareva, 2020), exchange rates (Liu et al., 2022), gold (Yousef, Shehadeh, 2020), property and real estate (Milcheva, 2022), bonds (Liu et al., 2022) and oil prices (Mhalla, 2020). Several studies have also reported the effects of the pandemic that harmed various industrial sectors, such as transportation, mining, electricity, environment (He et al., 2020), construction

(Pamidimukkala, Kermanshachi, 2021), aviation (Maneenop, Kotcharin, 2020) and tourism (Hao et al., 2020).

Long before the COVID-19 pandemic, other infectious diseases such as swine flu, MERS, SARS, Ebola, and Zika had substantial economic and financial implications, negatively affecting Gross Domestic Product (GDP) growth rates and stock market returns (Ma et al., 2020). Others found a negative impact of the 1918 Great Influenza Pandemic on GDP, consumption, and stock returns (Bai et al., 2020). Besides impacting the stock market, a pandemic can affect a company's financial fundamentals, including profitability, employment, and debt (Ma et al., 2020). Thus, an epidemic is always detrimental to the development of the capital market.

The COVID-19 virus naturally mutates and generates new variants over time. Some of these more recent variants are more infectious and lethal than their predecessors (Islam et al., 2022). The emergence of new variants of COVID-19, such as Gamma, Delta, and Omicron has posed a threat to global efforts in dealing with the pandemic (WHO, 2022). Therefore, government intervention becomes more expensive and less effective in returning the world economy to its pre-pandemic state (To et al., 2021). Thus, mass vaccination plays a role in creating immunity, allowing the global economic activity to return to normal (Rouatbi et al., 2021). However, the literature regarding the impact of vaccine development and mass vaccination on financial markets is still minimal. The financial markets literature explore only the impact of successful clinical trial drug development (Sumadi, 2016), approval of new drugs (Donovan, 2018), and potential development of new drugs for cancer (Huberman, Regev, 2001) on the stock market.

Research on the impact of vaccine development on the stock market did not exist until the COVID-19 pandemic hit. The world has never experienced a widespread health crisis like this before; hence, herd immunity can only be achieved through mass vaccination (MacIntyre et al., 2022). With a vaccine efficacy of at least 90% against all infections, herd immunity can be achieved by vaccinating 66% of the population (MacIntyre et al., 2022). (Rouatbi et al., 2021) reported the positive impact of the COVID-19 vaccination program in 66 countries in reducing the volatility of stock returns, where vaccination was measured by the number of daily vaccines administered, the duration of vaccination, and the increase in the number of daily vaccines.

Previous research by (Chan et al., 2021) analyzed the stock market's reaction to the initiation of COVID-19 vaccine clinical trials in humans. The average abnormal return in 49 countries increased by 15.2 basis points (bps) on the first day of clinical trials of the vaccine. Afterwards, abnormal returns increased by 30.0 bps and 51.7 bps, respectively, on the first day of phase 2 and phase 3 clinical trials. The increase in abnormal returns indicates a favourable reaction of the stock market to vaccine development, which continues into the next phase of the vaccine test.

In both developed and developing countries, post-clinical trial mass vaccination significantly reduced stock market volatility (To et al., 2021), so an increase in the vaccinated population contributed to stabilizing stock markets. Several other studies have also reported on the impact of vaccine development on the economy and the stock market that has been carried out in a short time (Bakry et al., 2021; Chan et al., 2021; Gräb et al., 2021). The study by

(Bakry et al., 2021) in analyzing the impact of vaccination was limited to data until February 2021, whereas (Rouatbi et al., 2021) extended the study period to April 2021, when the immunization program was still in its infancy, with 20.5 million doses administered compared to August 2021 of 41.18 million doses. Thus, this study extends the research period from 13 January 2020 to 31 August 2021.

In addition to vaccination, the number of victims of positive cases, deaths, and government intervention also contribute to volatility in the capital market (Ibrahim, Kamaludin, 2020; Khan et al., 2020; Zaremba et al., 2020). During the COVID-19 period, (Zaremba et al., 2020) pioneered research on the impact of government-imposed social restrictions on stock market volatility. They explore the impact of the aggregate stringency index and the individual impact of seven government policy actions on stock market volatility. The results show that non-pharmaceutical intervention (tightness policy) significantly increases the volatility of the stock market.

Strict government policies such as lockdowns, workplace closures, or restrictions on people's movement are effective in reducing the spread of infection, but they have serious economic impacts (Atalan, 2020; Zaremba et al., 2020). Strict policies stop production and all other economic activities (Wagner, 2020). The government's strict policy in handling COVID-19 is also stricter, broader, and of a longer duration than the policy response to the handling of the Spanish Flu and the 1957-1958 influenza pandemic (Baker et al., 2012).

Government policies in dealing with pandemics are always dynamic and change according to the conditions of COVID-19 itself. This intervention changes lead to increased uncertainty, which makes the stock market more volatile (Fauzi, Paiman, 2021; Zhang et al., 2020). One of the main sources of market volatility is the uncertainty and potential economic loss due to a pandemic (Ashraf, 2020; Zhang et al., 2020). Higher stock market volatility can lead to investor pessimism regarding future economic developments (Razak et al., 2020). In addition, the decline in investor confidence also causes uncertainty about the company's growth opportunities which then increases the risk of falling stock prices (Hong, Stein, 2003). Thus, the hypothesis of this study are as follows:

H_1: There is a negative effect of COVID-19 vaccination on stock index return volatility in ASEAN countrie

H_2: There is a positive effect of the government's tightness policy on the volatility of stock index returns of the six ASEAN countries

3. Research Methodology

This study uses stock price indexes from six ASEAN countries (Indonesia, Philippines, Malaysia, Thailand, Singapore, and Vietnam) over a period of 427 days (13 January 2020 – 31 August 2021), yielding a total of 2,562 observations. ASEAN is the seventh largest economic superpower in the world and the fourth in Asia, with a combined GDP of US$3.0 trillion (International Monetary Fund, 2022). Among ASEAN countries, ASEAN-5 (Singapore, Indonesia, Malaysia, Thailand and Vietnam) are the countries with the strongest GDP growth and stable economic activity (Munir et al., 2020). The impact of COVID-19 in

one of China's neighbouring regions has had a direct effect on its economy (Fauzi, Paiman, 2021).

Table 1 shows the six ASEAN member countries included in this study, where the stock price index is obtained from the *Eikon Refinitive Database*. This study uses only six ASEAN member countries because the other four do not have a capital market (Brunei Darussalam) or have a very small number of listing firms (Laos, Cambodia, and Myanmar)[4] (Naufa et al., 2019). The research period begins on 13 January 2020 as that is when the first time a COVID-19 case entered Southeast Asia in Thailand (Sim et al., 2021). The study period concludes on 31 August 2021, taking into account the number of vaccinated populations (at least the first dose) in Southeast Asia, which has reached 91% (WHO Southeast Asia Regional Office, 2021) and extends the previous study period (Rouatbi et al., 2021; To et al., 2021).

Table 1. Research

No	Country	Major Stock Indices
1	Philippines	PSEi Composite
2	Indonesia	IDX Composite
3	Malaysia	FTSE Malaysia KLCI
4	Thailand	SET Index
5	Singapore	Straits Times Index
6	Vietnam	Vietnam Ho Chi Minh Stock Index

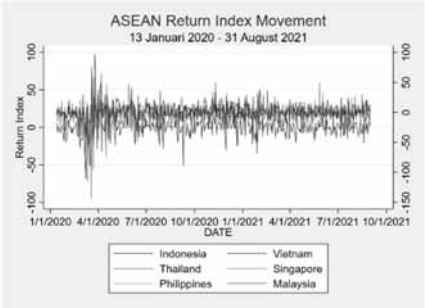
Daily vaccination data is obtained through Our World in Data (*ourworldindata.org/coronavirus*), which collects the most recent data from the government and the Ministry of Health of each country. The government's stringent policy response is based on the Oxford COVID-19 Government Response Tracker (*covidtracker.bsg.ox.ac.uk*). The stringency index is a composite measurement of nine government response metrics: school closures; workplace closures; event cancellation; meeting restrictions; closure of public transportation; stay-at-home requirements; information campaigns; internal restrictions; and international travel (Hale et al., 2020). On a given day, the index is calculated as the average score of these nine metrics, each of which ranges from 0 to 100 (Worldometer, 2022).

It has been widely explained in the literature that the volatility of stock returns fluctuates from time to time (Teräsvirta, 2009). In other words, there are fluctuations or alternating increases and decreases in the data (Soedewi, Purqon, 2015). Research in capital markets, that use time series data, usually has a high level of volatility. This is also the case in our study, as shown in Figure 1 and Figure 2, whereby price and return fluctuation exist in the majority of the six indexes during the pandemic. The high volatility of financial data results in volatility clustering, often referred to as heteroscedasticity symptoms (Hafizah et al., 2020), whereas homoscedasticity is required for time series data modelling (Ghozali, Imam, 2016). To overcome heteroscedasticity, the time series model that can be used is the Autoregressive *Conditionally Heteroscedastic-Generalized Autoregressive Conditionally Heteroscedastic* (ARCH-GARCH) model (Dutta, 2014), which is widely used in studies examining the volatility of financial assets (Miswan et al., 2014).

[4] Laos has 11 registered companies (Lao Securities Exchange (LSX), 2022), Cambodia has 9 registered companies (Cambodia Securities Exchange (CSX), 2022), while Myanmar has only 7 registered companies (Myanmar Securities Exchange Centre, 2022).

Figure 1. ASEAN Price Index Movement

Figure 2. ASEAN Return Index Movement



The traditional GARCH model can capture the clustering of volatility and leptokurtosis[5], but the model assumes that the financial data come from an asymmetric distribution (Bakry et al., 2021). Thus, the GARCH model cannot capture the asymmetric response of volatility to market shocks caused by both good and bad news (Dutta, 2014). The *Glosten Jaganathan Runkle-Generalized Autoregressive Conditionally Heteroscedastic* (GJR-GARCH) model (Glosten et al., 1993) overcomes this limitation and captures the asymmetric response to volatility by examining negative shocks that have a greater impact on return volatility than positive shocks.

(Glosten et al., 1993) and (Nelson, 1991) have developed *Glosten-Jagannathan-Runkle-GARCH* (GJR-GARCH) and exponential GARCH (EGARCH) models. In this study, the GJR-GARCH asymmetric model (*p, q*) is used to obtain the conditional variance of stock market index returns during COVID-19 or referred to as stock market volatility. This study uses *p*=1 and *q*=1 because they are the most appropriate options for the financial time series (Glosten et al., 1993). The use of the GARCH (1,1) model is considered sufficient for most of the financial data (Engle, 2001). The formula for the GJR-GARCH (1,1) model specifically is as follows:

$$r_t = \mu + \varepsilon_t \quad (1)$$

$$VOL_t = \omega + \alpha\gamma(\varepsilon_{t-1}^2) + \beta_j h_{t-1} \quad (2)$$

Where r_t is the stock index return of each country which is calculated by *ln(Pt/Pt-1). P_t* is the closing price of the stock index in period *t*, while *Pt-1* is the closing price of the stock index in period *t-1*. VOL_t is the volatility at time *t*; denotes the asymmetric parameter. The equation of panel data analysis used to calculate the effect of vaccination and government strictness on stock market volatility during COVID-19 is the following formula:

$$lnVOL_{i,t} = \beta_o + \beta_1 lnSI_{i,t} + \beta_2 lnNVAC_{i,t} + \varphi X_{i,t} + \varepsilon_{i,t} \quad (3)$$

Where *i* and *t* refer to country and time, respectively. β_o is a constant variable. The dependent variable $lnVOL_{i,t}$ is the natural logarithm of the daily stock index return volatility as measured from equation 2. The independent variable is the natural logarithm of the number

[5] *Leptokurtosis is a condition when the volatility of securities is not volatile, where the volatility of a security changes at a relatively low level* (Pati et al., 2017).

of daily vaccinations ($lnNVAC_{i,t}$) and the natural logarithm of government policy tightness index value ($lnSI_{i,t}$). In addition, $\varphi X_{i,t}$ was added as a country-level control variable as suggested by previous studies (Bakry et al., 2021; Rouatbi et al., 2021; Uddin et al., 2021). The control variables are the natural logarithm of daily exchange rate changes in the country's currency value to USD (*lnER*) for country *i* at time *t*, the natural logarithm of the number of daily positive confirmed cases (*lnNC*), and the natural logarithm of the number of daily death cases (*lnND*) measured for the country *i* at time *t*.

PfizerAnn was the dummy variable when Pfizer-BioNTech announced vaccine development on 9 November 2020. Meanwhile, *PfizerVAC* was the dummy variable when the Pfizer-BioNTech vaccine was first administered by the US Food and Drug Administration on 23 August 2021. Table 2 explains in more detail the variables, definitions, and research data sources used.

Equation 3 can be estimated using ordinary static panel regression, such as pooled ordinary least squares (OLS) or panel random effects regression, which is in line with previous studies (Bakry et al., 2021; To et al., 2021). However, to decide which model is the most efficient and reliable, this study uses the *Breusch-Pagan Lagrange Multiplier* (LM) test to select the best estimation model. The LM test is an analysis carried out with the aim of determining the best method between common effects or random effects (Abbas & Eksandy, 2018). The LM test shows $p>0.05$. Thus, the pooled ordinary least squares (OLS) model is used to test eq 3.

Table 2. Definition of operational variables

Variables	Definition	Data Sources
Dependent Variables		
lnVOL	Natural logarithm of daily stock index return volatility measured by conditional variance extracted from asymmetric GJR-GARCH (1,1) for country *i* at time *t*	*Eikon Refinitive Database* (stock index price data*)*
Independent Variables		
lnNVAC	Natural logarithm measured as daily new COVID-19 vaccination for country *i* at time *t*	*ourworldindata.org/coronavirus*
lnSI	Natural logarithm measured as the daily strictness policy index from the Oxford Covid-19 Government Response Tracker (OxCGRT) for country *i* at time *t*	*github.com/OxCGRT/covid-policy-tracker*
Control Variables		
lnNC	Natural logarithm measured as the daily number of positive cases for country *i* at time *t*	*ourworldindata.org/coronavirus*
lnND	Natural logarithm measured as the number of cases of death for country *i* at time *t*	*ourworldindata.org/coronavirus*
lnER	Natural logarithm measured as the change in the exchange rate for country *i* at time *t* against the US Dollar	*investing.com/currencies/single-currency-crosses*
PfizerAnn	Dummy variable taking 1 on the day Pfizer-BioNTech announced the development of a COVID-19 vaccination that is 90 percent effective in stopping the virus and 0 otherwise	*google.com*
PfizerVAC	Dummy variable taking 1 on the day of Pfizer-BioNTech COVID-19 vaccine administered first by the US Food and Drug Administration and 0 otherwise	*google.com*

The results of the volatility test using the GJR-GARCH (1.1) model in Table 3 show the significant coefficient of 0.877, indicating changes in volatility that fluctuate and cause stock index movements to experience an unstable tendency.

Table 3. GARCH volatility test

lnip	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
garch(1,1)	0.877	0.035	24.980	0.000	0.809	0.946	***
constant	0.000	0.000	-5.060	0.000	0.000	0.000	***

*Note: *** p<0.01*

Table 4 shows a low correlation between the primary variables *lnSI*, *lnNVAC*, and *lnVOL*. Other control variables, such as *lnNC*, *lnND*, and *lnER* had a low correlation with *lnVOL*, indicating no multicollinearity in the research data. *lnNC* and *lnND* are positively correlated, but this is reasonable given that number of COVID-19-positive cases and daily deaths are always in line (Rouatbi et al., 2021). The results of the classical assumption test on the data, however, found heteroscedasticity through the *Breusch-Pagan* test and autocorrelation through the *Wooldridge* test. Generalized Least Square (GLS) is used instead of OLS to test equation 3. GLS can overcome time series autocorrelation and correlation (cross-section) among observed values (Musau et al., 2015; Winarno, 2017). GLS is also more effective than the OLS in estimating data with autocorrelation and heteroscedasticity model errors (Iswati et al., 2014).

Table 4. Pairwise correlation test

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) lnVOL	1.000							
(2) lnSI	0.021	1.000						
(3) lnNVAC	-0.177****	0.178****	1.000					
(4) lnNC	-0.072****	0.459****	0.435****	1.000				
(5) lnND	-0.087****	0.294****	0.426****	0.840****	1.000			
(6) lnER	-0.085****	-0.021	0.012	-0.025	-0.280****	1.000		
(7) PfizerAnn	0.059**	0.015	-0.079****	-0.013	-0.016	0.001	1.000	
(8) PfizerVAC	0.004	0.042**	0.183****	0.152****	0.178****	0.000	-0.017	1.000

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

4. Results and Discussions

Table 5 shows the descriptive statistics of the study in the combined period (Panel A), the period before vaccination (Panel B), and the period after vaccination (Panel C). The average value of daily vaccination (*lnNVAC*) in Table 5 Panel C is 7.667, indicating that the number of daily vaccinations in ASEAN countries is not yet maximized (i.e. around 150,000 vaccinations per day). This is because the vaccinations supplies are still limited. However, governments in ASEAN countries continue to strive to increase the number of COVID-19 vaccinations because with more and more citizens being vaccinated, the potential for herd immunity is greater (Rodrigues et al., 2020).

Even though the number of daily vaccinations is still limited, the government strives for routine vaccinations. The minimum value of *lnNVAC* is 0 due to differences in countries in ASEAN in initiating COVID-19 vaccination. For example, Vietnam was not vaccinated until 9 March 2021, whereas Singapore administered the vaccine earlier than other countries, on 31 December 2020. The highest *lnNVAC* value was 14.846 on 13 August 2021, when Indonesia carried out the most vaccinations in ASEAN, 2.8 million doses.

Table 3. Descriptive statistics

Variables	*Obs*	*Mean*	*Std. Dev.*	*Min*	*Max*
Panel A: Before and After Vaccination Period (13/Jan/2020 – 31/Agu/2021)					
lnVOL	2562	-8.821	0.605	-10.213	-5.033
lnNVAC	2562	3.124	5.136	0.000	14.846
lnSI	2562	3.912	0.899	0.000	4.605
lnNC	2562	4.888	3.269	0.000	10.947
lnND	2562	1.713	2.154	0.000	7.635
lnER	2562	-4.785	3.756	-10.055	-0.276
PfizerAnn	2562	0.016	0.127	0.000	1.000
PfizerVAC	2562	0.016	0.127	0.000	1.000
Panel B: Period Before Vaccination (13/Jan/2020 – 30/Des/2020)					
lnVOL	1518	-8.730	0.665	-10.197	-5.033
lnSI	1518	3.738	1.127	0.000	4.605
lnNC	1518	3.576	2.927	0.000	9.032
lnND	1518	1.019	1.637	0.000	5.557
lnER	1518	-4.790	3.754	-10.055	-0.280
PfizerAnn	1518	0.028	0.164	0.000	1.000
PfizerVAC	1518	0.000	0.000	0.000	0.000
Panel C: Period After Vaccination (31/Des/2020 – 31/Agu/2021)					
lnVOL	1044	-8.953	0.477	-10.213	-6.392
lnNVAC	1044	7.667	5.469	0.000	14.846
lnSI	1044	4.166	0.169	3.707	4.445
lnNC	1044	6.796	2.762	0.000	10.947
lnND	1044	2.722	2.403	0.000	7.635
lnER	1044	-4.776	3.760	-10.054	-0.276
PfizerAnn	1044	0.000	0.000	0.000	0.000
PfizerVAC	1044	0.040	0.197	0.000	1.000

The government's response to COVID-19 is measured by the logarithm of the natural stringency index (*lnSI*). Table 5 Panel B shows the number 0 for *lnSI* because when COVID-19 first hit ASEAN on 13 January 2020, there were no countries that had responded to the pandemic. Vietnam was the first ASEAN country to implement a strict policy on 27 January 2020, followed by the Philippines on 30 January 2020. The average *InSI* across all time periods (Panels A, B, C) was relatively high, indicating that the average ASEAN country has implemented strict government policies in dealing with COVID-19. For example, Indonesia in the Implementation of Emergency Community Activity Restrictions, mandated that all non-essential sector employees work from home, shopping centres and malls were closed, and school activities were conducted online from 3 to 20 July 2021. Then, on 7 June 2021, Malaysia implemented the Movement Control Order policy, which imposed a total national lockdown across all social and economic sectors.

