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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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Fisnik Morina[1]
Duresa Kilaj[2]
Sadri Alija[3]

NEXUS BETWEEN MACROECONOMIC FACTORS AND FINANCIAL DEVELOPMENT: EMPIRICAL EVIDENCE FROM TRANSITION COUNTRIES[4]

The main purpose of this study is to analyze how different macroeconomic factors have influenced the financial development of countries in transition as well as the effect of these factors on the volatility of the banking sector in these countries. Secondary data acquired and processed from yearly statistics reports of the World Bank, the International Monetary Fund, the OECD, the European Central Bank, Eurostat, and others were used to develop this research. In the analytical section of the literature review, numerous scientific papers by various authors that have examined the issue of financial development in the economies of various countries have been reviewed. This research covers data from 2005 to 2020, which will be examined using panel and time series econometric models.

Based on the study's econometric findings, we can conclude that non-performing loans, natural resources, market liberalization, GDP per capita, inflation, and interest rates have a statistically significant impact on the financial development of transition countries by determining the amount of broad money and the volume of bank loans and deposits in these countries' financial systems. The empirical findings of this study will serve as good scientific and empirical evidence for future studies in the field of financial development and economic growth, as well as practical evidence for governments around the world in the form of strategic macroeconomic policies that will positively affect the financial development of countries in transition. In relation to essential conclusions, this research offers true and consistent findings. The studied period (2005-2020) offers a compelling time frame for making sound findings and recommendations.

Keywords: financial development; economic growth; broad money; deposits; loans
JEL: G21; B22; E44; N2; O11

[1] *Prof. Ass. Dr. Fisnik Morina, Vice – Dean and Professor at Faculty of Business, University "Haxhi Zeka" – Peja, Kosovo, Post – Doc Research in Banking, Finance, Risk Management and Financial Institutions at the University of Graz and the University of Malta. Email: fisnik.morina@unhz.eu.*

[2] *MSc. Duresa Kilaj, Faculty of Business, University "Haxhi Zeka", Peja, Kosovo. Ph.D. (cand) in Economics at South East European University, Tetovo, North Macedonia. Email: duresa.kilaj@unhz.eu.*

[3] *Prof. Dr. Sadri Alija, Professor at Faculty of Business and Economics, South East European University – Tetovo, North Macedonia. Email: s.aliji@seeu.edu.mk.*

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1. Introduction

Financial development can be defined as the process of enhancing the efficiency of allocating financial resources, monitoring capital and investment projects, promoting competition, and increasing the significance of the financial system (Huang, 2006). The size, structure, and efficiency of a financial system play a crucial role in determining economic development. One way to gauge such development is through market liberalization and financial liberalization. These processes aim to protect inefficient financial institutions and exert pressure for the reformation of the financial infrastructure, ultimately leading to a stable financial system. As a result, access to finance is enhanced, information asymmetry is mitigated, and adverse selection and moral hazard are reduced (Huang, 2006).

In the literature that examines the interaction between finance and economics, financial development is commonly regarded as a process involving the growth and enhancement of financial markets. This development is assessed through a combination of qualitative and quantitative indicators that capture aspects such as financial access, the performance of financial intermediaries and other financial institutions, and the legal regulatory framework that provides the operational foundation for financial institutions (Rama, 2016).

The development of the financial system encompasses the growth, efficiency, and stability of financial markets, as well as increased accessibility to these markets. This development brings various advantages to the economy. A well-developed and effectively managed financial market facilitates the allocation of savings towards profitable investments (Stiglitz & Weiss, 1983; Diamond, 1984), reduces information and agency costs, and promotes an efficient distribution of financial income (Greenwood, Jovanovic, 1990). Additionally, it helps lower the costs associated with corporate governance (Bencivenga & Smith, 2000).

The study aims to analyze the factors affecting financial development in countries undergoing transition. It will cover a time period of 16 years, specifically from 2005 to 2020. The study will focus on a panel of 10 countries in transition, utilizing panel data analysis techniques.

The structure of this paper will consist of several sections. In the first section, the paper will introduce the purpose and significance of the study, provide a concise overview of the methodology employed, and outline the expected results. The second section will present a literature review, drawing upon the works of contemporary authors in recent years. This section will provide a comprehensive overview of the relevant literature on the topic. In the third section, a meta-analysis will be conducted, synthesizing studies by authors from various countries who have analyzed the determinants of financial development in countries undergoing transition. This meta-analysis will contribute to a broader understanding of the factors influencing financial development in such contexts. The fourth section will focus on the research methodology. It will discuss the data sources utilized in the paper, analyze each variable included in the econometric models, and specify the econometric models employed for the analysis. The fifth section will present the empirical data and findings of the study, including the testing of hypotheses. This section will provide a detailed analysis of the results obtained from the data analysis. Finally, the paper will conclude with a section dedicated to summarizing the main conclusions drawn from the study, offering recommendations,

discussing the limitations of the research, exploring other implications derived from the findings, and listing the references used throughout the paper.

2. Literature Review

Financial development encompasses various dimensions, policies, and institutions that drive a country towards effective monetary intermediation, stable markets, and extensive integration within the economy. Seetanah (2009) underscored the crucial role of financial development in fostering economic growth. His study also emphasized the significance of factors that facilitate financial development. Previous empirical evidence has consistently demonstrated that financial development is influenced by multiple factors. By examining the methodologies employed by previous researchers, it is beneficial to conclude that financial development has a positive impact on economic growth (Seetanah, Ramessur, & Rojid., 2009).

Law and Demetriades (2006) employed several dynamic models to identify the factors influencing financial development. Their study analyzed data from 43 countries over a 21-year period, spanning from 1980 to 2001. The findings of their analysis led to the conclusion that market liberalization, investment rate, and interest rate are the most significant determinants of financial development. Additionally, the results indicated that