In the pre-vaccination period (Table 5, Panel B), the highest *lnSI* value was 4.605, indicating a stringency index of 100. This policy was implemented by the Philippines on 25 March 2020, when President Rodrigo Duterte signed the "*Bayanihan to Heal as One Act*", which granted him full authority to combat the COVID-19 pandemic. The highest *lnSI* value in the vaccination period (Panel C) was lower than in the pre-vaccination period (Panel B). The existence of vaccination can be a tool to achieve immunity in society, allowing the government to loosen restrictions.

Statistical data revealed that *lnNC* and *lnND* increased during the vaccination period (Panel C), but *lnVOL* decreased by an average of -8.953 from the pre-vaccination period. *lnNVAC* as a vaccination variable can be an antidote to market volatility when the rising number of positive cases and deaths causes investors to become increasingly alarmed. This is our initial evidence of the negative effect of vaccination on stock market volatility in ASEAN. The high *lnNC* and *lnND* during the vaccination period were caused by the *Delta* variant, which was more virulent than the previous variant (*Alpha, Beta, & Gamma*). In addition, *lnNC* and *lnND* both show a minimum of 0, because, on certain days, a number of countries do not report any additional COVID-19-positive cases or death.

The results of the regression model of equation 3 for all countries from 13 January 2020 to 31 August 2021 are presented in Table 6. The government's health policy that aims to achieve immunity in the society through mass vaccination (*lnNVAC*) has a negative effect on volatility (*lnVOL*) in the ASEAN stock market. During the COVID-19 period, the number of daily vaccinations injected into the community may play a role in reducing volatility in the stock market. This may be due to the massive vaccination campaign carried out by the government, which can boost investor confidence, thereby encouraging a bull market and tends to help reduce volatility in the ASEAN stock market (Rouatbi et al., 2021). This finding is consistent with previous research that there is a negative effect of COVID-19 vaccination on international stock market volatility (Apergis et al., 2022; Bakry et al., 2021; Chan et al., 2021; Gräb et al., 2021; Rouatbi et al., 2021; To et al., 2021).

Table 6. GLS regression results for all countries and all periods

Variables	Coef.	St.Err.	t-value	p-value
lnNVAC	-0.020	0.003	-7.570	0.000****
lnSI	0.029	0.015	1.950	0.051*
lnNC	0.021	0.008	2.490	0.013**
lnND	-0.046	0.012	-3.850	0.000****
lnER	-0.020	0.004	-5.610	0.000****
PfizerAnn	0.217	0.092	2.360	0.018**
PfizerVAC	0.220	0.094	2.340	0.019**
Constant	-8.996	0.055	-163.520	0.000****

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

Vaccination can improve immunity and public health (Biggs, Littlejohn, 2022), leading to higher life expectancy (Chudasama et al., 2020). Higher life expectancy can increase the incentives for households to smooth consumption over time and save a greater proportion of their income (Heaton, Lucas, 2017). This share of income allows them to invest more money in the future, for example, to further their education or purchase stocks (Jit et al., 2015). Macroeconomically, the health of good economic actors, is critical to broader economic performance (Bloom, Canning, 2003), in both business and the public economy. Therefore, vaccinations that affect public health are an important factor in the stock market performance (Ngwakwe, 2021).

Using the same model as in equation 3, this study also investigates the effect of vaccination, strict government policies, and other COVID-19 variables on stock market volatility in each country prior to and after vaccination (see Table 7). Each country starts vaccination at a

different time. Indonesia and Malaysia began vaccinations on 25 January 2021, while Vietnam did not begin until 6 March 2021.

Table 7. Regression results per country and per period

	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam	All Countries
Panel A: Period Before Vaccination							
lnSI	0.315****	-0.083	0.123**	-0.009	-0.104***	0.051	0.023
lnNC	-0.186***	0.052**	0.022	-0.068*	0.128****	0.181****	0.041***
lnND	0.040	-0.035	-0.061***	0.000	-0.014	-0.234	-0.080***
lnER	-2.049**	-7.030****	-11.344****	-18.705****	-11.445****	-64.535**	-0.018***
PfizerAnn	0.230	0.366*	0.626***	0.698**	0.881***	-0.183	0.181*
PfizerVAC	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Constant	-2.846***	-18.840****	-53.362****	-14.548****	-47.958****	-657.79*	-8.968***
Panel B: Period After Vaccination							
lnSI	-2.394	0.360	0.006	0.201	-0.134	0.342	0.365***
lnNVAC	0.001	-0.013	0.000	0.013	-0.002	0.015	-0.008***
lnNC	-0.121	-0.488****	0.019	-0.010	0.112*	0.076**	0.006
lnND	0.046	0.197***	-0.082***	-0.054	-0.094	-0.107***	-0.038***
lnER	-0.779	-6.318	-6.433****	-3.367	0.714	-79.966**	-0.026***
PfizerAnn	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PfizerVAC	0.102	0.630***	-0.011	0.037	0.348**	0.358	0.233***
Constant	-5.382	-16.053**	-33.687****	-10.956***	-6.620	-814.382**	-10.482***

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

Table 7 Panel A shows the pre-vaccination period beginning on 13 January 2020, the date of the first positive case in ASEAN, and ending on 30 December 2020, the day before the first vaccination in Singapore (Worldometer, 2022). The vaccination period (Panel B) starts on 31 December 2020, when the first vaccination was administered in Singapore, and ends on 31 August 2021. In Panel B, *lnNVAC* shows consistent results with Table 6, indicating that vaccination can reduce the volatility of the ASEAN stock market when the vaccination program is implemented in ASEAN. Thus, this study provides evidence to support the first hypothesis (H_1) that COVID-19 vaccination has a negative effect on stock return volatility.

Table 6 shows a marginally positive relationship between the government's stringency policy (*LnSI*) and the stock market volatility. These results support earlier findings that non-health interventions, such as the closure of schools, workplaces, internal movement restrictions, and international travel, as well as the cancellation of public events during the COVID-19 outbreak, significantly increased stock market volatility (Bakry et al., 2021; Engelhardt et al., 2021; Rouatbi et al., 2021; Zaremba et al., 2020).

The government's stringent policies lead to low levels of public trust due to the lack of public awareness in complying with policies, especially in developing countries (Engelhardt et al., 2021). People's disobedience to the government's stringent policies could exacerbate the impact of the pandemic and trigger further tightening policies, which ultimately inhibited economic activity (Zaremba et al., 2020). Thus, investors responded negatively to this government policy and generated negative signals of economic and financial instability in ASEAN countries. This initial response made investors react negatively to changes in government conservatism in anticipation of uncertainty in the pandemic situation (Zaremba et al., 2020).

The government's stringent policy gave different results during the pre-vaccination period, whereas in Table 7 Panel A, *lnSI* had no significant impact on stock market volatility. This is evidenced by the absence of a positive response to the strict policy on stock market volatility in the majority of ASEAN countries. Before and after vaccination, Malaysia, Singapore, and Vietnam did not respond significantly to the effect of *lnSI*. However, the three countries responded more to the confirmation of positive cases as an indicator of market fear and uncertainty than to the government's strict policy preceding vaccination. These results support the previous study, indicating that the stringency index has no effect on the volatility of the stock market in the absence of the vaccination variable (Yiu, Tsang, 2021).

The government's stringency policy has a positive effect on *lnVOL* in the post-vaccination period (see Table 7 Panel B), which is consistent with the findings in Table 6 for the period and the entire country. This result differs from the pre-vaccination period (Table 7 Panel A) because in the post-vaccination period (Panel B), starting on 31 December 2020, there was the first wave and the second wave of COVID-19, which resulted in significantly tighter government policies to control case transmission (Song et al., 2021). The emergence of a new and more contagious *Delta* variant, migrant workers, and international tourists in the ASEAN region who transmit COVID-19 caused these major waves (Fauzi, Paiman, 2021). Therefore, this study provides empirical evidence to support the second hypothesis (H_2) that government stringency policies have a positive effect on stock return volatility.

This study also examines the impact of the control variables, namely daily positive cases (*lnNC*) and daily death cases (*lnND*) due to COVID-19, as well as the daily currency exchange rate (*lnER*) of each ASEAN country relative to the US dollar. Table 6 shows that the increase in positive cases contributes to the volatility in the ASEAN stock markets. These results support the previous research, that demonstrated an increase in COVID-19 positive cases as a negative reaction of investors to triggers of increased stock market uncertainty during the pandemic (Bakry et al., 2021; Rouatbi et al., 2021; To et al., 2021; Zaremba et al., 2020).

The results in Table 6 are consistent with the period before vaccination (Table 7 Panel A), but different from the period following vaccination (Panel B). *lnNC* continues to have a positive effect on the volatility of the stock market, but this effect becomes insignificant after vaccination. This is because the market captures vaccination information as an important tool for governments and health institutions to contain and reduce positive cases of COVID-19 (Mertens et al., 2022), resulting in a positive investor sentiment that drives stock market performance (Hartono, 2021).

Mortality cases have a negative effect on the volatility of the ASEAN stock markets, as shown consistently in Tables 6 and 7. These results contradict those of studies (Rouatbi et al., 2021) and (To et al., 2021), but are in line with studies (Bakry et al., 2021) and (Zaremba et al., 2020). When assessing economic and business prospects, it appears that investors are more concerned with positive cases data than with mortality rates (Bakry et al., 2021). These diverse results show that numerous factors affect the movement of the stock market. In addition to demand and supply, there are additional market-disrupting factors, such as government intervention, news sentiment, and abnormal trading (Herlina et al., 2022).

5. Conclusions and Recommendations

This study aims to determine the effect of mass vaccination and the government's stringency COVID-19 policy on the volatility of stock market returns in six ASEAN countries. This study uses daily data on major stock indices, stringency index, vaccinations, positive cases, deaths, and the exchange rate relative to the US Dollar. The results of this study indicate that mass vaccination reduces stock market volatility, with increased vaccination helping to stabilize stock markets in six ASEAN countries. This study also demonstrates that government intervention in non-health matters, such as tightening policies, has a positive effect on volatility.

Mass vaccinations carried out by the state can boost investor confidence, thereby encouraging a bull market and reducing volatility in the ASEAN stock markets. Vaccination also improves health and tends to increase life expectancy, allowing individuals to increase consumption and invest more in the stock market. In contrast, market volatility increases as a function of the stringency index as a proxy for government policies, and vice versa. Stringent policies implemented by the government caused uncertainty from economic actors and investors regarding the economic outlook during a pandemic situation, thereby increasing volatility.

This study provides recommendations for governments in the ASEAN region to encourage more aggressive vaccination policies. Based on the findings of this study, in order to minimize stock market volatility during pandemics, it is crucial that policymakers respond quickly to implement a strong vaccination program. In addition, the government is expected to implement policies that are beneficial to economic actors. The government needs to loosen tight policies to reduce stock market volatility by promoting vaccination to create herd immunity as soon as possible. Governments should carefully consider adapting their regulatory response to the pandemic in the light of the need to strike a balance between public health and the economy.

This recommendation is supported by the recent data on *OurWorldInData.org* which indicates that high vaccination rates in the majority of the sample countries result in a reduction in stringent policies, which ultimately stabilizes the stock market. For example, as of 9 October 2022, Singapore, with a population vaccination rate of 93.91%, has an impact on reducing the level of strictness rate by 17.59%, thereby impacting the stabilization of the Straits Time Index above 3,000 levels.

Mass vaccination is a topic that requires further attention from researchers employing a variety of approaches to determine the role of vaccines in international financial markets. This study uses a volatility estimation model (GJR-GARCH). Further studies can test the selection of the best model to determine the appropriate model using GARCH-X, GARCH-M, or TGARCH.

The research data also exhibited signs of heteroscedasticity; future studies can remedy this condition by employing alternative methods such as Weighted Least Squares. In addition, the ASEAN stock market is the sole focus of this study. Future research is expected to explore the impact of vaccinations on other financial assets, such as corporate bonds or cryptocurrencies, and in other regions. By considering geographical factors, culture, population, and varying levels of education in each country, further research can also conduct

different tests for each country. This research has the opportunity to have confounding effects from variables outside the study. For example, there is the emergence of negative sentiments for the first & second waves of COVID-19 and the latest variant of Delta. Therefore, further research can consider incorporating these variables to compare the results.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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Sviatoslav Kniaz[1]
Nazar Podolchak[2]
Yurii Dziurakh[3]
Veronika Karkovska[4]
Anatolii Kucher[5]

DEVELOPMENT OF GOVERNMENT REGULATION ON INVESTMENT ACTIVITIES IN AGRICULTURE OF UKRAINE[6]

The purpose of this study is to determine the main factors of state regulation that affect the efficiency of investment activities in agriculture of Ukraine. It is proved that the weakness of state regulation of investment activity in agriculture is the lack of a balanced long-term policy of economic development, which turns Ukraine into an agrarian state. The balance of payments deficit has been covered in recent years (2015–2019) due to exports of low value-added agricultural raw materials. Taking into account the fact that the world food market is constantly growing shortage of quality products, Ukraine has prospects to become a developed agro-industrial country in terms of stimulating investment in the processing of agricultural raw materials. Methodological tools for assessing the impact of government action on key indicators of investment activity in the agricultural sector of Ukraine have been developed. The level of impact of the effectiveness of state regulation with the use of such tools as financing of investment management bodies and financial incentives for investment development is the highest compared to the effectiveness of other instruments of state regulation. Rising government spending on investment management and financial assistance to farmers has a positive impact on the dynamics of return on investment in agriculture. The practical value of the developed methodological tools lies in the possibility of their use by managers of agricultural enterprises to forecast their condition, taking into account the influence of factors of state regulation related to ensuring the efficiency of investment activities in the agriculture of Ukraine. Given that forecasting is reduced to one resulting parameter, the proposed toolkit is easy to use. It should be used to justify regulatory decisions, in particular, on investment processes in agriculture.

Keywords: investment support; agriculture; investment efficiency; VAT refund; state budget; farmers; strategy
JEL: H70; Q10; Q14

[1] *Sviatoslav Kniaz, DrS, Prof., Lviv Polytechnic National University, sviatoslav.v.kniaz@lpnu.ua.*
[2] *Nazar Podolchak, DrS, Prof., Lviv Polytechnic National University, nazar_podolchak@yahoo.com.*
[3] *Yurii Dziurakh, PhD, Assos. Prof., Lviv Polytechnic National University, yurii.m.dziurakh@lpnu.ua.*
[4] *Veronika Karkovska, DrS, Prof., Lviv Polytechnic National University, veronika.y.karkovska@lpnu.ua.*
[5] *Anatolii Kucher, DrS, Prof., Lviv Polytechnic National University, anatolii.v.kucher@lpnu.ua.*
[6] This paper should be cited as: *Kniaz, S., Podolchak, N., Dziurakh, Y., Karkovska, V., Kucher, A. (2023). Development of Government Regulation on Investment Activities in Agriculture of Ukraine. – Economic Studies (Ikonomicheski Izsledvania), 32(2), pp. 136-150.*

1. Introduction

Agriculture is one of the priority sectors for development in Ukraine. The products of this sphere are one of the main export items of the Ukrainian economy. Given its viability and importance, public authorities must ensure its development. The main measures to this end are the introduction of a favourable investment policy in the field of agriculture. In the turbulent economic environment caused by a number of geopolitical factors, the growing problem of food shortages caused by the war, the effects of the COVID-19 pandemic, changes in the environment, the issues of the government regulation of investment activity into new agricultural technologies and agricultural development are relevant. In view of this, the problem investigated in this article is the definition and assessment of the current state of state regulation of investment activities in Ukraine, its problems and prospects. The assumption of this study is that the level of state assistance in the field of investment in agriculture depends on the topics of its development. Issues of development and improvement of state regulation of investment activities, including in the field of agriculture, have become the subject of research by a number of authors.

The main aspects of the regulation of investments in the agricultural sector of the EU are shaped by the "Policy Framework for Investment in Agriculture" (Policy framework…, 2013). Analysing this document, we should underline the key role of private investments, which should be supported by regulators: "Private investment is essential if agriculture is to fulfil its vital function of contributing to economic development, poverty reduction and food security. Agricultural production needs to increase by at least 60 % over the next 40 years to meet the rising demand for food resulting from world population growth, higher income levels and lifestyle changes. Given the limited scope for net area expansion, agricultural growth will rely mainly on new increases in productivity, supported in particular by private investment in physical, human and knowledge capital. Agricultural investment can help contain upward pressure on food prices in the context of rising land and water scarcity, thereby enhancing global food security.

Undoubtedly, the investments are one of the key factors of economic growth, long-term and short-term capital investments, consisting of capital expenditures (capital investments); costs associated with the growth of working capital (during the expansion of production) or working capital in full, necessary to start production (during the creation of new production), as well as costs necessary to prepare an investment project (The Verkhovna Rada…, 2020). The essence of investments, their interpretation in the scientific literature and practical experience of investing show the significant potential of this economic tool in the processes of intensification of production, improving the efficiency of management and implementation of socioeconomic projects. Yu. Lupenko et al. (2017) believe that investment processes in agriculture have recently slowed down sharply due to the reduction of financial opportunities for investors and the state. Restoration of the positive dynamics of investment requires radical measures to increase the investment attractiveness of the industry and the fastest macroeconomic stabilisation in the country. It can be stated that given the current state of agriculture, the problem of intensifying investment activity remains relevant. This, in turn, will improve the state of logistics, contribute to the growth of production capacity and the degree of its use, will provide a social impact in rural areas.

T. Muluneh (2021) concentrated on digital aspects of agricultural development: the application of digital technologies (modern ICTs) has to transform the internal functioning of rural institutions, the delivery of agricultural goods and services, and the interaction between government and the rural public with enhanced transparency, accountability, regulation and contract enforcement, and active participation of all involved stakeholders aiming to ensure growth and development of the agricultural sector.

The main trends in governance of the agricultural sector in the age of globalisation are discussed in the book (Higgins, Lawrence, 2005). The impact of government policies on private R&D investment in agriculture is discussed in the article (Higgins, Lawrence, 2005). This study undertakes this research by examining the relationship between government policies and biotechnology research by agribusiness firms in China, using a unique survey dataset of 103 Chinese agribusiness firms in the chemical and seed industries. The results provide support for the argument that government policies can induce private investment in biotechnology R&D. This most basic policy change required to encourage R&D is government approval of new GM traits for cultivation and GM traits for consumption.

It should be noted that state regulation and development of investment activities in agriculture is an indirect influence of the state on socioeconomic processes through laws and regulations, implemented by supporting certain price, credit and tax instruments, export and import quotas, management projects initiatives stimulating, etc. Thus, the development of agriculture is ensured by the joint activities of all participants in this process: agricultural workers, investor contributions and the implementation of the regulatory function of public administration.

In addition, there are a number of economic, legal, financial, political, social negative factors that affect the investment climate of Ukraine's agriculture. In our opinion, the risk of foreign investment in agriculture in the field of state regulation should include corruption; unprotected property rights, raiding; centralisation of power, ie the inability of regions to compete in attracting investment; forcing business to cover the financial problems of the region under the pretext of its involvement in solving social issues; pressure on business from the authorities; unresolved issues of public-private partnership; frequent changes in non-compliance legislation; incompleteness of the legislative process and the impossibility of implementing the adopted laws (Chip, 2018).

A. Mykhailov (2010) focused on the use of various financial instruments for the formation of investment resources in agriculture. In particular, he found that the most common in recent years among domestic financial instruments were bank lending, forward procurement, agricultural receipts and leasing services. But he emphasises that the set of financial instruments differs depending on the size of agricultural enterprises, their affiliation to agricultural holdings. The difference in the possibilities of access and accumulation of investment resources of agricultural producers of different sizes is proved by other scientists (Swinnen, 2009; Graubner et al., 2020; Deng et al., 2019; Srour, 2018). Other, no less important factors hindering foreign investment in agriculture include political instability; unemployment; low qualification of graduates of management and marketing specialities; lack of time and financial resources to improve the skills of employees in enterprises; low level of foreign language proficiency of young people; weak infrastructure development; bad

ecological situation (Deng et al., 2019; Srour, 2018). However, according to L. Chip (2018), there are many other negative factors that reduce the investment attractiveness of the agricultural sector of Ukraine First of all, they include the low level of protection of the rights of landowners and land users, insufficient content of the cadastral register and the register of property rights, a number of inconsistencies between them, adjustment of infrastructure, freight transportation. At present, Ukraine does not have a specially authorised central executive body in the field of investment activities. As rightly noted by O. Shatylo (2010), the main problem of state regulation of investment activities is the dispersion of powers between different government agencies in this area. Nowadays, without exaggeration, everyone and nobody are engaged in investment activity in Ukraine.

The results of the analysis of the main aspects and issues of the government regulation of the agricultural sphere are represented in the work (Polushkina et al., 2013). I. Bezpiata (2016) studied the peculiarities of attracting foreign investment in the agricultural sector of the economy. She considered the main factors that allow to form the preconditions for increasing the level of investment attractiveness of the regions of Ukraine. The author considers the implementation of European initiatives in the field of agricultural policy to be an important area of state support for the development of investments in the agricultural sector.

Studies (Dmytriieva, Sviatets, 2021; Honcharuk, Dziurakh, 2018; Dziurakh, 2019) present the effectiveness of filtration methods and the results of the analysis that can be used in the management and forecasting of long-term agricultural development of Ukraine. However, it is important when studying the development of agriculture in Ukraine to take into account the influence of public administration to improve the accuracy of forecasting.

Resuming this short literature review, it can be concluded, that foreign experience of government regulation of investment in agriculture is different in different countries, but the aim is, in general, the same – to support the investments, especially from foreign investors (globalisation and digitalisation supports this process). Also, given the above, there is reason to state that most of the analysed scientific papers are only fragmentarily devoted to the problems of state regulation of investment in agriculture and contain mainly theoretical rather than applied methodological recommendations to take into account factors which have an impact on attracting investment in agriculture.

2. Methodology

The purpose of this study is to determine the main factors of state regulation that affect the efficiency of investment activities in agriculture in Ukraine. The hypothesis of the study is that the growth of the favourable system of state regulation of agriculture in Ukraine should increase investment in this sector of the economy.

The methodological basis of the study were the methods of economic-statistical, correlation and regression analysis. They were used to compute the influence of the main government actions on the main indicators of the investment activity in the agricultural sector in Ukraine. The study period covers the interval from 2010 to 2019. This period was divided into three-

time intervals, each of which reflects a certain direction of public investment policy in agriculture:

- 2010-2013 – a period of relative stability, which was associated with the implementation of economic policy aimed at increasing exports to the markets of the CIS countries;
- 2014-2015 – a period of financial, economic and political crisis, characterised by a sharp decline in key indicators of socioeconomic development;
- 2016-2019 – post-crisis period of the gradual recovery of Ukraine's economy, its adaptation to new economic conditions.

In order to obtain a complete picture of the impact of instruments of state regulation on investment processes in agriculture, a factor analysis has been performed. To this end, it is necessary to identify the features of the impact of various instruments of state regulation on investment in the agricultural sector. We will perform the assessment using the method of correlation and regression analysis, because there are no direct linear relationships between the analysed indicators. The impact of economic instruments of state regulation on the volume of investment in agriculture was studied by the following indicators:

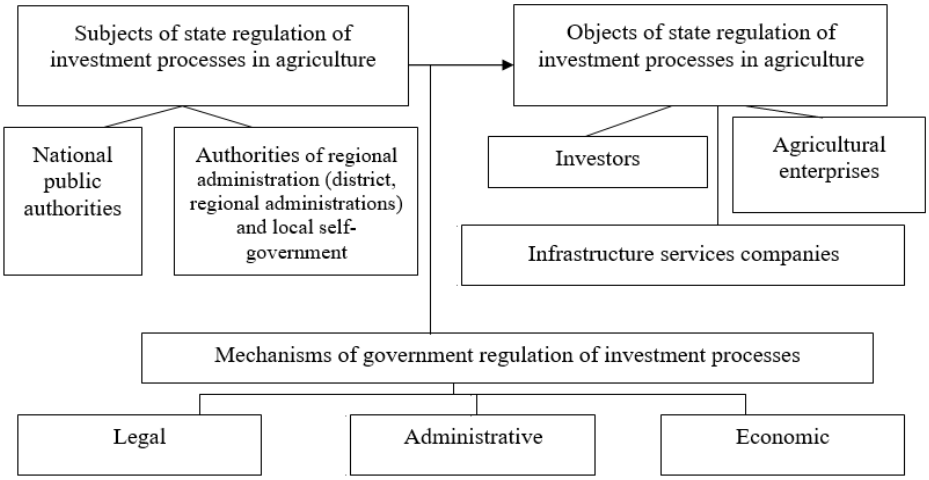
- state budget expenditures to support state regulators of the agricultural sector;
- the amount of the state budget for financial assistance to farmers;
- the amount of VAT refunds to farmers for exports;
- volumes of public procurement from agricultural enterprises.

3. Results and Discussion

State regulation and development of investment activities in agriculture are based on the general principles of development of the system of state influence on economic processes, taking into account the specifics of the development of individual countries and regions. Therefore, to determine the main determinants of the development of this process, it is necessary to explore specific factors that operate in specific conditions for the state. This includes a study of the legal, institutional and economic preconditions for the functioning of the agricultural sector, as well as the institutional and organisational foundations of state regulation of investment processes. Objective economic and geopolitical factors in the development of the agricultural sector create its investment attractiveness for potential domestic and foreign investors. Creating a positive investment climate and attracting domestic and foreign investment involves the formation of organisational, legislative, economic and information and analytical support for state regulation of investment activities in agriculture. First of all, it is expedient to consider the specifics of the formation of institutional support for state regulation in the field of investment processes stimulating agriculture. No single state authority that would comprehensively resolve the issue of state regulation of investment attraction is present in Ukraine now. Some functions of regulating investment processes, regardless of the sector of the economy, are divided between different

government organisations and institutions. Summarising the above, we can form a structural scheme of state regulation of investment activities in agriculture of Ukraine, which includes the main subjects, objects and mechanisms of state influence on the processes of investing in the agricultural sector (Figure 1). Previously identified subjects of state regulation of investment activities in agriculture include a set of national and regional public administration bodies.

Figure 1. Structural scheme of state regulation of investment activity in agriculture of Ukraine



Source: created by the authors on the basis of Gale & Gooch, 2018; Zoitovich, 2020; Wu, Li, 2020; Lindsay et al., 2021; Zakharin, 2021.

The objects of state regulation of investment processes in agriculture are directly the investors by themselves (private enterprises, international organisations, financial institutions), economic entities in the agricultural sector and infrastructure organisations (transport companies, state registrars, technical park maintenance companies, etc.).

The mechanisms of state regulation of investment processes can be divided into three major groups: legal, administrative and economic. The logic of the study requires a more detailed consideration of each of them. In particular, legal mechanisms are the regulation of the activities of participants in the investment process in the agricultural sector through the creation of a regulatory framework (codes, laws, orders, regulations, etc.).

Mechanisms of direct influence on the participants of the investment process are administrative. Such influence implies the application of instructions, orders and directives of higher state authorities in order to regulate the activities of both investors and agricultural enterprises by themselves. The administrative mechanisms of state influence on investment incentives include the definition of strategic development goals and their reflection in indicative and other plans, target programs; long-term government orders and contracts for

the supply of certain types of agricultural products; state support of agricultural production development programs (Shokhnekh et al., 2020).

Economic mechanisms of state regulation of investment processes involve the use of financial leverage to influence the activities of investors and farmers. These primarily include the financing of expenditures for the maintenance of national institutions that carry out (or are directly related) the management of the investment process and the allocation of funds for the implementation of public and public-private targeted programs and projects.

State regulation of investment processes involves expenditures from the state budget to finance state-targeted programs in the field of investment development of agricultural enterprises. Changes in some methodological approaches to the state regulation of investment processes in agriculture are due to the need for various tactical tasks, and this is the reason for a public administration response to all the peculiarities of the economy and the agricultural sector in particular. In accordance with the basic provisions of public financial policy, the states carry out large-scale distribution and redistribution of GDP through the economic mechanism of influence.

Obtaining objective results of the assessment should provide for the levelling of the impact of the devaluation (UAH) in 2014-2015. Therefore, all indicators used for regression analysis are reduced to the currency equivalent (USD) at the average annual rate of the NBU. The initial data for evaluation and symbols of indicators are provided in Table 1.

Table 1. Indicators for the analysis of the dependence of the volume of investments in agriculture on the use of various instruments of state regulation in 2010-2019, mln USD

Indicators	Legend	Years									
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Investments in agriculture (capital and foreign direct)	*Y*	2066	2791	3083	2996	2356	1833	2429	2974	2929	2709
Expenditures to support state regulators of the agricultural sector	x_1	-	12	16	9	7	5	6	8	7	8
Financial assistance to farmers	x_2	-	152	129	165	64	31	14	190	167	172
VAT refund on exports	x_3	847	895	954	1071	696	455	595	741	578	575
Public procurement of agricultural products	x_4	4170	3600	3256	1768	1409	596	1117	1020	1061	1131

Source: calculated by the authors according to the State Statistics Service of Ukraine (Indicators of enterprise…, 2019).

The international software product Stata was used to calculate regression. The results of the regression calculation in the Stata program were normalised (a natural logarithm was found for the values for each indicator for greater objectivity of the evaluation results). The results of starting regressions are provided in Table 2.

The performed regression analysis gives grounds to assert a high density of the relationship between the indicators in the framework of multiple regression. The value of R^2 is 0.8974 and is close to 1. This indicates that the relationship between the volume of investment in agriculture and instruments of government regulation is high. In this case, based on the data

of the Fisher test (F-test), it is also possible to conclude that there is a stable relationship between the indicators, as its actual value is 4.37, which exceeds the minimum allowable value (4.2).

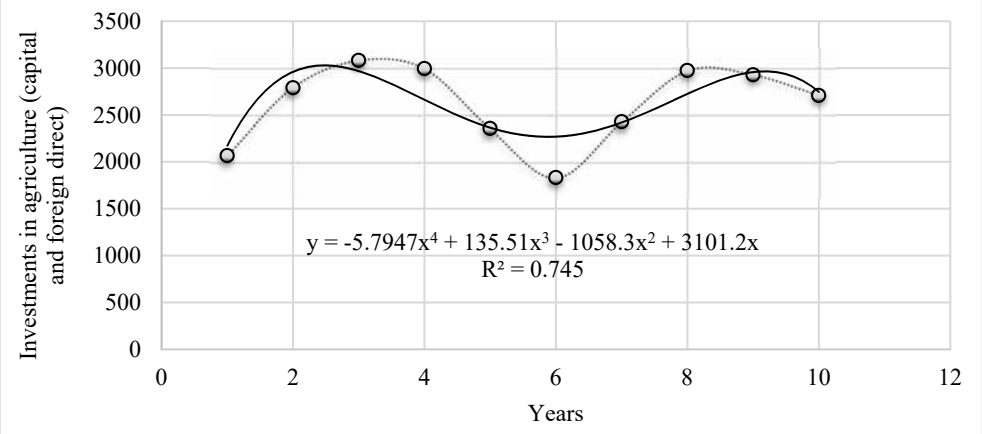
Table 2. The results of the regression analysis of the volume of investment in agriculture dependence on the use of various instruments of state regulation in 2010-2019

Regression parametres	Regression variations				
	Plural	Y from X_1	Y from X_2	Y from X_3	Y from X_4
R^2	0.8974	0.6526	0.5403	0.5463	0.1136
Fisher criteria	4.37 $F_{min} = 4.2$	9.39 $F_{min} = 1.6$	5.88 $F_{min} = 1.6$	7.22 $F_{min} = 1.6$	0.77 $F_{min} = 1.6$
Coefficients for variables, $b^1 – b^4$	X_1: $b^1 = 0.348$ X_2: $b^2 = -0.039$ X_3: $b^3 = 0.663$ X_4: $b^4 = -0.215$	X_1: $b^1 = 0.359$	X_2: $b^2 = 0.137$	X_3: $b^3 = 0.508$	X_4: $b^4 = 0.092$
Probability of error, $P^1 – P^4$	X_1: $P^1 = 0.360$ X_2: $P^2 = 0.676$ X_3: $P^3 = 0.197$ X_4: $P^4 = 0.397$	X_1: $P^1 = 0.028$	X_2: $P^2 = 0.060$	X_3: $P^3 = 0.036$	X_4: $P^4 = 0.414$

Source: calculated by the authors according to the State Statistics Service of Ukraine (Indicators of enterprise…, 2019).

It is important to pay attention to the obtained values of the coefficients for each variable. They express the value of the coefficient of elasticity of investment under the influence of each instrument of government regulation. As shown in Table 2 and Figure 2 data, in general, the growth of expenditures to support the state regulatory authorities of the agricultural sector had a positive effect on the increase in investment within both multiple and pairwise regression (in x_1). There was a directly proportional relationship between the indicators.

Figure 2. Trend analysis of the dependence of agriculture investment volume on the use of various instruments of government regulation



Source: built by the authors.

It can also be stated that the state financial support of farmers had an ambiguous nature of impact on the volume of investments. Within the multiple regression, the growth of financial support led to a decrease in investment (inversely proportional dependence), and within the pairwise regression (in x_2), the dependence was directly proportional. This can be explained as follows:

1) state financial support of the agricultural sector itself (in the absence of the influence of other factors) is an instrument of state regulation, which has a positive effect on investment in agriculture;
2) the positive effects of state financial support are offset by the influence of other factors, which, as it turned out as a result of the launch of regressions, had a greater degree of influence. That is, in this aspect, the state policy of VAT refunds and public procurement in 2010–2019 offset the positive impact of state financial assistance. Based on this, it is possible to make assumptions about the insufficient efficiency of the use of the above instruments of state regulation of investment activity in the agriculture of Ukraine.

VAT refunds on exports had a positive effect on investment in agriculture, which confirms the results of multiple and pairwise (in x_3) regressions. Instead, the impact of public procurement is quite controversial. The results of multiple and pairwise (in x_4) regressions show that the positive effects of public procurement are offset by the influence of other factors. That is, the implementation of public procurement from farmers, together with the use of other instruments of state regulation of investment in agriculture, does not give significant positive consequences.

Based on the results of the study of the main economic instruments of investment activity state regulation in agriculture of Ukraine, we found the following:

1. The number of agricultural enterprises has a stable upward trend. Therefore, the policy of state regulation in the direction of increasing the level of taxation of economic entities in agriculture did not have a significant impact compared to other sectors of the economy. The dynamics of the number of agricultural enterprises largely depended on macroeconomic dynamics. The share of agricultural production has constantly been increasing, which positively characterises the reforms carried out in the agricultural sector over the past 9 years.
2. The reduction in investment occurred due to the withdrawal of capital from Ukraine during the economic crisis. During 2016–2019, the opposite trend was observed. Characterising the dynamics of the share of investment in GDP and gross investment in the economy of Ukraine, it should be noted that there is a tendency for its gradual growth in 2015-2019. The share of investment in GDP generated in the agricultural sector increased significantly between 2015 and 2019. This trend can be explained by the fact that after the economic crisis, Ukraine began to export more agricultural raw materials to world markets, reducing the share of high value-added products. Therefore, the investment attractiveness of agriculture in the new economic conditions has become much higher compared to other sectors of the economy.
3. The weakness of state regulation of investment activity in agriculture is the lack of a balanced long-term policy of economic development, which turns Ukraine into an

agrarian state. The balance of payments deficit has been covered in recent years (2015-2019) due to exports of low value-added agricultural raw materials. Taking into account the fact that the world food market is constantly growing shortage of quality products, Ukraine has prospects to become a developed agro-industrial country in terms of stimulating investment in the processing of agricultural raw materials.

4. The pace of dynamics of foreign direct investment in agriculture is sharper than in the economy as a whole. This may indicate that foreign direct investment in the agricultural sector is quite resilient to changing economic conditions and the political situation in Ukraine, and therefore agriculture largely needs economic stabilisation and a balanced policy of state regulation.
5. During 2010-2019, the state policy of regulating investment activity in agriculture showed less interest in the fundamental and infrastructural principles of agricultural sector development. Instead, the main efforts of public authorities in recent years have begun to focus on targeted subsidy funding programs for agricultural producers. Measures of state regulation of investment activity in agriculture did not contribute to increasing the economic potential of agricultural enterprises. Instead, the indicators of production capacity and the book value of biological assets decreased, thus reducing the level of investment attractiveness of the agricultural sector.
6. The growth of expenditures to support the state regulatory authorities of the agricultural sector had a positive effect on the increase in investment within both multiple and pairwise regression (in x_1). There was a directly proportional relationship between the indicators. The state financial support of farmers had an ambiguous nature of impact on the volume of investments.
7. The state policy of VAT and public procurement reimbursement in 2010-2019 offset the positive impact of state financial assistance. Based on this, it is possible to make assumptions about the inefficiency of the use of the above instruments of state regulation of investment activity in agriculture. In turn, the implementation of public procurement by farmers, compared to the use of other instruments of state regulation of investment activities in agriculture, has no significant positive consequences.

In order to deepen the analysis of the effectiveness of state regulation of investment activities in agriculture, a correlation and regression analysis of the relationship between the following indicators:

- the resulting indicator: investment in agriculture (capital and foreign direct);
- factor indicators: these are the indicators shown further.

The initial data for the construction of the regression model are provided in Table 3.

The results of the regression calculation in the Stata program. All data are presented in a panel view. The results of starting regressions are provided in Table 4.

Table 3. Indicators for the analysis of the dependence of the return on investment in agriculture on the effectiveness of their state regulation in 2012-2019, mln USD

Indicators	Legend	Year							
		2012	2013	2014	2015	2016	2017	2018	2019
Investments in agriculture (capital and foreign direct)	Y	3083	2996	2356	1833	2429	2974	2929	2709
Investment efficiency ratio	x_1	0.82	1.88	0.99	1.09	1.08	0.87	1.12	0.90
Coefficient of efficiency of financial stimulation of investment development of agrarians	x_2	1.30	1.14	0.93	0.91	1.56	1.44	1.16	1.09
Coefficient of investment efficiency of VAT refund to farmers	x_3	1.04	0.87	1.21	1.19	1.01	0.98	1.26	0.93
Coefficient of investment efficiency of public procurement	x_4	1.28	1.24	1.20	0.82	3.09	0.66	0.85	0.96

Source: calculated by the authors according to the State Statistics Service of Ukraine (Indicators of enterprise…, 2019).

Table 4. The results of the regression analysis of the dependence of the return on investment in agriculture on the effectiveness of their state regulation

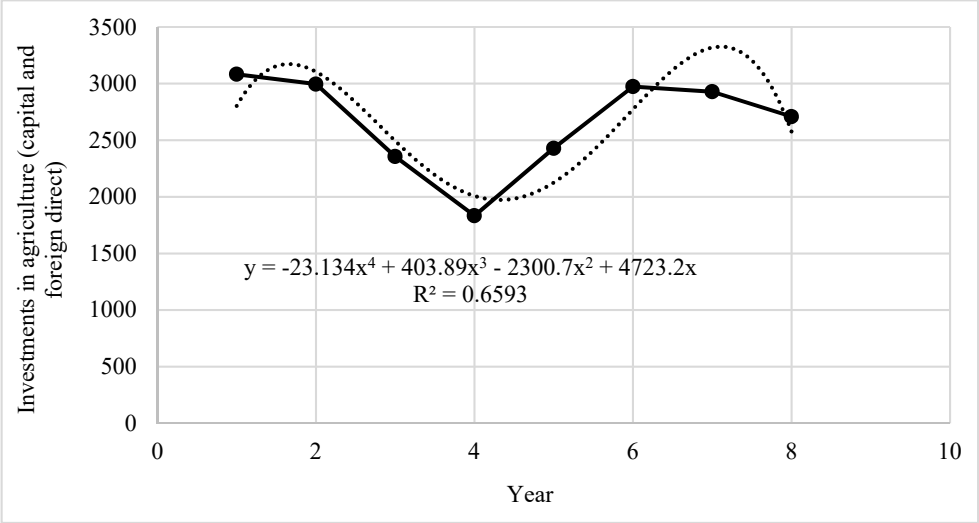
Regression parametres	Regression variations				
	Plural	Y from X_1	Y from X_2	Y from X_3	Y from X_4
R^2	0.5252	0.4069	0.3587	0.3056	0.2680
Fisher criteria	19.92 $F_{min} = 4.22$	17.15 $F_{min} = 1.25$	13.98 $F_{min} = 1.25$	11.00 $F_{min} = 1.25$	9.15 $F_{min} = 1.25$
Coefficients for variables $b^1 – b^4$	X_1: $b^1 = 0.918$ X_2: $b^2 = 1.229$ X_3: $b^3 = 4.140$ X_4: $b^4 = -0.126$	X_1: $b^1 = 0.995$	X_2: $b^2 = 0.405$	X_3: $b^3 = 2.501$	X_4: $b^4 = 0.261$
Probability of error $P^1 – P^4$	X_1: $P^1 = 0.356$ X_2: $P^2 = 0.236$ X_3: $P^3 = 0.345$ X_4: $P^4 = 0.582$	X_1: $P^1 = 0.000$	X_2: $P^2 = 0.001$	X_3: $P^3 = 0.003$	X_4: $P^4 = 0.006$

Source: developed by the authors according to the State Statistics Service of Ukraine (Indicators of enterprise…, 2019).

The performed regression analysis gives grounds to indicate the average level of probability of the relationship between the indicators in the framework of multiple regression. The value of R^2 is 0.5252. This indicates that the relationship between the level of return on investment in agriculture and the effectiveness of certain means of state regulation of investment activity is high. In this case, based on the data of Fisher's criterion (F-criterion), it is also possible to conclude that there is a stable relationship between the indicators. as its actual value is 19.92, which exceeds the minimum allowable value (4.22).

Let's analyse the obtained values of the coefficients for each variable. As shown in Table 4 and Figure 3 data, the level of impact of the effectiveness of state regulation using such means as financing of investment management bodies and financial incentives for investment development, is the highest compared to the effectiveness of other instruments of state regulation. Rising government spending on investment management and financial assistance to farmers has a positive impact on the dynamics of return on investment in agriculture.

Figure 3. Trend analysis of the dependence of the agriculture investment return on the effectiveness of its government regulation



Source: built by the authors.

According to the results of the values of multiple regression coefficients, we can say that the decline in investment efficiency of public procurement, in general, had a negative impact on the level of return on investment in agriculture. This may indicate the limited use of public procurement to stimulate investment processes in agriculture in the current macroeconomic dynamics.

However, a significant risk in this direction is the high level of corruption in public authorities (Table 5). The problem of corruption in Ukraine is a systemic phenomenon that is very difficult to fight. Overcoming it requires a significant investment of resources and time. Foreign investors understand this situation and therefore are often ready to work in Ukraine with the expectation of improving the business climate in the future. Positive incentives for them in this direction are such strengths of the agricultural sector of Ukraine as favourable natural and climatic conditions, skilled labour resources, a capacious internal market and a high level of openness of the national economy.

Thus the effectiveness of state regulation and development of investment activities in agriculture was assessed. Indicators of the ratio (results of agricultural enterprises to investment and public financial assistance to farmers) have been declining during 2015–2019. This indicates a decrease in the level of effectiveness of public investment policy in agriculture. According to the results of correlation and regression analysis, it can be stated that the relationship between the level of profitability of investment in agriculture and the effectiveness of certain means of state regulation of investment activity is high. The level of impact of the effectiveness of state regulation using such means as financing of investment management bodies and financial incentives for investment development is the highest compared to the effectiveness of other instruments of state regulation. Rising government

spending on investment management and financial assistance to farmers has a positive impact on the dynamics of return on investment in agriculture.

Table 5. The main areas of use of opportunities and counteraction to threats in the field of state regulation and development of investment activities in agriculture

	STRENGTHS (S)	**WEAKNESSES (W)**
OPPORTUNITIES (O)	SO1. Further improvement of state policy in the field of transport infrastructure regulation. SO2. State promotion of agro-industrial clusters. SO3. Improving the mechanisms of state assistance to innovative development.	WO1. Formation of mechanisms for attracting investments in transport infrastructure. WO2 Promoting the development of state energy conservation policy, in particular green technologies in agriculture. WO3. Ensuring the sustainability of macroeconomic development and opportunities for financial assistance to the agricultural sector.
THREATS (T)	ST1. Resumption of the international program of cooperation with the IMF public debt restructuring. This is a necessary and exclusive condition for foreign investors. ST2. Intensification of work on the full functioning of the agricultural land market. ST3. Resolving the full-scale Russian military aggression on favourable terms for Ukraine.	WT1. Counteraction to corruption in public authorities further fight against corruption. WT2. Development of mechanisms to stimulate the export of agricultural raw materials, in particular the restoration of the VAT refund regime for exports. WT3. Strengthening reforms in the field of social policy in rural areas, promoting the formation of demographic potential in rural areas.

Source: Systematised by the authors on the basis of sources (Eze et al., 2020; Morkunas et al., 2018; UNCTAD, 2019; Karkovska, 2009; Oleksiv & Podolchak, 2005; Sumets et al., 2022).

4. Conclusion

Thus, summarising the results of the study, the effectiveness of state regulation of investment activities in agriculture was assessed. Indicators of the ratio (performance of agricultural enterprises to indicators of investment and public financial assistance to farmers) have been declining during 2015-2019. This indicates a decrease in the level of efficiency of public investment policy in agriculture.

Taking into account the main economic indicators, the legitimacy of the use of a number of relevant efficiency ratios is substantiated. The overall efficiency ratio of state regulation of investment activity in agriculture is defined as the ratio of the growth rate of investment in agriculture to the growth rate of budget expenditures to finance government agencies that regulate investment processes. If the value of this indicator is less than 1, it indicates a declining dynamics of the efficiency of investment regulation, and conversely, if the value of the indicator exceeds 1, the dynamics of the efficiency of state regulation is ascending. In this context, in 2017-2019, the level of efficiency of investment regulation decreased to 0.870-0.897, which indicates a decrease in the return of state resources, at the expense of which the bodies of state management of investment processes in agriculture were financed.

According to the results of correlation and regression analysis, we can say that the relationship between the level of return on investment in agriculture and the effectiveness of certain means of state regulation of investment activity is high. The level of impact of the effectiveness of state regulation with the use of such tools as financing of investment

management bodies and financial incentives for investment development is the highest compared to the effectiveness of other instruments of state regulation. Rising government spending on investment management and financial assistance to farmers has a positive impact on the dynamics of return on investment in agriculture.

A promising area for improving state regulation of investment in agriculture should be the formation of a single central body with authority to organise and control the implementation of the state strategy for agricultural development, as well as coordinate the work of various ministries and agencies responsible for attracting foreign investment.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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Genka Rafailova[1]
Zlatka Todorova-Hamdan[2]
Hristina Filipova[3]

DEVELOPMENT OF A HUMAN-CENTRIC MODEL FOR ASSESSMENT OF SMART AND SUSTAINABLE TOURISM DESTINATION[4]

The goal of this article is to present a methodology for assessing smart and sustainable destinations' development. There are plenty of studies on the determination of concepts and models of smart destination and smart tourism. But to implement them, there is a need for initial knowledge of the status quo and opportunities for comparing best practices and similar destinations. The management of tourist destinations needs an instrumentarium for assessing the achievements and status in regard to the model of smart destinations. The focus should be on the use of strategic-oriented development in the course of the evolution of technology infrastructure, infostructure (Buhalis, 2020, Gretzel et al., 2015) and pool of knowledge and skills, as well as their interrelations with sustainability. This paper augments theory and practice with a methodology that can be used for the elaboration of a strategy for smart destination development based on sustainability and a human-centric approach. The presented methodology in the article includes a model of a smart, sustainable destination and is applied in the case study. The strategies and development of tree cities are researched.
Keywords: smart destination; sustainable development; human-centric approach; smart city
JEL: L83; O20; Q01; Z32

1. Introduction

The goal of this article is to present a methodology for assessing destination development as smart and sustainable. There are plenty of studies for the determination of concept and model of smart destination and smart tourism. Based on them, there are strategic programs and initiatives oriented to the development of smart tourism and smart destinations (Femenia-

[1] *Genka Rafailova, PhD, Associate professor, University of Economics – Varna, +359879335580, e-mail: genka.rafailova@ue-varna.bg.*
[2]*Zlatka Todorova-Hamdan, PhD, Chief assistant professor, University of Economics – Varna, +359884272720, e-mail: zlatka.todorova@ue-varna.bg.*
[3] *Hristina Filipova ,PhD, Chief assistant professor, University of Economics – Varna, +359888313587, e-mail: h.filipova@ue-varna.bg.*
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Serra, Perea-Medina, 2016; Ivaras-Baidal, Hernandez, Mendoza de Miguel, 2019). But to implement a well-defined concept of smart destinations, there is a need for initial knowledge of the status quo and opportunities for comparing with best practices and similar destinations. The existing research in smart destination development defines approaches to apply innovative digital technologies and create a smart ecosystem (Gretzel et al., 2015), and their role in enhancing the tourist experience (Buhalis, Neufor, 2014; Lopez de Avila, 2015) and quality of life of local residents (Ivars, 2016; Ribes, Baidal, 2018). Other topics include exploring an interrelation between smart destination and sustainability, taking into account mainly ecological aspects (Gonzales-Reverte, 2019; Pawlikovska-Piechotka et al., 2016); analysing policy and practice in smart development of cities and destinations (Vargas-Sanches, Abbate, Perano, 2019); determining and explaining a collaborative value creation in the framework of S-D logic theory (Xiang Li, Younpeng li, 2013; Boes, Buhalis, Inversini, 2016). In plenty of research, the smart destination concept has evolved from the idea of smart cities. It is important for the orientation of smart tourism development to achieve enhanced tourist experience and quality of life for the local community. At the same time, there are methodologies with indexes for measuring the smartness level of cities and comparing them. The management of tourist destinations needs an instrumentarium for assessing the achievements and status determined by the model of smart destination. The focus should be on the use of strategic-oriented development in the course of the evolution of technology infrastructure, infostructure (Buhalis, 2020; Gretzel et al., 2015) and pool of knowledge and skills, as well as their interrelations with sustainability. The development of smart destinations has to be connected with the competitiveness and attractiveness of tourist destinations. The methodology is developed in the context of S-D logic theory, which places knowledge and skills at the core of value creation and competitiveness (Vargo, Lusch, 2008); smart and sustainable development as well as the theory and practice of Destination Management & Marketing and smart cities policy. This paper augments theory and practice with a methodology that can be used for the elaboration of a strategy for smart destination development based on sustainability and a human-centric approach. The presented methodology in the article includes a model of a smart, sustainable destination and is applied in the case study. The strategies and development of tree cities are researched.

2. Theoretical Background

2.1. Smart destination and smart cities

Smart destination is a concept of applied principles of smartness and pillars of a smart city in tourism. Smartness, defined as an innovative approach to solving problems based on a combination of knowledge in a variety of areas, real-time information and digital support of AI, machine learning, modelling, visualisation (Gretzel, 2015; Vargas, 2016) etc. The concept of smart city is developed with the growth of urbanisation (Lee, Hunter and Chung, 2020; World Bank, 2020) and density of the towns, and the need for overcoming their negative consequences – pollution, heavy traffic, stressful life for citizens, over-exploitation of resources etc. That requires complicated urban planning and a new approach of governance, based on a wide variety and quantity of data and knowledge, predicting models and balance of stakeholders' interests, including residents. The goal is, through the

digitalisation of infrastructure and city governance, to heighten the quality of life, to optimise the resources management and create an urban place harmonised with the environmental policy. Over the years, smart cities have become the symbol of ICT – driven urban innovation and development and have attracted the increasing attention of university researchers, governments, and businesses (Mora et al., 2017). Areas of smart city development are smart governance, smart mobility, smart living, smart economy and smart environment (Boes, Buhalis, Inversini, 2016; Giffinger et al., 2007; Winkowska J. et al., 2019; Lee et al., 2013; Caragliu et al., 2011). The most relevant area to this study is smart government. It uses big and open data and shares the decision-making process with stakeholders (Buhalis, Amaranganna, 2014; Gretzel, 2018).

The smart destination concept is developed with the dynamic evolution of ICT first to contribute to solving and preventing urban problems associated with tourism growth, such as pollution, overcrowding, heavy traffic and congestion, and second to allow effective networking of stakeholders (government, tourist business, cultural institutions, transport operators, NGO's), to create a greater tourist experience and living standard for residents.

According to Gretzel et al. (2015), the basis of smart destination development is "integrating ICT into physical infrastructure" and transforming data into an enriched experience: "the smart tourism destination (STD) can be defined as a tourism system that takes advantage of smart technology in creating, managing and delivering intelligent touristic services/experiences and is characterised by intensive information sharing and value co-creation".

Components of smart destinations are divided into hard and soft smartness (Gajdosik, 2017; Kulualp, Sari, 2020; Vargas-Sanches et al., 2019). Hard smartness is the foundation of smart tourism and destination development, embracing digital infrastructure, roads and buildings equipped with ICT, communication networks, platforms etc. The engine of smart destination development is the soft smartness expressed by data, connections, intelligence and knowledge, open innovation etc. According to Boes, Buhalis and Inversini (2016), only "intertwined and interconnected ICT, people and leadership within the ecosystem can contribute to the smart tourism destinations".

A Smart (business) ecosystem is an ecosystem which contributes to the competitiveness and growth of stakeholders by allowing them to share information, knowledge, resources and support, easy networking and participation in value co-creation processes (Gretzel, 2015; Boes, Buhalis and Inversini, 2016). The premises for this ecosystem are ICT, mainly the Internet of Things, tags, sensors, beacons, RFID etc. (Gretzel et al., 2015; Wise, Heidari, 2019). But only "dynamically interconnected" (Buhalis, Amaranganna, 2014) are actors such as businesses, governments, institutions, local communities and travellers, who collaborate and are open to an exchange of information, services and resources, construct and evolve it. Smart destination management supports this process through participative actions.

In theory and applied research, there are a variety of approaches and methodologies for the study, determination and evaluation of smart destinations. Based on components of smart destinations, most of them analyse and measure areas such as digitalisation, innovation, sustainability, connectivity, mobility in destinations, smartness and openness of its government. Invaras-Baidal et al. (2021) use three levels of indicators for smart destination

explanation and evaluation – strategic-relational (governance, sustainability, innovation and accessibility), instrumental (connectivity and intelligence) and applied (online marketing, information and performance). The European Commission uses four categories of indicators for awarding European towns as The European Capital of Smart Tourism (Smart Tourism Capital, 2019; Smart Tourism Capital, 2022) – digitalisation, sustainability, accessibility and creativity. They are based on SEGGATOUR (Segittur, 2015) pilot areas of smart tourist destinations. There are indexes for smart cities rankings[5], in at least 6 groups, such as environment (natural and built, water and waste, energy, technologies), society (culture, innovation and science), social cohesion, economy, mobility (inc. transportation), government, and quality of life (well-being, education, health and safety etc.). The existing and applied indicators are a good foundation for creating an assessment methodology for the status and progress of destinations' smart development, which is needed for strategy elaboration.

2.2. Sustainable development and smart destination

The concept of a smart destination consists of several intertwined elements. One of them is sustainability. Scientists have opted for different approaches in order to describe the correlation between the two concepts: smart and sustainable and their role in the development of the tourism destination.

According to González-Reverté (2019), there is a direct link between them. Theoretically, a destination can be considered intelligent if it is also sustainable. Nevertheless, in practice, this is not always the case. Most of the time, sustainability is underrepresented in the strategies of smart cities. The authorities should include this variable more actively on an operational level. The connection between the two approaches – smart and sustainable destination lies in the strategy of the destination and the implementation of technologies for more effective environmental management (Ribes, Baidal, 2018). A good conceptualisation of this statement is given by SEGITTUR (State Company for the Management of Tourism Innovation and Technologies in Spain) through their definition of the smart tourist destination. According to them, this is an innovative tourist destination, based on an infrastructure of modern and well-developed technologies, that ensures the sustainable development of the tourist area, facilitates the tourists' interactions, increases the quality of the experience at the destination and also improves the quality of life of the locals.

Shafiie et al. (2019) develop and propose a model for sustainable smart tourism destinations in which the two terms sustainability and smartness are important determining factors. The authors use the grounded theory method as a framework for their analysis. The aim of their systematic review is to explore the different aspects of smart tourism destinations and to develop the foundations of sustainable smart tourism destinations in order to create a conceptual model. Creating their model, Shafiee S. et al. (2019) conclude that when society utilises modern technologies for the economic and social prosperity of tourist destinations, they become factors for the successful development of smart destinations. They are considered important as a facilitating condition and stimulus affecting the dynamics of

[5] ISO indicators, European Smart cities Index, Cities in Motion, IMD Smart City Index.

destination development. In their presentation, the sustainable smart destination is a logical consequence of external factors. These casual conditions, along with context conditions such as economic and financial factors, technical and infrastructural factors, environmental factors and social and cultural factors, as well as intervening conditions such as government support, influence a wide range of actions within the concept of a sustainable smart tourism destination. They are categorised into 4 distinctive groups: Environmental Actions, Economical Actions, Social Actions and Technical Actions (Shalfie et al., 2019). They lead to several consequences related to a better quality of life and experience for local residents and visitors alike. However, sustainable development remains a focal point of the model. The current research paper suggests a change in the model-building process by applying a human-centric approach in the assessment of a smart and sustainable tourism destination. Although detailed, this model is rather static. The evolution of a sustainable smart tourism destination is an ever-evolving and complex process. There is a dynamic link between the factors influencing growth and the actions taken. Within the framework of the destination, the amelioration of the quality of life of the locals and the experiences of the tourists, among others, should not be considered as a simple consequence but rather a preset strategic goal.

Ribes and Baidal (2018) introduce a synergetic model incorporating smartness and sustainability. It has a more human-based approach. The tourist experience, as well as the well-being of the local residents, lies on the objective level of the concept. In this model, smartness is connected to sustainability via different technologies. They influence five destination areas. They are planning, efficient management of resources; monitoring transparency and participation, public-private cooperation, knowledge, innovation; and communication, awareness raising and the improvement of the tourist experience (Ribes, Baidal, 2018). The improvements proposed by the authors suggest more tourists, but with less intensive consumption of resources and with a less negative impact on the environment. This model is once again less dynamic. It shows the link between the two concepts, but the role of the various parties involved (government, locals, tourists and others) within the tourist destination is not evident, as well as the opportunities for their prosperity.

Many of the existing models related to sustainable smart tourist destinations focus on tourism competitiveness, rather than applying the principles of sustainability (González-Reverté, 2019). Their focus also shifts from the social dimensions of the concept. The direct impact on all of the involved parties is less researched. Tourists, locals and authorities should remain a vocal point in the model for a sustainable smart destination.

2.3. Destination Management

Destination management is oriented to the enhancement of destination competitiveness and attractiveness. To achieve that DMO focus on developing 6 “A” components of the tourism destination – attractions, amenities, available packages, accessibility, activities and ancillary services (Buhalis, 2000). But there is still a lack of enough theoretical explanation for the existence and character of a connection between the development of smart destinations and their level of competitiveness and attractiveness for tourists. Today, that insists, from one side, to be developed, supported and managed in the context of sustainability and smartness

(Gajdosik, 2018). On the other side, there is a need to connect the smart development of a destination with its attractiveness for tourists, residents and business.

2.4. S-D logic theory

S-D logic theory is fundamental for explanation and planning smart development because of its premises. Value co-creation by multiple actors (Kryvinska, Strauss, Olexova, 2013), always including the beneficiary and all social and economic actors are resource integrators. The smart tourist experience is based on the value of co-creation (Neuhofer, Buhalis and Ladkin, 2014). Value proposal is oriented to tourists in the context of their surroundings, behaviour and personality, and unique because of their contribution to it. Buhalis (2015) suggests that "interoperability and ubiquitous computing ensure that everybody is interconnected and processes are integrated towards generating value, through dynamic co-creation, sustainable resources and dynamic personalisation and adaptation to context". But that happens in a network of actors – businesses, residents, government, institutions and associations, who exchange services and at the same time consume them. Using S-D logic theory as an instrumental framework guarantees a human-centric approach to smart destination development or development oriented to the needs, rights and benefits of tourists, residents, and society. At the same time provides opportunities for collaboration between different stakeholders which enriches the social capital and stimulates innovation and enhances "collective intelligence" (Buhalis, 2020).

3. Methodology of Research

The methodology of research in the current paper comprises qualitative research with a review of articles, policy documents and programmes for sustainable and smart destination development and a case study. Theoretical analysis is useful to find pillars for elaborating a model for a smart, sustainable destination and, respectively, the measuring indicators. The case study is used to apply the elaborated model and to determine its workability.

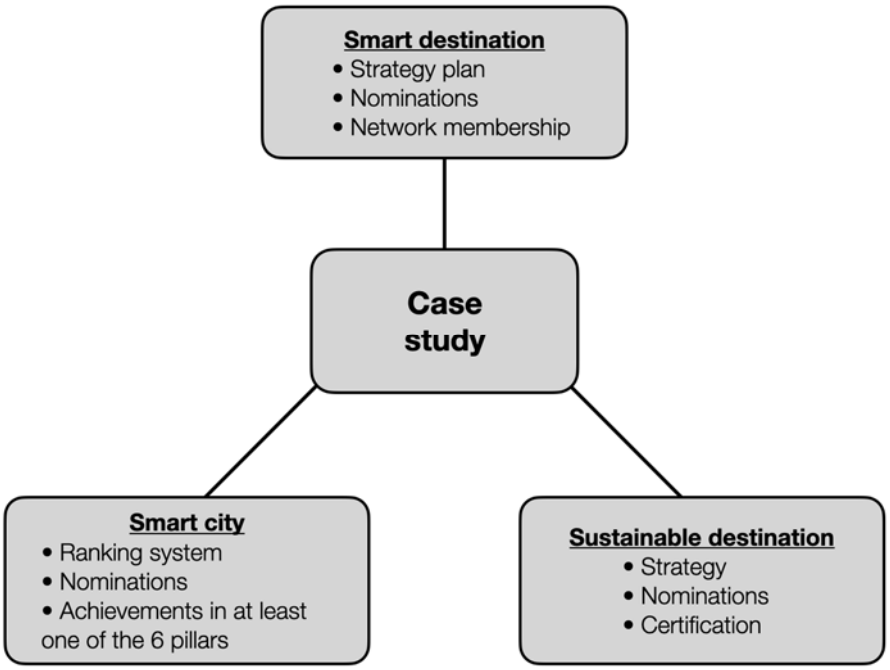
The theoretical review was implemented in three steps. First, scientific articles in ResearchGate, Web of Science and Scopus in areas of "smart cities", "smart destinations and smart tourism", "sustainable development of destinations" and "S-D logic theory" were collected and classified according to the keywords and topics. Then their abstracts were reviewed and selected, which present an intersection between at least two of the areas and at the same time, are relevant to the goal of this research. At the end, selected articles were analysed and a theoretical base was extracted. This review was used to find out and classify good practices in smart cities and destinations.

The inspection of policy documents and programs was online. First, it was implemented through found examples of good practices in smart cities and destinations, as well as in sustainable development. The ranking systems for smart cities, smart tourism destinations and sustainable destinations in 2020, 2021 and 2022 were surveyed. The available strategies and policies of the first 10 nominated or awarded places in Internet databases were

researched. If there was no access to documents and the date of one of the cities or destinations in the top ten, it was skipped to the next one in the list.

The case study is applied because of its advantages as a research method to study in depth very dynamic and relatively new areas of theory and practice as well as to implement and check elaborated concepts and models. The first criterion for the selection of places for the study is their presence in the ranking systems for smart and/or digital, sustainable and/or green city and tourist destinations. The second criterion is to be marked with official strategies, programs, processes and achievements in 3 areas – smart city, smart destination and sustainable destination (see Figure 1).

Figure 1. Areas of selection criteria for case study



Source: Authors elaboration.

4. Methodology for Assessment of Smart Sustainable Destination Development

4.1. Premises for the methodology

Applying the smart destination concept in destination management contributes to an enhanced experience for tourists and better quality of life, mainly from a hard smartness view – digitalisation and developed infrastructure for mobility and accessibility. But it is still questionable if that is strategically oriented and explicitly interconnected with sustainable development. Tourists in smart destinations can enjoy a better experience thanks to real-time, personification and context-aware information, connectivity with surroundings and easy

mobility. Nevertheless, they need an environment and services which allow them to fulfil their travel purposes and desires, such as relaxation, enrichment, entertainment etc. Even though one of the premises of STD is a better quality of life for citizens, there should be a guarantee that residents are involved in development of their living place and co-creation of the tourist experience in an enjoyable way. They need knowledge and capability to participate in these processes and contribute to smart development. The sustainability of smart destinations is mainly presented by measures for environmental protection and energy efficiency, which are not enough. From a strategic point of view, they should be locally determined and connected with policy for combating climate change, sustainable models of urban development, management of local resources and local community growth. There is a call for a goal which expresses an integrative view for STD development – as a tourist place, urban space, space for living, working and economic prosperity, for community life and values, environmentally friendly, decoupled from factors impacting climate change.

Applying the concept of smart destination first at all insists on assessing achievements, compared with the best practices, which can allow taking strategic decisions on what to be developed in a local context. The indicators for smartness can be used, but they should be subordinated to the integrative goal and idea, which reflects the smartness concept and human-based approach. There is a demand for a framework for assessment indicators, which is based on smart destination principles, oriented to sustainable development and focused on human aspects. They have to measure the status and progress of smart development in relation to forming a smart ecosystem, based on S-D logic, which guarantees effective collaboration between different actors – residents, tourists, tourism and other stakeholders. In order to accomplish the above-mentioned, the article presents a model for a smart and sustainable destination.

4.2. Model of smart sustainable destination development

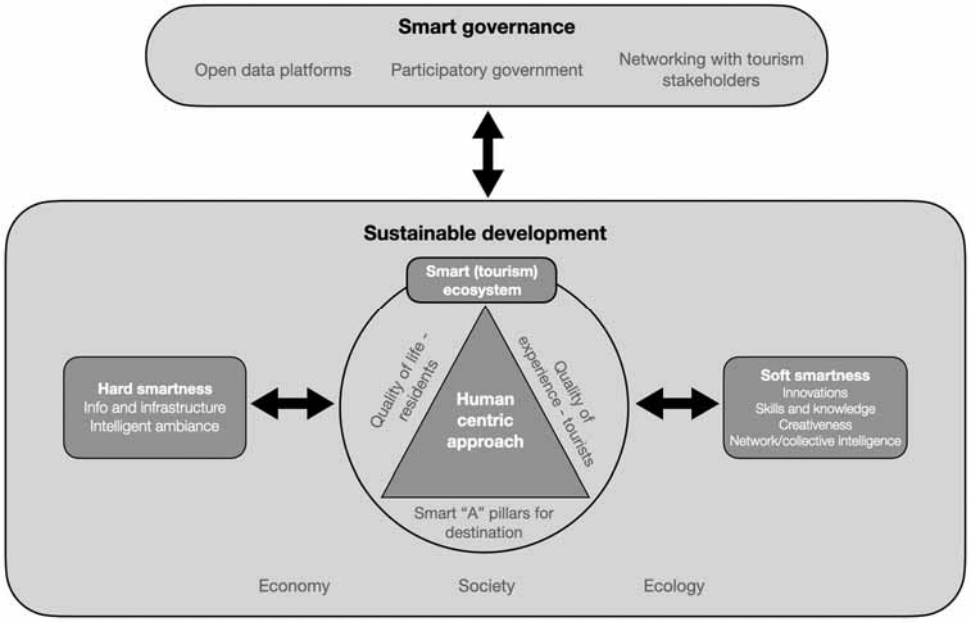
The theory and study for smart destinations give us the dimension for its application and realisation, expressed in developing a smart ecosystem (Vargas-Sanches, 2016; Dogra, Kale, 2020), based on the interrelation of hard and soft smartness and created, supported and managed by a smart government with a purpose to enhance the quality of life, tourists experience and destination competitiveness (see Figure 2).

Smart government shares information and resources and uses big data and open innovation to involve all stakeholders in the decision-making process, planning, monitoring and control. Smart government, together with business, residents, education and science, develops, supports and regulates hard smartness and soft smartness in the context of sustainable development, which guarantees strategic aspects of its policy. Evaluation of progress and status is through 3 categories of indicators – digitalisation, sustainability orientation and participatory.

Infrastructure with integrated ICT and developed infostructure shape hard smartness. Investments in smart technologies and their implementation are oriented to the construction of an "intelligent ambient", which allows and stimulates innovation and creative processes in the context of sustainable development. That insists hard smartness be developed in

combination with soft smartness. The last is determined by innovations such as ideas, products, technologies, enterprises and a combination of them; skills and knowledge, and creativity of residents, tourists and businesses. The indicators for hard smartness are digitalisation, sustainability and human approach. The indicators for soft smartness are intelligence, creativeness and innovativeness in the context of sustainability.

Figure 2. A model of smart sustainable destination



Source: The figure is elaborated by the authors, based on Gretzel et al. (2015), Boes, Buhalis and Invarsini, (2016), González-Reverté (2019); Vargas-Sanches et al. (2019); Invaras-Baidal et al. (2021).

A result of smart governance and developing hard and soft smartness connected with sustainability is creating a sustainable smart (tourism) ecosystem which allows all stakeholders to be involved, connected and interact with each other. The smart ecosystem gives opportunities and stimulates tourists and residents to co-create tourist products, share values and have enjoyable experiences. At the same time, the attractiveness of the destination is protected and evolving, and stakeholders are prospering. This ecosystem contributes to a rising quality of life and allows the operant resources to be used as a source of destination competitiveness (Wang et al., 2013) and success of destination management. The pillars of destination attractiveness have to be developed and managed in a smart and sustainable way. The indicators are connectivity, sustainable mobility, satisfaction of citizens and tourists, and destination competitive positioning.

5. Case Study

The aim of the case study is to apply the developed model for smart, sustainable destinations in three selected worldwide cities based on their strategies for smartness and sustainability. The selected cities are Copenhagen, Bordeaux, and Seoul (see Table 1), according to the criteria that places have to be nominated or awarded, as well proceed official strategies and programs in the following areas – smart cities, smart destinations and sustainable destinations (see Figure 1).

The selection process (Pozdniakova A, 2017) includes 3 steps:

1) Reviewing indexes that measure smartness and sustainability (IMD Smart City Index) (IMD, 2021), Quality of Life Index (Numbeo, 2022), SDG (Sustainable development Goals) Index score (Sustainable Development Report, 2019) (see Table 1);
2) Awards and nominations for European Smart Tourism Capital and
3) Finding out the existence of official city policy and/or formally adopted SSC (Smart and/ or sustainable cities) strategies and responding to the general SSC concept (Pozdniakova, 2018).

Table 1. The ranking of Copenhagen, Bordeaux and Seoul

City	IMD, Smart City Index 2021	Awards and nominations	Quality of Life Index, June, 2022	SDG (Sustainable Development Goals) index score, 2019
Copenhagen	7 (rating A)	European Smart Tourism Award '2019 for outstanding achievements in digitalisation	185,69 (very high)	68,7
Bordeaux	32 (rating BB) new in the ranking	European capital of smart tourism 2022	167,09 (very high)	62,6
Seoul	13 (rating BBB)	-	125,74 (moderate)	77,9 (for South Korea)

Source: The table is elaborated by authors.

The IMD Smart City Index assesses the perceptions of residents on issues related to structures and technology applications available to them in their city. Cities are grouped based on the HDI (Human Development Index) score. Group 1 is considered to have the highest HDI level with AAA-AA-A-BBB-BB.

The Quality-of-life Index (highest value is 240) shows the quality of life by measuring important criteria such as safety/crime, health care, climate, cost of living, public transport/traffic, pollution etc.

The SDG index score measures the total progress of a city towards achieving all 17 SDGs. The score can be interpreted as a percentage of SDG achievement. As very high achievement is considered > 70, the next levels are 65-70 and 60-65.

The three cities Copenhagen, Bordeaux and Seoul are situated in different geographical areas, with different types of planning legislation and administration. The arguments for choosing

Copenhagen and Seoul are related to the fact that both cities have well-established policies, related to smart tourism and many achievements in the field of smartness and sustainability (see Table 1). Copenhagen is rated 7th place according to IMD Smart City Index for 2021 and awarded for its achievements in digitalisation in 2019 (Smart Tourism Capital, 2019). Seoul is rated 13th place as a smart city for 2021, but it is distinguished by government policy and program for digitalisation. Bordeaux, on the other hand, is a special case with its prosperous city background, dynamic development and significant achievements in smartness and sustainability. This is proven both by the Award and nomination for European capital of smart tourism 2022 (Smart Tourism Capital, 2022) and by the recognition, including for the first time Bordeaux in the IMD Smart City Index 2021, putting Bordeaux straight on 32nd position.

COPENHAGEN

Copenhagen (population 1 350 000) is the largest city in Denmark, with awards that honour the city as: European Green Capital (European Union); the Most Livable City in the World (Monocle, 2021); the most advanced city in the world in terms (Smart City Expo World Congress, Barcelona) etc.

Copenhagen is the most popular city in Denmark for international travellers. In 2019 it reached 73rd place among the world's most popular cities, with 3.19 million tourists (WorldData.info, 2020a). The total number of arrivals in tourist accommodations in Denmark for the same year is 8,3 million arrivals (Statista, 2020a), so Copenhagen has 39% of all tourists arriving in Denmark. The number of overnight stays of tourists in Denmark's regional destinations in 2019 shows that the urban area of Copenhagen had the most overnight stays of tourists, reaching over 10.9 million overnight stays (2019 – total 33,09 million overnights in Denmark) (Statista, 2020b).

Smart Governance

Copenhagen's smart city approach is strongly anchored in the three main objectives of achieving carbon neutrality by 2025; creating a greener, more sustainable, and more livable capital city; and supporting economic growth.

Proposed to strong decentralisation, the Danish basic data program introduces the once-only principle, under which, for example, public authorities cannot ask citizens for the same data provided earlier, savings yielded by this program reached around thirty-five million euros by 2020 owing to the decrease in administrative costs.

Hard smartness

Smart Info and Infrastructure is developing under Smart city integration progress (Quelin, Smadja, 2021):

- Development of an intelligent traffic systems framework (to ensure that 75 per cent of all trips within the city should be taken by bike, public transport, or on foot; Denmark is known as a "bike nation", and over one million journeys are taken by bike in Copenhagen every day – efforts to provide better conditions for cyclists;

- Copenhagen Intelligent Traffic Solutions (CITS) platform consists of a network of Wi-Fi access points that can geolocate Wi-Fi-enabled devices on the streets without compromising privacy and monitor traffic in real time;
- Recycling services: Denmark aims to be recycling 70 per cent of all its waste by 2025, and it produces a comparable per-person rate of municipal waste;
- Housing and energy: The city is seeking to reform its current building stock so that it makes smarter use of energy by decreasing the electricity usage of all buildings by up to 10 per cent and reducing their heat consumption by 20 per cent by 2025;

Soft smartness

- Employment-finding services: Denmark characterises its labour model as one of "flexicurity" (OECD Better Life Index, 2021). The model allows employers to easily hire and fire employees, to adapt to marketplace conditions and gives employees a secure safety net;

Quality of life

According to the OECD, Denmark is among the best places to live (see Table 2) in terms of the work-life balance that it offers (OECD Better Life Index, 2021).

The city is best explored by bike using one of the world's most developed bike-path systems. The high standard of living, easy access to the Internet, modern metro system and thriving business environment attract talent from all over the world.

Quality of tourist experience

The municipality of Copenhagen is the leading tourism region in Denmark by turnover. It ranked first in 2018 with 33,4 billion Danish Kroner (or 4,7 billion dollars) (Statista, 2021).

The contribution of travel and tourism to the GDP (% of GDP) of Denmark grew by 0.27 % from 8.1 % in 2018 to 8.2 % in 2019 (Knoema, 2021). Within 24 years, the country's dependence on tourism has increased noticeably, as in 1995, tourism revenue was about 2% of the gross national product. In the first 6 months of 2022, Tripadvisor has 669558 reviews (Tripadvisor, 2022a) of Copenhagen hotels, restaurants and attractions

Smart tourist business and pillars of destination

- Wonderful Copenhagen, the city's official tourism organisation, declared 2017 the end of tourism as we know it. So, tourism would be considered a means to a more sustainable future, so both the city and visitors alike can benefit.
- The visitors are guided around with the help of AI technology;
- Innovative technologies such as moving posters, robotics, or VR goggles are some of Copenhagen's best attractions;
- Tourists can take advantage of the city's app, which guides users between attractions. Within the app, a tracking module helps the authorities to understand better movement

patterns both around the city and at attractions on the outskirts. The collected data is helping to improve services continually.

- An app offers self-guided tours through local Copenhagen neighbourhoods, meaning tourists get to see the "real" side of the city.

BORDEAUX

Bordeaux metropolis (750 000 residents) is France's 6th largest urban area and the most attractive city in France to live and work (Foncière des régions report, 2014), having undergone a thorough urban and economic metamorphosis. Designated by UNESCO as a World Heritage Site and recognised as the world's major wine industry capital representing around half of the local economic base, Bordeaux is also one of the leaders in higher education and a pioneer in digital and green development.

Bordeaux is announced as the winner of the European Union's competition for the European Capital of Smart Tourism for 2022 (European Commission, 2021), presenting remarkable achievements in all four categories of the competition.

Smart Governance

Bordeaux has opened its data portal with high transparency. An open data portal is the quickest and simplest way to communicate information.

Hard smartness

Bordeaux is part of one of 16 pilot projects selected through SynchroniCity (Open&Agile Smart Cities, 2019), one of the IoT European Large-Scale Pilot Projects, which started in 2019. With the experience from SynchroniCity, the city expects to complete the cycle on a technical level between the sensors connected to the urban data platform and the applications, which provide citizens with better digital services.

The management of the intelligent city of Bordeaux includes initiatives for digitalising the urban infrastructure, such as developing smart parking, smart lighting, and smart buildings. A system called Things as a Service (TaaS) (Kerlink, (2019) was installed in a smart-city trial system in Bordeaux. The pilot program was recognised by Solutions Numeriques magazine with the Digital Transformation Trophy in 2019. The deployment included approximately 500 sensors connected to more than 200 public streetlights, e-vehicle charging stations, refuse-sorting containers, waste bins and public buildings.

Soft smartness

In Bordeaux, there are unique advantages to studying. As an educational centre, it has a great student atmosphere and gives an opportunity to supplement the educational level with knowledge and skills that can be used in various future careers in the food and hospitality industry. Bordeaux has become one of the favourite Erasmus destinations for international students. Bordeaux also pays attention to young people and their problems. Such an example is Pixpay's Teenage Lab which is exploring the habits of young people and is offering solutions to support them.

Quality of life

Bordeaux is a good place to live, with high ratings in housing, safety and healthcare. Bordeaux is considered a very tolerant and relaxed place. The city attracts with the cheaper-than-Paris cost of living, good weather, excellent transportation system, proximity to the Pyrenees (for skiing in the winter), and UNESCO World Heritage status.

The Agora Tourism Bordeaux website – residents, visitors and tourism professionals can share their ideas and opinions to build the tourism and events of tomorrow.

The Bordeaux metropolitan area is considered attractive by 98% of its residents: interesting architecture that gives it elegance, a particularly high-quality range of shopping and restaurants, and an ideal geographical location. Most inhabitants in the metropolitan area support tourism.

More and more residents believe that the development of tourism in Bordeaux has a positive impact. Tourism is perceived as a driving force – 68 % of the residents in 2021 voted positive on culture and leisure offer (in comparison to 2018 – 64 %) (Agoda Tourism Bordeaux, 2021) and 58 % voted positive on infrastructures (55 % in 2018). 14% of the residents (2021) believe that the development of tourism in Bordeaux has a positive impact on their quality of life (7% in 2018). According to the same study for 77% of residents, it is important to support the tourism industry to boost the economy. Six out of ten residents say they would be willing to help welcome visitors. 62% of Bordeaux inhabitants think that "Bordeaux must continue to promote itself in order to attract tourists".

Quality of tourist experience

The Bordeaux metropolitan area saw a significant improvement -78 % score (or +34 points compared to 2019) in its second year of taking part in the Global Destination Sustainability Index 2021, which analyses the environmental and social performance of the local territory and the sustainable commitment of partners and the Tourism and Convention Office.

- 4 million stays in Bordeaux in 2021, mainly French tourists (Agoda Tourism Bordeaux, 2022);
- 16.4 million overnight stays recorded in Bordeaux Metropole in 2021;
- 80% of the overnight stays – by French people, 20 % – by foreigners (18% of them Spanish, 15% – British, 9% – German);
- 16 000 private-sector jobs linked to tourism in Bordeaux Metropole;
- In 2021 59% of customers in paid accommodations came for business, 41% – for leisure;
- The attractiveness of the destination (Agoda Tourism Bordeaux, 2022);
- 2 million wine tourists in the Bordeaux wine region in 2018 (average production of 5 million hectoliters of wine per year);
- 1.1 million visitors to museums and exhibition spaces in 2019 (638 000 in 2020);
- 42 097 river cruise passengers in 2019;

- 1 734 congresses hosted in Bordeaux in 2021 and 97 million Euro million in economic benefits from hosting these congresses;
- Overall satisfaction index for Bordeaux – 210 points, which is slightly higher than the Eurocities standard (+7 points compared to the average of 203 points), according to the 2019 TCI Research visitor satisfaction survey.

In the first 6 months of 2022, Tripadvisor has 461 856 reviews of Bordeaux hotels, restaurants, and attractions. Among the first 10 activities in France, according to Tripadvisor, is Saint-Emilion Electric Bike Day Tour with Wine Tasting&Lunch (Tripadvisor, 2022b) in 5th place.

Smart tourist business and pillars of destination

Bordeaux takes action to encourage positive tourism, according to the 3 pillars of sustainability: economical, environmental, and social. Good examples are Bordeaux Trip, which proposes guided tours of the Gironde capital on electric bikes; a slow tourism experience with Ataho, a local tourism organisation, that offers outdoor micro-adventures; a "clever bike tour" of Bordeaux and also exploring the vineyards of Bordeaux without leaving the city; eco-responsible leisure in the city; gourmet tours; Darwin village gives a second life to former military barracks as an inspiring and alternative ecosystem in the Bastide district.

SEOUL

Seoul (population 9 960 000) is the capital city of the Republic of South Korea. The huge metropolis combines traditions, leading-edge innovations, strict environmental politics, and people-oriented initiatives. That makes Seoul a truly Smart City. Seoul invests $1.19 billion (About Smart Cities, 2021) in the innovation of the daily lives of citizens.

Seoul City has been perceived as a global city of merit. Seoul was a finalist in the annual World Smart City Awards for its "Global Digital Capital and City of Digital Social Innovation" project (Smart City Expo World Congress, 2022) twice in 2016 and 2017.

Smart Government

The local government developed a big data-based Smart City master plan in several categories, including IoT-based Shared Parking System, Taxi with artificial intelligence and smart surveillance cameras. E-Governance of the city of Seoul – Seoul's open governance strategy encourages transparent city governance. The Dasan Call Center is a 24/7 government agency that fields all questions regarding city services. Residents also have the option to book public services and utilities through the internet 24/7. So far, Seoul has always held the first position in the performance of municipal e-government among the major 100 cities around the world since the Global E-Governance Survey started.

A smart city digital platform called "Digital Mayor's Office" is successfully operating in Seoul. Every citizen can check the status of the entire city at a glance in real time.

Hard smartness

In 2014, Seoul was recognised as the world's most wired city and took first place in technology readiness by Price Waterhouse Cooper's "Cities of Opportunity Report".

- Road recharging vehicles during the drive – OLEV is an online electric vehicle technology that charges vehicles wirelessly from the road.
- U-Seoul Safety Service involves every citizen (from 2008), combining location services and CCTV technologies. This solution enables one to notify family members of emergencies of their relatives.
- The city's high-tech streetlamps reduce electricity consumption and provide residents with wireless internet access.

The u-Green service of Seoul represents a network of sensors assessing factors such as water and air quality, transmitting this information directly to public spaces and the devices in citizens' living rooms

Significantly enhanced convenience of public transportation through "Seoul's Intelligent Traffic System" (ITS), Smart Transportation Card, and Bus Information System (BIS).

Seoul is supporting other cities by exporting smart city solutions, including TOPIS (Transport Operation and Information Service), IoT-embedded LED streetlights, and smart garbage processing systems.

- Seoul plans to install 50,000 IoT- embedded sensors across the city and to gather "city life data", including floating population, UV rays, fine dust, noise, vibration, and more.
- Seoul is working hard towards "urban regeneration" instead of "demolishing" the city. Seoul has established the "Seoul-type Sustainable Development Implementation System" and is running the evaluation of sustainability across the administration.

In terms of energy policies, the production of new and renewable energies will be expanded, such as solar power and electric/hydrogen-powered vehicles and citizen participation to prepare against energy depletion will be encouraged.

Soft smartness

Main steps made to fulfil the strategy of the digitalised city:

- Seoul has provided education courses on smart technologies since 2008;
- Offering lectures and city-funded classes through private education institutions;
- Forced low-income individuals and elderly people, as well as immigrants, to use smart devices;
- Smart citizens – some of the examples of expanding citizens' engagement are "Democracy Seoul," a citizen participation policy proposal platform; "M-Voting," a mobile voting system; and "Seoul Online Civil Complaints," an online/mobile window to register and process civil complaints.

Quality of life

In 2015, Seoul was rated as Asia's most livable city with the second highest quality of life index globally by Arcadis.

Seoul is a fast-paced metropolis with 24-hour facilities and an expat-friendly social environment. Local citizens and visitors benefit from Seoul's affordable and reliable public transport system, which is also equipped with public Wi-Fi common to the most wired city in the world. Another example is the late-night bus called "Owl Bus". This is an innovative scheme for night-time transportation. After surveying the opinion of the citizens, a total of nine routes of the Owl Bus have been designated in the areas with the highest demand for public transportation at night time. These buses are now responsible for the safe trip home for more than 10,000 people a night.

Seoul has made significant progress over the past few decades towards providing services to its citizens more intelligently and improving their quality of life. It consistently appears in the leading pack of global rankings. In 2019, Seoul Metropolitan Government (SMG) announced an investment of $1.2 billion until 2022 on smart initiatives to drive further improvements (Smart Cities World, 2020).

Quality of tourist experience

Seoul is the most popular city in South Korea for international travellers. In 2019, Seoul ranked 23rd among the world's most popular cities, with 9.11 million tourists. It makes 52 % of the total number of international tourists (total 17.5 million) visiting South Korea in the same year (World Bank. Data, 2022). On average, each of the tourists arriving in 2020 spent about 3,953 US Dollars (WorldData.info, 2020b).

In 2016, Seoul had a total of 126,785 guest accommodations and restaurant establishments employing 480,090 people (UNWTO-WTCF, 2017).

Seoul attracts domestic and international tourists coming mainly from East Asia, principally China, Japan, and Southeast Asia. According to Tae-Hyoung and T.Gim (2018), the Seoul City Tourism satisfaction index in 2018 was 4, 38 (from 1 to 5), which is a sharp increase in comparison to 2016 – 4,15 and to 2015 – 4,14 (UNWTO-WTCF, 2017).

In the first 6 months of 2022, Tripadvisor has 494 497 reviews of Seoul hotels, restaurants, and attractions (Tripadvisor, 2022c).

Smart tourism business and pillars of destination

As a result of over-tourism, the city is now revising and re-shaping its tourist destination policies towards developing quality tourism rather than quantity tourism and to disperse tourists into a larger number of tourist precincts in other districts.

The summarised results of the development of Copenhagen, Bordeaux, and Seoul as smart destinations are expressed through indexes for climate and pollution and the total quality of life index in June 2022 (see Table 2).

Table 2. Quality of life indicators for Copenhagen, Bordeaux and Seoul, June 2022

Quality of life index June, 2022	Copenhagen	Bordeaux	Seoul
Quality of life	185,69 (very high)	167,09 (very high)	125,74 (moderate)
Climate	83,74 (very high)	93,30 (very high)	68,39 (high)
Pollution	21,23 (low)	39,27 (low)	58,77 (moderate)

Source: Quality of life index June '2022 (Numbeo.com, 2022).

6. Discussion

The case study reveals that high quality of life and quality of tourist experience are results of policy and initiatives of smart governments that support and develop smart ecosystems but only in the context of sustainable development and a human-based approach. Digitalisation, oriented to create high-tech infrastructure and infostructure, doesn't guarantee an enjoyable experience for residents and tourists. This issue also concerns the protection of the environment and achievements towards climate change prevention. Seoul is one of the best-digitised cities in the world but has a moderate result according to the Quality of Life Index, which puts some challenges to the city to be solved. The Quality of life index for Copenhagen and Bordeaux is considered very high. These two cities have high and moderate achievements in SDG. Even though the attainments in climate change prevention and decreasing pollution are high and moderate in Seoul, they are behind these in Copenhagen and Bordeaux. The smart government of Bordeaux develops a smart ecosystem through projects and investments in hard and soft smartness and orientation to increase the attractiveness of the city for its residents, tourists and business. As a result, Bordeaux is considered as an attractive place for living, working, studying, leisure and business. The relation of the number of tourists to local citizens is approx. 4 to 1, which is higher compared to this one in Copenhagen – 3 to 1 and Seoul 1 to 1, but residents of Bordeaux enjoy welcoming visitors and accept tourism development. Seoul faces many challenges concerning over-tourism. Even though the statistics show an increase in tourists' satisfaction, their quality of life needs further improvement. Therefore Seoul's government policy is centred on developing quality tourism and dispersing tourists to other districts. That proves that the presented human-centric model is effective and the most appropriate for the well-being of everyone involved in the process: tourists, locals and authorities.

The case study shows different degrees of progress and challenges for the three cities. What unites them are the efforts towards digitalisation and improving the quality of tourists' experience. But the governance, which is oriented to developing a smart tourism ecosystem in the context of sustainable development and human-centered, has better results. They are enhancing the quality of life and tourists' experience as well as destination attractiveness and stakeholder prosperity.

The analysed cities prove the efficiency of the proposed model of a smart sustainable destination. All of them present a balanced mix between soft and hard smartness as well as the active participation of the government in further development of the concept of a smart sustainable destination. Based on several indexes (IMD Smart City Index, The Quality-of-life Index, The SDG index score), Copenhagen, Bordeaux and Seoul show very high scores.

This serves as proof that a human-centric approach is one of the most efficient strategies for a successful smart sustainable destination.

7. Conclusion

The research presents a human-centric model for a smart and sustainable destination, focused on creating a smart tourist (business) ecosystem. It is applicable for the assessment of the status and development of smart destinations and elaborating strategies for smart and sustainable development. The model is used for the case study.

The model is a good base for elaborating a framework for the assessment of the status and development of smart destinations, which enriches the already existing evaluation systems. The indicators in this framework reveal the connection between pillars of smart and sustainable destination – smart government, sustainable development, hard and soft smartness, and a smart tourism ecosystem. The main group of indexes should present the links between governance, smart infrastructure and infostructure, innovations, creativeness and sustainability and smart ecosystem.

There are some limitations of this research. The number of studied destinations is limited. They need to be divided into several groups according to their size, type of tourism, location, urban classification and others. The indicators are presented only in categories and they have to be further developed. In order to achieve that, future research on a bigger number of destinations needs to be conducted. They could be categorised into different groups according to the above-mentioned criteria.

The proposed model could be used as a base for developing a smart ecosystem index. It can contribute to measuring achievements and comparing different destinations.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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Vladan Pavlović[1]
Goranka Knežević[2]
Radica Bojičić[3]

DO THE PROFITABILITY, THE VOLUME OF ASSETS, AND EQUITY OF PUBLIC ENTERPRISES HAVE ANY ROLE IN LOCAL AUTHORITIES' GENDER AND AGE POLICY? – A CASE STUDY OF BELGRADE[4]

The clearest picture of an actual gender policy in a country could be given by investigating the local authorities' appointment of the directors and supervisory board members of public enterprises since no mandatory quotas have been imposed on membership on those boards. On the other hand, the election of the supervisory board member of those enterprises by the employee could show if gender inequality is present in the population. The paper's second goal is to detect any patterns in the appointment of the directors, supervisory board chairmen, and supervisory board members regarding their age and gender and the firm's characteristics. In a sample of all of Belgrade's public enterprises, we found that gender inequality is widely present in the world of politics. At the same time, it does not appear to be present in the population. Regarding age policy, older people are more likely to be appointed by the local authority in financially more powerful enterprises.
Keywords: public enterprises; gender policy; age policy; financial performance; board
JEL: M41; M48; M14; G30

1. Introduction

In Ancient Rome, women's public role gradually expanded from the mid-fourth century to AD 68 when major changes happened in the role of women in the private sector (Bauman, 2015). In the third millennium AD, the gender issue is still a hot topic in the EU, whose legal

[1] *Vladan Pavlović, PhD, Full Professor,University of Pristina in Kosovska Mitrovica, Faculty of Economics, Kosovska Mitrovica, Serbia, Phone: +38163384866, e-mail: vladan.pavlovic@pr.ac.rs.*
[2] *Goranka Knežević, PhD, Full Professor, Singidunum University, Belgrade, Serbia, Phone: +381113094094, e-mail:gknezevic@singidunum.ac.rs.*
[3] *Radica Bojičić, PhD, Associate Professor,University of Pristina in Kosovska Mitrovica, Faculty of Economics, Kosovska Mitrovica, Serbia, Phone: +38128497921, e-mail: radica.bojicic@pr.ac.rs.*
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system is significantly influenced by Roman law (Vujović, 2017). For a while, EU law provided for electoral quotas, and as a consequence of harmonization with the EU legislative, mandatory electoral gender quotas were introduced in Serbia in 2002.

Recently, the Directive Proposal "Women on Boards", stuck for a decade, has been unblocked. By 2026, large publicly listed companies with more than 250 employees should have at least 40% of their non-executive director positions or 33% of their non-executive and executive director positions held by members of the under-represented sex (European Commission, 2022). Thus, the issue of gender quotas is in the spotlight, both in the EU member states and the candidate countries for membership. The Directive's requirements will enhance the research on how diversity within management teams or various boards contributes to performance (Rodríguez-Fernández et al., 2020).

However, large publicly listed companies are not the objective of this research, nor is the effect of women's participation on boards on financial performance. Instead, the gender and age policy of public enterprises established by the local self-government unit has been analyzed. These enterprises have monopoly positions, and profit maximization is not their primary goal. The Directive's requirements do not apply to these entities. So, no gender quotas are set for them, and membership in their supervisory boards does not attract public attention. Furthermore, data concerning women's participation in supervisory board membership and director positions of these enterprises are not considered in reports on gender equality. Therefore, it could be assumpted that the gender and age policy concerning these enterprises could adequately reflect the real attitude among politicians toward gender policy.

The pattern of appointing directors and members of the supervisory board has also been explored. More precisely, we were looking to see if these enterprises' profitability, the volume of assets, and equity have any role in local authorities' gender and age policy. Furthermore, we explored if these patterns could be found among the employees.

Investigating female representation on board seems particularly important for public enterprises when gender quotas are not imposed. Therefore, this study aims to fill this gap in the literature on public administration and to contribute to the ongoing public administration reform (PAR) in Serbia, which is being carried out as a consequence of signing the Stabilization and Association Agreement with the EU (Cerović et al., 2018; Muhhina, 2018). The public administration reform (PAR) is deeply rooted in informal institutions or culture, while the Serbian culture score on the gender equality dimension is still median (Mojić et al., 2018).

2. Literature Overview

In most countries, women are underrepresented in the political arena and face difficulties obtaining public positions (Hernik, Vera, 2020, p. 84). Women are taking a steeply increasing share of leadership roles in the corporate world (Brieger et al., 2019). Yet, progress in improving female board representation has been slow (Halliday et al., 2021), and women directors are still underrepresented (Reddy, Jadhav, 2019). However, the proportion of

women on corporate boards varies widely across countries (Carrasco et al., 2015; European Commission, 2022).

Numerous factors influence women's participation on boards. Scholars have indicated that the proportion of women sitting in a firm's board of directors is influenced by the characteristics of the country, i.e., economic, social and cultural characteristics (Terjesen, Singh, 2008; Carrasco et al., 2015; Low et al., 2015; Halliday et al., 2021), business environment and customer base (Brammer et al., 2019), the industry type (Hillman et al., 2007; Mukarram et al., 2018), the firm type (Morikawa, 2016; Brieger et al., 2019), type of ownership (García-Meca, Santana Martín, 2022; Huh, Kashian, 2021; Martín-Ugedo, Minguez-Vera, 2014; Nekhili, Gatfaoui, 2013), the ownership structure (Morris et al., 2021; Cordeiro et al., 2020; Lin et al., 2018), organizational size (Hillman et al., 2007), the board size (De Cabo et al., 2012; Nekhili, Gatfaoui, 2013), the diversification strategy (Hillman et al., 2007), the network effects (Hillman et al., 2007), the firm risk (Poletti-Hughes, Briano-Turrent, 2019; Morikawa, 2016; Martín-Ugedo, Minguez-Vera, 2014), company's age (Morikawa, 2016) and growth orientation (De Cabo et al., 2012), etc.

Besides the reason to fight against inequalities, prescribing a gender quota on the board of directors has also been strongly promoted by mentioning economic arguments which stem from the conviction of the advantage of gender-balanced boards (Pavlović et al., 2022). Consequently, many studies have been conducted over the globe on the impact of board gender diversity on firm performance. However, the results of these studies are inconclusive. (Reddy, Jadhav, 2019) Furthermore, Yu and Madison (2021) recently concluded that the adopted mandatory gender quotas have mainly decreased companies' performance. Numerous studies have also been conducted to explore the benefit of mixed-gender boards on corporate social responsibility, but the results are inconclusive (Amorelli, García-Sánchez, 2021). Furthermore, it has been indicated that gender stereotypes are widely present (Adams, Funk, 2012; Baxter, 2012). However, this is still "one of the most topical corporate governance issues, which has understandably attracted considerable interest from academics, governments, policy-makers, practitioners and supra-national bodies" (Nguyen et al., 2020).

In addition to the abovementioned arguments, Thiruvadi and Huang (2011, p. 4) argue that a mixed-gender board may further enhance public confidence, while some scholars argue that the percentage of women on board is associated with audit quality (Knežević et al., 2022). That seems to be particularly important for public companies and public enterprises. While research has been conducted on the impact of board gender diversity on firm market value (Solal, Snellman, 2019), which is partially influenced by public confidence, no research has been conducted on a sample of public enterprises.

3. Gender Quotas for Company Boards

Achieving gender equality in the workplace has been an important policy goal in European countries for many years, while promoting gender equality has been acknowledged as one of the main objectives of the EU (Leszczyńska, 2018). From October 2010 to April 2019, the

proportion of women on the boards of the largest listed companies in the EU doubled from 12% to 28% (European Institute for Gender Equality, 2019).

The European Parliament brought a resolution in July 2011 on women and business leadership (2010/2115(INI)). The European Commission proposed the Directive on improving the gender balance among non-executive directors of listed companies in 2012. In November 2013, the European Parliament approved a draft directive setting a target quota for companies listed on stock exchanges that at least 40% of their non-executive directors must be women (EU Parliament, 20.11.2013). This resolution was adopted by 459 in favor, 148 against, and 81 abstentions (EU Parliament, 20.11.2013).

Nevertheless, the "Women on boards" Directive was blocked in the Council for a decade until Employment and Social Affairs ministers finally agreed on a position last March (European Council, 2022). On June 7, 2022, the Council and European Parliament reached a political deal on a new EU law promoting a more balanced gender representation on the boards of listed companies (European Council, 2022). That agreement implies that by 2026, publicly listed companies in the EU should aim to have at least 40% of their non-executive director positions or 33% of their non-executive and executive director positions held by members of the under-represented sex (European Council, 2022). In cases where candidates are equally qualified for a post, priority should go to the candidate of the under-represented sex (European Commission, 2022). The Directive mandates companies to prescribe clear and transparent board appointment procedures with an objective assessment based on merit, irrespective of gender (European Commission, 2022). Listed companies must inform the competent authorities once a year about the gender representation on their boards and, if the objectives have not been met, how they plan to attain them. This information would be published on the company's website in an easily accessible manner (European Commission, 2022). The proposal includes effective, dissuasive, and proportionate penalties for companies that fail to comply with open and transparent appointment procedures (European Commission, 2022). Parliament succeeded in including examples of specific penalty measures, such as fines and companies having their selection of board directors annulled by a judicial body if they breach the national provisions adopted pursuant to the Directive (European Parliament, 2022).

It is important to highlight that small and medium-sized enterprises with fewer than 250 employees are excluded from the Directive's scope (European Commission, 2022).

The Directive aims to ensure gender balance in corporate boards of listed companies is sought across the EU, while allowing flexibility to suspend the procedural requirements set out in the Directive for the Member States, which have adopted equally effective measures (European Commission, 2022). The Member States need to transpose the new elements of the Directive into national law within two years once it is published in the Official Journal (European Commission, 2022).

It should be known that despite the "Gender on boards" Proposal Directive was not accepted for a decade after the Commission made its proposal, some EU countries took proactive measures to improve gender balance in economic decision-making. France (40%), Belgium, Italy, Portugal (33%), Germany, and Austria (30%) prescribed gender quotas. At the same time, some Member States brought some "soft measures", i.e., got legislative quotas

restricted to state-owned companies or applied without sanctions. (European Institute for Gender Equality, 2019) Simultaneously, regulators worldwide aim for a higher representation of females on corporate boards (Marisetty, Prasad, 2022).

The gender quotas in the national assemblies have been posed to justify the election system by adequately reflecting the population by combating one "of the most primitive and oldest forms of inequality" (Turan, 2015). The argument for introducing gender quotas to combat inequality has also been widely promoted in the business environment. As noticed on the European Parliament (2022) and European Commission (2022) websites, females are underrepresented in high-level positions, including corporate boards, despite making up 60% of graduated university students. In the EU's largest publicly listed companies, only a third of non-executive corporate board members are women, even less among executive boards. (European Commission, 2022) Significant differences exist among member states, which range from 45.3% of women on boards in France to 8.5% in Cyprus (European Parliament, 2022).

Yet, the introduction of gender quotas on corporate boards has also been widely attempted to be justified by economic arguments, although many studies do not confirm it (Reddy, Jadhav, 2019). Regner and Wolters, the lead European Parliament negotiators, highlighted the economic arguments for adopting the Directive. (European Parliament, 2022), Namely, Regner stated that more women on boards improve the overall quality of boards and make companies more resilient and innovative, while Wolters added that more diversity in boardrooms contributes to better decision-making and results (European Parliament, 2022).

On the other hand, many arguments have been made against mandatory gender quotas on companies' boards over the last decade. Private shareholders were opposed to being influenced by the fixed quota, particularly because research does not firmly confirm that having more women on board will contribute to better corporate performance (Knežević et al., 2021). He and Kaplan (2017) summarized the arguments against prescribing mandatory quotas. On the one hand, gender quotas can be demotivating due to the perception that they are unfair and can reduce employee engagement due to negative attitudes about work among male employees, as well as contribute to making the company less attractive to male candidates. Gender quotas can also lead to stigmatizing women involved due to gender quota requirements. Additionally, women may be less motivated, thinking they sit on boards because of quotas rather than results, and may be marginalized or delegitimized (He, Kaplan, 2017). Research has also shown in Norway that the participation of women on boards due to the mandatory quotas did not trickle down to lower levels in companies and that quotas may not change anything about the deeper-rooted problem (Bertrand et al., 2014; He, Kaplan, 2017).

4. Gender Issues in Serbia

Although the modern history of gender equality began in Serbia after the Second World War (Ignjatović, Bošković, 2017, p. 199), Serbia adopted some mechanisms to achieve gender equality after the political changes of the early 20th century (Ignjatović, 2006; Ignjatović,

Bošković, 2017). The political goal of EU membership has dominated the promotion of gender equality in Serbia (Ignjatović, Bošković, 2013, p. 425).

Due to accession to the European Union, gender equality became one of the key priorities of the Government of the Republic of Serbia (Petrović, Babović, 2022). The Vice President of the Government of the Republic of Serbia and the President of the Coordinating Body for Gender Equality recently stated that progress had been made in the last five years since the political will exists, as well as the readiness of the society to improve gender equality in political, economic, and social life (Petrović, Babović, 2022). According to the Global Gender Gap Report 2020 compiled by the World Economic Forum, Serbia ranks 39th out of 153 countries in terms of gender, with a score of 0,736.

Serbia was the first country outside the European Union to introduce the Gender Equality Index in 2016. This composite indicator measures the complex concept of gender equality and, based on the EU policy framework, assists in monitoring the progress of gender equality across the EU over time.

The gender equality index in 2018 is 58.0 points and compared to the values from 2016 and 2014, it indicates continuous, albeit slow, progress (Petrović, Babović, 2022). Compared to EU member states, Great Britain, and three countries in the Western Balkans region that are candidates for EU membership (Albania, Montenegro, and North Macedonia), Serbia is positioned in 23rd place between Croatia and Bulgaria. Compared to the countries in the region, it has a lower value of the index than Albania and North Macedonia and a higher value in the contribution to Montenegro (Petrović, Babović, 2022, p. 20).

The most significant positive changes (an increase in value by 9.2 index points between 2016 and 2018 and an increase of 18.5) were recorded in the domain of power, which measures gender equality in decision-making positions across the political, economic and social spheres. The sub-domain of political power examines the representation of women and men in national parliaments, government, and regional/local assemblies. The sub-domain of gender balance in economic decision-making is measured by the proportion of women and men on corporate boards of the largest nationally registered companies listed on stock exchanges and national Central banks. (European Institute for Gender Equality, 2022) Progress has been partially achieved through legally defined quotas for women's representation in bodies of legislative power at all levels (Petrović, Babović, 2022, p. 11).

In the sub-domain of political power, Serbia records higher values than the EU-27 average, mainly due to the legally defined quotas for the participation of women in the legislature at all levels. Compared to EU member states, Great Britain, and three countries in the region, the Republic of Serbia ranks 19th between Luxembourg and Austria (Petrović, Babović, 2022, p. 42). In the previous reporting cycle, the Republic of Serbia also recorded a higher value than the average for the EU (then EU-28) for the sub-domain of economic power. Still, in 2018 the value fell below the EU-27 average.

In Serbia today, women make up the majority of the student population (Ignjatović, Bošković, 2017, p. 203). The Global Gender Gap Report 2020 shows female domination in the field of Business, Administration, and Law (the value of the gender indicator is 1.05). According to statistical data for secondary education levels in economics, law, and

administration, females represent 67% to 75% of the total number of students, while they represent approximately two-thirds of graduates in humanities and social sciences (Ignjatović, 2006, p. 140). Some professions would be considered a typical woman's profession, and the accountant profession in Serbia is among these professions. According to the Serbian Association of Accountants and Auditors (member of the International Federation of Accountants - IFAC), from 2010 to 2019, 81.76% of persons who obtained a certificate in accounting were women. The dominance of women in accounting can be considered traditional. In the seventies, 71% of the Association of Accounting and Financial Workers of Serbia members were women (Škobić, 2015, p. 147). Still, just 11% of the AAFWS's delegates were women (Škobić, 2015, p. 147).

According to data for 2021 - B2, Serbia has, on average, 23,4 women on boards of the largest listed companies. The most significant women's participation on boards has Iceland (47,1), followed by France (45,3) and Norway (41,5), while the minor participation is in Malta (8,5). When the neighbourhood is observed, the same participation is in Croatia (23,4), while less per cent of women are present on boards in Bulgaria (21), North Macedonia (21), Montenegro (20,3), Slovenia (19,4), Romania (17,5), and Bosnia and Herzegovina (11,3) (European Institute for Gender Equality, 2022).

Looking for the board president, Serbia has, on average, 18,2 women acting as the board's president. In 6 EU countries, no female has been appointed to that position (Cypar, Estonia, Luxemburg, Netherlands, Czech Republic, and Malta), while the most percentage is in Slovakia (40), Poland (31,6), and North Macedonia (30). When the neighbourhood is observed, apart from North Macedonia, the most significant percentage of women acting as board presidents is present in Bosnia and Herzegovina (20), while a less rate of female presidents is present in Bulgaria (13,3), Montenegro (10), Romania (5,6), Slovenia (5), and Croatia (4,8) (European Institute for Gender Equality, 2022).

By observing these data, it could be concluded that the position of women in the business sector is more favourable than in several EU countries. Therefore, it could be supposed that gender issues in the corporate world are not particularly hot. This conclusion could be reinforced by observing the political aspect. Currently, Serbia has a female LGBT Prime Minister, four female ministers, and a female National Assembly Speaker. Additionally, a woman is a Governor of the National Bank, President of the Constitutional Court, President of the Misdemeanor Court, etc. Still, if Serbia remains to join the EU, large publicly listed companies with more than 250 employees should comply with the requirement to have at least 40% of their non-executive director positions or 33% of their non-executive and executive director positions held by members of the under-represented sex.

However, it seems that everyday life does not support the displayed image. Recently, one Minister was formally removed for his vulgar, sexist message (Ignjatović, Bošković, 2017, p.198), while another Minister retained his chair despite his official address to women on the occasion of International Women's Day when he quoted the following verses "woman does not need you to respect her, but to love her […] … All women love rich men because a woman is always poor. They are afraid of smart men… She always succumbs to "stronger, not prettier or smarter, not better or kinder" (Association of women FemPlatz and A11 – Initiative for Economic and Social Rights, 2018).

As Ignjatović and Bošković (2017, p. 198) stated, gender equality policy in Serbia has always been partly guided by formalism and ambivalence. This could be well illustrated by the comic situation of the past when the well-known Serbian male actor Toma Kuruzović at his young age, was elected delegate to the Women's Anti-Fascist Front of Yugoslavia (AFŽ), because no man in the region at the time wanted to let his wife or daughter participate in this movement.

5. Why Does the Gender Issue Seem to be Particularly Important for Public Enterprises?

Public enterprises in Serbia are governed by the supervisory board and the director (Law on Public Enterprises, Article 15). Looking into the structure of the supervisory board of public enterprises and the gender and age of the directors of those enterprises can reveal the real gender situation in Serbia. Namely, gender quotas are imposed neither for the appointment to supervisory boards of public enterprises nor for the appointment of directors. However, the supervisory board members' appointments and directors' appointments in those enterprises do not attract much public attention. On the other hand, due to the nature of these positions, the potential inequalities could not be explained by the assumption that women might be more absent from work than men, mainly due to pregnancy and subsequent childcare. Despite the widespread belief that women are more absent from work than men (Patton, Johns, 2007), no studies in Serbia have been carried out on this subject, while several studies abroad have not supported this hypothesis (Beblo, Ortlieb, 2012). Considering that public enterprises "perform public interest activities" (Article 15), the political argument of the need for adequately reflecting the population is also present. That is especially important considering the conflicting goals of public enterprises. While one goal is ensuring the continuous performance of activities of general interest and regular satisfaction of the consumer's needs, the other goal is earning a profit (Article 4) to fill the budget (Article 58). The government, i.e., the local self-government units, is the principal and agent at the same time (Liechti, Finger, 2019, p. 513). "Due to these hybrid goals (which often conflict), it is likely that the state behaves as an 'opportunistic principal' (Sobol, 2016), meaning that it defines vague, unclear, conflicting, or changing expectations for SOEs" (Liechti, Finger, 2019, p. 514). "Both the OECD and the World Bank identify goal ambiguity as one of the main challenges in SOE governance" (Liechti, Finger, 2019, p. 514).

Among others, the Supervisory Board adopts long-term and medium-term business strategies and development plans and is responsible for their implementation. Further, it adopts an annual or three-year business program harmonized with long-term and medium-term business strategies and development plans. It also decides on status changes, establishing other legal entities, and capital investment. Additionally, it decides on profit distribution, etc. (Article 22). The population could not be adequately represented without female participation on those boards. In addition, the Supervisory Board supervises the director's work, discusses financial reporting matters and external audit reports, and brings decisions on adopting financial statements (Article 17:5-6). That is why, among other criteria for membership in the supervisory board, the Law on Public Enterprises prescribes knowledge of corporate governance or finance (Article 17:5). But for financial reporting issues, knowledge in finance

seems to be more important. So, it seems to be quite logical to appoint people with accounting knowledge in those bodies, at least if the goal is to minimize financial frauds and scams. Keeping in mind that more than 81% of certified accountants in Serbia are women, while the majority of alums of faculties of law and economics are women as well, it could be expected that women are adequately represented in supervisory boards of public enterprises (Pavlović et al., 2022). Due that a number of studies show that women are less likely to commit fraud or to practice earnings management (Gavious et al., 2012; Arun et al., 2015; Francis et al., 2015; Ho, Liao, Taylor, 2015; Ho, Li, Tam, Zhang, 2015; Cumming et al., 2015; Shawver, Clements, 2015), appointing women to supervisory boards of public enterprises could be suitable not only for combating inequalities but also for improving the quality of financial reporting. Kennedy and Kray (2014, p. 53) stated that gender differences in reactions to ethical compromises are one possible explanation for the under-representation of women in high-ranking positions in business organizations. Still, many conflicting studies suggest similarities or differences in ethical evaluations and ethical decision-making of males and females (Shawver, Clements, 2015, p. 557). Research in Serbia has not shown that the gender and age of the board members have any influence on performance or the quality of the financial reporting (Knežević et al., 2017; Pavlović et al., 2018; Pavlović et al., 2019a; Pavlović et al., 2019b).

Two members of the supervisory boards and the directors of the public enterprises are appointed by the political authorities that established those enterprises: The Republic, the autonomous province, or the local self-government unit (Article 3), while one supervisory board member is delegated from the employees. According to the Law on Public Enterprises (Articles 17, 19, and 25), the supervisory board of public enterprise established by the local self-governmental unit does not contain an independent member. Thus, all supervisory board members appointed by the local authority and the director could be political party members. So, the policy of appointing directors and members of the supervisory board could be seen as the manifestation of the actual gender policy that takes place below the spotlight directed toward high political positions. Thus, we have analyzed the gender structure and age of the member of supervisory boards. Additionally, we have investigated if a pattern can be found in the sense of financial characteristics of enterprises where women are appointed. Better financial performance means not only higher monthly compensation for their service as board members but also higher challenges for combating potential financial manipulations.

6. Data and Methods

The sample consists of all public enterprises established by the city of Belgrade (city owned). Belgrade is the capital and the only town on the level of a district in Serbia (Law on the Territorial Organisation of the Republic of Serbia, 2020). With more than 1.27 million inhabitants, Belgrade is the largest city in the Balkan Peninsula and the fourth largest city in Southeastern Europe, preceded by Istanbul, Bucharest, and Sofia.

That comprises all (twenty) public enterprises established by the local self-government unit. These enterprises are from the following industries: veterinary services; funeral services; public lightening; maintenance and management of urban green areas; parking services; road

maintenance; construction of utility infrastructure and development of public areas; watercourse maintenance; maintenance of Belgrade fortress and park; waterworks and sewerage maintenance and upgrading; maintenance of congress, cultural and business centre; maintenance of Belgrade's lake; city marketplaces; heating plant; city waste disposal; public bus transportation; combined utility billing company; and hippodrome. The city of Belgrade owned a zoo park as well, but the zoo park does not have the legal form of a public enterprise. All financial and non-financial data were gathered from the Serbian Business Registers Agency (SBRA), and we identified the supervisory board members delegated from the employee from public enterprises' websites. We have taken the average financial performance from the period 2015-2018. The personal characteristic of the directors and supervisory board members of those enterprises are taken from January 1, 2019. One enterprise from the sample is overdue and would go bankrupt if it was not city-owned. Bearing in mind that this public enterprise does not provide essential services to citizens, the local authority decides to privatize it. Since the management of this enterprise does not have the primary goal of providing services and making a profit but rather of completing the privatization, this enterprise was not taken into account in the analysis because it makes no sense to do so.

We posted the following research questions:

R1: Does the local authority follow the gender policy of the state's government in appointing directors and supervisory board members of public enterprises?

R2: Does the gender policy of the local political authority reflect the employee's attitude toward membership eligibility?

R3: Are directors and supervisory board members in city-owned public enterprises with larger assets and equity older?

R4: Are directors and supervisory board members in city-owned public enterprises with the highest results older?

R5: Do the employees follow the same patterns as the local authority when they choose their representative on the supervisory board?

Descriptive statistics and correlation analysis have been used to answer those questions. Our statements will be confirmed or rejected using the Sig (2-Tailed) test. All data are analyzed using IBM SPSS Statistics 23.0.

7. Results

Tables 1.1-1.7 show the gender and age structure of the directors and supervisory board members.

Table 1.1. Entity sizes

		Frequency	Per cent	Cumulative Percent
Valid	Micro-entity	1	5	5
	Small-sized entity	6	30	35
	Medium-sized entity	6	30	65
	Large-sized entity	7	35	100
	Total	20	100	

Table 1.2. Director's age

	N	Minimum	Maximum	Mean	Std. Deviation
Director	20	32	66	46.30	10.26
Valid N (listwise)	20				

Table 1.3. Supervisory Board Chairman's gender and age

	N	Minimum	Maximum	Mean	Standard Deviation
Man	18	38	70	49.94	10.74
Woman	2	43	50	46.50	4.95

Table 1.4. Supervisory Board member's gender and age

	N	Minimum	Maximum	Mean	Standard Deviation
Man	43	28	71	50.48	10.98
Woman	17	38	65	50.52	8.81

Table 1.5. Employee Supervisory Board member's gender and age

	N	Minimum	Maximum	Mean	Standard Deviation
Man	12	28	63	47.00	10.42
Woman	8	40	64	51.25	6.96

Table 1.6. Women on boards

Women	Board member	Board members appointed by the local authority	Board members elected by the employee
Frequency	17	7	10
Percent	28.33	17.50	50.00
Total	60	40	20

Table 1.7. Entity sizes and employee supervisory board members

	Micro entity	Small-sized entity	Medium-sized entity	Large-sized entity
Man	1	2	2	5
Woman	0	4	4	2
Total	1	6	6	7

The results show a medium-strong, high, and significant statistical relationship between the participation of women on the supervisory board and the member delegated by the employees ($p = 0.001$, $\rho = 0.687$) and a medium-strong, high, and significant statistical relationship between the participation of women in supervisory board and the member appointed by the local authority.

Table 2. Correlations between the participation of women on the supervisory board and members appointed by the local authority/elected by the employees

		Board members appointed by the local authority	Board members elected by the employee
Participation of women on boards	Pearson Correlation	0.551**	0.687**
	Sig. (2-tailed)	0.002	0.001
	N	20	20

** Correlation is significant at the 0.01 level (2-tailed).
Source: Authors' own calculations.

The results show a slightly negative relationship between women's participation in supervisory boards and supervisory board chairman appointed by the local authority ($p = 0.264$, $\rho = -0.262$) as well as a slightly positive relationship between women's participation on boards and board member appointed by the local authority ($p = 0.601$, $\rho = 0.125$). However, both correlations are statistically insignificant.

Table 3. Correlations between the participation of women on supervisory boards and chairman and participation of women on supervisory boards and the member appointed by the local authority

		Supervisory board chairman, appointed by the local authority	The supervisory board member, appointed by the local authority
Women's participation on boards	Pearson Correlation	-0.262	0.125
	Sig. (2-tailed)	0.264	0.601
	N	20	20

Source: Authors' own calculations.

The results show a highly significant, statistical, and medium relationship between the age of the director and the supervisory board member appointed by the local authority ($p = 0.029$, $\rho = 0.488$) as well as with the average age of the board's members ($p = 0.008$, $\rho = 0.578$).

Table 4. Correlations between the age of the director, the average age of the supervisory board members and the members appointed by the local authority

		The average age of the board members	Board members appointed by the local authority
Director	Pearson Correlation	0.578**	0.488**
	Sig. (2-tailed)	0.008	0.029
	N	19	20

** Correlation is significant at the 0.01 level (2-tailed).
Source: Authors' own calculations

The results show a statistically significant but weak relationship between the average age of the board members and the entity size ($p = 0.033$, $\rho = 0.479$) and a highly statistically significant, medium, strong and linear relationship between the average age of the board members, total assets ($p = 0.008$, $\rho = 0.590$) and equity ($p = 0.007$, $\rho = 0.591$). In the table set from 6.1-6.2, we can see the correlations between the age of the supervisory board member appointed by the local authority and the entity's total assets and equity.

Table 5. Correlations between the average age of the supervisory board members and the entity's size, total assets, and equity

		Entity size	Total assets	Equity
The average age of the supervisory board members	Pearson Correlation	0.479*	0.590**	0.591**
	Sig. (2-tailed)	0.033	0.008	0.007
	N	20	19	19

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
Source: Authors' own calculations

The results show a medium, strong, positive, and highly statistically significant relationship between the age of the supervisory board members appointed by the local authority and the firm's total assets ($p = 0.010$, $\rho = 0.560$) and a weak, positive, and statistically significant relationship with equity ($p = 0.040$, $\rho = 0.475$).

On the other hand, in public enterprises without women on board, the results show a strong, statistically significant and positive relationship between the age of the supervisory board members appointed by the local authority and with firm's revenues ($p = 0.031$, $\rho = 0.854$), operating income ($p = 0.029$, $\rho = 0.858$), net income ($p = 0.044$, $\rho = 0.824$) and cash flow ($p = 0.047$, $\rho = 0.888$) in public enterprises without women on supervisory boards.

Table. 6.1. All enterprises

			Total assets	Equity
All enterprises	Age of the board member appointed by the local authority	Pearson Correlation	0.560**	0.475*
		Sig. (2-tailed)	0.010	0.040
		N	19	19

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
Source: Authors' own calculations

Table 6.2. Enterprises without women on board

			Revenue	Operating income	Net income	Cash Flow
Enterprises without women on board	Age of the board member appointed by the local authority	Pearson Correlation	0.854*	0.858*	0.824*	0.888*
		Sig. (2-tailed)	0.031	0.029	0.044	0.047
		N	6	6	6	5

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
Source: Authors' own calculations

The results show that the age of the board members delegated from the employees does not correlate with revenues, operating income, net income, cash flow, total assets, and equity.

Table 7. Correlations between the ages of the supervisory board members delegated from the employees and revenues, operating income, net income, cash flow, total assets, and equity

		Revenues	Operating income	Net income	Cash flow	Total assets	Equity
Board members delegated by the employees	Pearson Correlation	0.080	0.016	0.009	0.186	0.427	0.419
	Sig. (2-tailed)	0.737	0.946	0.970	0.446	0.068	0.074
	N	20	20	20	19	19	19

Source: Authors' own calculations.

The results show a statistically highly significant and very strong, almost completely linear relationship ($p = 0.001$, $\rho = 0.959$) between the age of the director of public enterprises without women on the supervisory board and the cash flow as well as an almost linear, statistically significant relationship with the total assets ($p = 0.031$, $\rho = 0.913$) and equity ($p = 0.032$, $\rho = 0.909$).

Table 8. Correlations between the age of the director, the average age of the board members, and total assets, equity, and cash flow in enterprises without women on supervisory boards

		Total assets	Equity	Cash Flow
Director	Pearson Correlation	0.913*	0.909*	0.959**
	Sig. (2-tailed)	0.031	0.032	0.001
	N	5	5	5

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).
Source: Authors' own calculations.

8. Discussion

We see that twenty of Belgrade's public enterprise directors are men. If we add to the sample the Belgrade Zoo, also owned by the city (i.e., the director is appointed by the local government but established as a limited liability company (LLC)), the picture remains unchanged. We also note that eighteen of the twenty supervisory board chairmen are men. Thus, 90% of the presidents, who are not formally appointed by the local authority but are substantially so, are men. These data may indicate gender discrimination on the part of the local government at the management level of city-owned enterprises.

Seventeen of the sixty board members are women (28%), and women are present on 70% of the boards of public enterprises (14 out of 20). These data could indicate that women are not represented on boards in an ideal way but rather in an acceptable manner. However, we can only have a real picture of gender politics if we take a deeper look at the data.

Further analysis reveals that no woman is appointed on board by the local authority in 65% of enterprises (13 out of 20). Two boards have a female majority, and in both cases, a woman was elected as the representative of the employees. Thus, no board has both female members appointed by the local authority. Of forty board members (including the chairman) appointed

by the local authority, thirty-three are men. Thus, 83% of all board members appointed by the local authority are men, while women represent 17% of the appointed members.

Seventeen women are, therefore, members of supervisory boards, but the local authority does not appoint most of them. They are elected as employee representatives. Ten of the twenty board members elected by the employees are women, meaning that 50% of employees elected supervisory board members are women.

These data might suggest that gender discrimination is present at the political level but not in the larger population represented by employees of city-owned enterprises. However, since the vast majority of accountants, finance professionals, and lawyers employed in public enterprises are women, this conclusion cannot be definitive. The fact that fewer women are delegated to large-sized entities could support the hypothesis that even employees choose a man if they can choose between a man and a woman. It is likely that in small-sized entities, only one gender is present in the positions of an accountant, financial specialist, or lawyer. Namely, in medium-sized entities, 67% of the members delegated from the employees are women. Further, in the large-sized entities, the percentage drops to 29% and to 33% in the small-sized entities.

The youngest female supervisory board chairman is 43 years old, while the youngest male chairman is 38. On the other hand, the oldest female supervisory board chairman is 50 years old, while the oldest male chairman is 70 years old. We find that women appointed by the local authority are aged between 38 and 65 while the age of appointed men is between 28 and 71 and that the standard deviation is lower for women. However, looking at the employee delegates, it is noticeable that appointed women are between 40 and 64 years old while the age of men is between 28 and 63. Thus, the local authority appointed younger women than the employees did. Data on the years of board members are taken from January 2019. However, board members were appointed earlier, so at the time of appointment, all board members were younger than the ages shown on the tables. This means that the local authority appointed women under the age of 38 as board members while employees did not.

The results of defining possible patterns for posting a Supervisory Board member align with expectations. A pattern for the appointment of a board member by the local authority is found, while a pattern for the election of a board member from among the employees is not detected. The results show that the local authority tends to appoint older people to the boards of public enterprises with the largest assets ($p = 0.010$, $\rho = 0.560$) and equity ($p = 0.040$, $\rho = 0.475$). Still, the volume of assets is the dominant criterion. Results reveal that women are not likely to be appointed to boards of large-sized entities. Results also reveal that in enterprises with the highest revenues, operating income, net income, and cash flow, both the local authority and the employees not only tend to appoint elderly persons but also tend to appoint a male person. It seems that women are not likely to be adequately represented in financially powerful enterprises. The more powerful the enterprise is, its board members have greater power. The more powerful the enterprise is, the more it can finance different activities. The more financially powerful the enterprise is, the more it can remunerate its board members.

The age and gender policies of appointing directors and supervisory board members seem to be mutually conditioned. Namely, some clear patterns are found in public enterprises without

women on supervisory boards. Namely, in those enterprises, a highly statistically significant and very strong, almost completely linear relationship is found between the age of the director and the firm's cash flow ($p = 0.001$, $\rho = 0.959$) as well as an almost linear, statistically significant relationship with the total assets ($p = 0.031$, $\rho = 0.913$) and equity ($p = 0.032$, $\rho = 0.909$).

So, the larger the entity is, the average age of the director and board members increases and vice versa. Since the results are much more robust when looking at total assets and equity than the size of the entity, so this implies that the value of assets is the most dominant appointment criterion than the other criteria based on which the size of the entity is determined (number of employees and revenues). On the other hand, employees do not consider the entity's characteristics when they elect their representatives on the supervisory board.

9. Conclusions

The official data from the European Institute for Gender Equality shows progress in gender equality in Serbian political, economic, and social life, particularly in the domain of power, particularly in the sub-domain of political power, where Serbia records higher values than the EU-27 average. The turning point at the local authority level happened in 2016 when after the local elections, the share of women among councillors of local assemblies increased from 19% to 36% (Petrović, Babović, 2022, p. 41). That progress has been partially achieved through legally defined quotas for women's representation in bodies of legislative power at all levels (Petrović, Babović, 2022, p. 11). But, that picture from above, which shows that women occupy important positions in the state administration, is not supported when we look at data under the radar. Looking at the gender politics of the local authority concerning the appointment of directors and supervisory board members of city-owned public enterprises where no gender quotas have been imposed, it is clear that gender inequality is still present.

While it is immediately clear that there are no women in the director position and that 90% of the supervisory board chairmen are men, the picture of women's participation in public enterprises' supervisory boards owned by the local self-government unit is blurred. Therefore, a deeper analysis is needed. Namely, women make up 28,33% of supervisory board members, but the local authority appointed only 17,33% of those women supervisory board members. Having in mind that the majority of people with knowledge of finance, corporate governance, and accounting are women, which is the criterion defined by the Law on Public Enterprises for being a supervisory board member, it could be seen that gender equality is far from being achieved on the level of self-government unit.

Therefore, it has been confirmed that the local authority does not follow the gender policy of the state's government in appointing directors and supervisory board members of city-owned public enterprises.

Notwithstanding, 50% of the employees' delegates are female. According to the Law on Public Enterprises, the supervisory board member delegated by the employees could not be a member of a political party (Article 19), nor could it be nominated by The Supervisory

Board, the director, and the Executive Director (Article 20). It could be concluded that gender inequality is not present beyond the political area.

Therefore, it has been confirmed that the employee's attitude toward membership eligibility does not reflect the gender policy of the local political authority, i.e., gender inequality is not present among the employees.

It has also been confirmed that the local political authority appointed older directors and supervisory board members in public enterprises with larger assets and equity. That could be a reflection of the higher political power of members of political parties who are longer in politics or a result of the policy of appointing persons with more experience in larger enterprises. The fact that the age of the board members delegated from the employees does not correlate with revenues, operating income, net income, cash flow, total assets, and equity reveals that there is no pattern that employees applied to elect their representative.

It is not easy to explain the clear pattern of appointing directors and supervisory board members regarding the firm's cash flow, total assets, equity, and revenues found in public enterprises without women on supervisory boards, whereas this pattern is not found in public enterprises with female members on boards. We can notice just a few facts: enterprises without women on boards are engaged in male-dominated industries, and all of them hold a monopoly position in the market (all public enterprises do not); the policy of supervisory board members' appointment does not follow the same pattern whether women are appointed or not.

It has also been shown that the employees do not follow any patterns contrary to the local authority when they choose their representative on the supervisory board.

Our results indicate that gender inequality is widely present in the world of politics in the absence of external pressure.

The results of this study can provide important insights that are useful for public administration reform (PAR) in improving gender equality in public enterprises in Serbia, as PAR is one of the main challenges in Serbia's EU integration process. Our results could also be an important insight for combating gender and age inequality which seems to appear in the non-regulated area and is not visible to the broader public.

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SUMMARIES

Eva Kovářová, Tomáš Váňa

REDUCTION OF POVERTY AND MATERIAL DEPRIVATION IN THE EU COUNTRIES: WHAT MATTERS THE MOST?

Poverty reduction belongs to the long-term priorities of public policy actions in most countries. In 2010, the European Union and its member states aimed to reduce the number of people living at risk of poverty by 2020. However, most EU countries failed to achieve their targets concerning poverty reduction, partly because of the challenges they had to cope with (slow economic recovery after the crisis, migration, COVID-19). In 2022, poverty risks were increasing in the EU countries once again. Therefore, research focused on determinants of poverty can help policymakers to identify the areas in which policy measures will be useful for poverty reduction or at least its stabilisation in the EU countries. The paper introduces an analysis examining five determinants of poverty (related to employment, incomes, education, and social protection), when poverty was understood in terms of incomes as well as material deprivation. The panel regression analysis was done for cross-sectional data covering EU 26 countries and the period 2010–2019. Statistical results revealed the statistically significant relationships between poverty risks (measured with the use of at-risk-of-poverty rate and rate of material deprivation), and employment, work intensity, and income inequality (representing the determinants of poverty). Findings indicated that particularly the policy measures adopted within the employment and labour market policies must be used in the fight against poverty in EU countries.
Keywords: employment; income inequality; material deprivation; panel regression; poverty; work intensity
JEL: I32; I38; P46

Alban Elshani, Lekë Pula

IMPACT OF TAXES ON ECONOMIC GROWTH: AN EMPIRICAL STUDY IN THE EUROZONE

This paper analyzes the effects of types of taxes on economic growth in Eurozone countries. Three of the largest types of taxes are taken into analysis, namely personal income tax (PIT), corporate income tax (CIT), and value-added tax (VAT). The data for the independent variables (types of taxes) and the dependent variable (Gross Domestic Product – GDP) from 2002 (since the creation of the currency union) until 2019 have been taken into consideration. A total of 306 observations are entered into the panel model and analyzed using a fixed effect regression. The purpose of this paper is to highlight which types of taxes can affect growth and the magnitude of their effect. Results reveal that personal income tax, social security contribution, and customs duties and excises have a negative effect on GDP in the Eurozone countries. Whereas corporate income tax and value-added tax have a positive effect. We also find that as the share of tax income in GDP increases, their impact on economic growth deteriorates. Based on the empirical findings, we recommend that policymakers should focus on Value Added Tax and corporate income tax in order to have an impact on economic growth. Extra care should be taken in personal income tax revenues and customs and excise revenues, revenues that negatively affect economic growth.
Keywords: Tax revenue; Economic Growth; Value Added Tax; Personal Income Tax; Corporate Income Tax
JEL: C50; E62; F43; H20; P10

Ivka Tsakova

CONSEQUENCES OF GLOBAL FIRM DOMINATION IN THE POST-DEMOCRATIC EUROPEAN UNION (AND ITS MEMBER STATES)

The article analyses the crisis situation in the EU today, caused by the dominating influence of big companies and banks in public affairs on national and European levels in post-democracy (C. Crouch). In light of the political-economic and critical approach, the article analyses the power of global firms as a main factor in the New public management (NPM) during the current neoliberal capitalism. The post-democratic consequences by the implementation of the NPM in the EU and its member states are: a) emptying political institutions of their democratic content; b) defective market economy due to existing monopolies, and c) attempts to privatisation of civil society. The conclusion comprises some ideas for the rehabilitation of politics and its democratisation.
Keywords: European Union; Post-democracy; New public management; Neoliberalism; global/giant firms
JEL: P16; H1; D42; L38; K4

Milena Angelova

FACTORS FOR BOOSTING THE GREEN TRANSITION OF THE EUROPEAN MICRO, SMALL AND MEDIUM-SIZED ENTERPRISES

Micro, small and medium-sized enterprises, be they traditional enterprises, family businesses, traders, social economy enterprises, crafts or liberal professions (referred to hereafter as MSMEs), are an essential part of the solution towards a competitive, climate-neutral, circular and inclusive European economy, provided that the right conditions are created and prevail. The positive impact is generated by MSMEs through improving their own environmental performance and through providing expertise and solutions to other enterprises, citizens and the public sector. While acknowledging and highlighting the diversity and different needs of the European MSMEs, the current paper focuses on identifying factors for boosting their green transition and mapping out the effects of the recent multiple crises on this process.
Keywords: micro enterprises; small and medium-sized enterprises; MSMEs; sustainability; digitalization; support policies; social responsibility
JEL: D83; H12; L25; M38; P18; Q56

Todor Krastevich

RETARGETING CUSTOMERS USING UPLIFT MODELING

“Traditional” digital marketing campaigns are based primarily on a priori geotargeting, augmented with profiling of potential consumers based on language, sociodemographics, interests and preferences. A step ahead is when experimental results from A/B testing are used for more precise retargeting, in order to prove in a statistically significant way the direction and size of the effect of a potential communication marketing impact. Through the application of uplift modelling, it is possible to complement the experimental data from A/B testing by identifying the effect of specific marketing treatments (e.g. a specific message, alternative display ad design, web page layout and/or change in price offer) on specific individuals as opposed to an overall increase or decrease in conversion rates caused by the impact. This technique can help evaluate and predict their responses through supervised machine-learning classification algorithms. This nuanced analysis allows for personalized targeting of marketing communication to only leads who are likely to respond positively to an impact. This paper

proposes and demonstrates a prototype model for optimal retargeting of customers based on machine learning algorithms and open-source programming.
Keywords: Uplift models; predictive modeling; retargeting; supervised machine learning
JEL: M37; C35; C55; C63

Igor Britchenko, Oksana Polinkevych, Viktor Trynchuk, Inna Khovrak

THE IMPACT OF COVID-19 ON THE PHILOSOPHY OF DOING BUSINESS IN A SUSTAINABLE ENVIRONMENT

The article presents the results of the analysis of business philosophy changes under the influence of COVID-19 in the context of sustainable development. The aim of the article is to study the change in the philosophy of doing business under the influence of COVID-19 consequences and to highlight the main features of the philosophy and vectors of development. In the process of describing the business philosophy, the authors proposed an approach based on the criteria of sustainable development. The methodological basis of the study were methods of comparison, generalisation, analysis and synthesis, scientific abstraction, and expert evaluation. Characterisation of certain business philosophies was based on open public information on certain sectors of the economy, according to GICS. This approach enabled international comparability of research results. The authors found that the business philosophy has changed under the influence of COVID-19 and received an ecological, socio-psychological focus. Analysis of business philosophies allowed us to identify new slogans in the philosophy of generalised enterprises by sectors of the economy (industrial and consumer). The hypothesis that the business philosophy should be simple and customer-oriented has been confirmed. At the heart of this philosophy are social responsibility, economic aspects, corporate culture, and the goals of sustainable development.
Keywords: business philosophy; sustainable development; COVID-19; business concepts; business relationship styles; customer behavior
JEL: M21; M14; O1; L21

Herjuna Qobush Izzahdi, Ani Wilujeng Suryani

COVID-19 VACCINATION, GOVERNMENT STRICT POLICY AND CAPITAL MARKET VOLATILITY: EVIDENCE FROM ASEAN COUNTRIES

The COVID-19 pandemic had a negative impact on the volatility of the stock market in the ASEAN region. Mass vaccination and strictness policies are government efforts to tackle stock market losses. Hence, this study aims to examine the effect of the COVID-19 vaccination and the stringent government policies on the volatility of stock markets in ASEAN countries. We collected the daily index prices, the number of vaccines, and the stringency index from 13 January 2020 to 31 August 2021. Using the GJR-GARCH model (1, 1) and Generalized Least Square regression, this study found that the mass vaccination had a negative effect on stock market volatility, whereas the government's stringent policies had a positive effect. Mass vaccination tends to increase the confidence of economic actors, impacting investors' confidence in the stability of the stock market. Meanwhile, the government's strict policies have caused uncertainty among economic actors and investors regarding the economic prospects during the pandemic, leading to high levels of volatility. Therefore, governments must promote more aggressive vaccination policies, thereby reducing stringent policies for economic agents.
Keywords: COVID-19; mass vaccination; stringency policy; stock market volatility
JEL: G14; G15; G18; I18

Sviatoslav Kniaz, Nazar Podolchak, Yurii Dziurakh, Veronika Karkovska, Anatolii Kucher

DEVELOPMENT OF GOVERNMENT REGULATION ON INVESTMENT ACTIVITIES IN AGRICULTURE OF UKRAINE

The purpose of this study is to determine the main factors of state regulation that affect the efficiency of investment activities in agriculture of Ukraine. It is proved that the weakness of state regulation of investment activity in agriculture is the lack of a balanced long-term policy of economic development, which turns Ukraine into an agrarian state. The balance of payments deficit has been covered in recent years (2015–2019) due to exports of low value-added agricultural raw materials. Taking into account the fact that the world food market is constantly growing shortage of quality products, Ukraine has prospects to become a developed agro-industrial country in terms of stimulating investment in the processing of agricultural raw materials. Methodological tools for assessing the impact of government action on key indicators of investment activity in the agricultural sector of Ukraine have been developed. The level of impact of the effectiveness of state regulation with the use of such tools as financing of investment management bodies and financial incentives for investment development is the highest compared to the effectiveness of other instruments of state regulation. Rising government spending on investment management and financial assistance to farmers has a positive impact on the dynamics of return on investment in agriculture. The practical value of the developed methodological tools lies in the possibility of their use by managers of agricultural enterprises to forecast their condition, taking into account the influence of factors of state regulation related to ensuring the efficiency of investment activities in the agriculture of Ukraine. Given that forecasting is reduced to one resulting parameter, the proposed toolkit is easy to use. It should be used to justify regulatory decisions, in particular, on investment processes in agriculture.
Keywords: investment support; agriculture; investment efficiency; VAT refund; state budget; farmers; strategy
JEL: H70; Q10; Q14

Genka Rafailova, Zlatka Todorova-Hamdan, Hristina Filipova

DEVELOPMENT OF A HUMAN-CENTRIC MODEL FOR ASSESSMENT OF SMART AND SUSTAINABLE TOURISM DESTINATION

The goal of this article is to present a methodology for assessing smart and sustainable destinations' development. There are plenty of studies on the determination of concepts and models of smart destination and smart tourism. But to implement them, there is a need for initial knowledge of the status quo and opportunities for comparing best practices and similar destinations. The management of tourist destinations needs an instrumentarium for assessing the achievements and status in regard to the model of smart destinations. The focus should be on the use of strategic-oriented development in the course of the evolution of technology infrastructure, infostructure (Buhalis, 2020, Gretzel et al., 2015) and pool of knowledge and skills, as well as their interrelations with sustainability. This paper augments theory and practice with a methodology that can be used for the elaboration of a strategy for smart destination development based on sustainability and a human-centric approach. The presented methodology in the article includes a model of a smart, sustainable destination and is applied in the case study. The strategies and development of tree cities are researched.
Keywords: smart destination; sustainable development; human-centric approach; smart city
JEL: L83; O20; Q01; Z32

Vladan Pavlović, Goranka Knežević, Radica Bojičić

DO THE PROFITABILITY, THE VOLUME OF ASSETS, AND EQUITY OF PUBLIC ENTERPRISES HAVE ANY ROLE IN LOCAL AUTHORITIES' GENDER AND AGE POLICY? – A CASE STUDY OF BELGRADE

The clearest picture of an actual gender policy in a country could be given by investigating the local authorities' appointment of the directors and supervisory board members of public enterprises since no mandatory quotas have been imposed on membership on those boards. On the other hand, the election of the supervisory board member of those enterprises by the employee could show if gender inequality is present in the population. The paper's second goal is to detect any patterns in the appointment of the directors, supervisory board chairmen, and supervisory board members regarding their age and gender and the firm's characteristics. In a sample of all of Belgrade's public enterprises, we found that gender inequality is widely present in the world of politics. At the same time, it does not appear to be present in the population. Regarding age policy, older people are more likely to be appointed by the local authority in financially more powerful enterprises.
Keywords: public enterprises; gender policy; age policy; financial performance; board
JEL: M41; M48; M14; G30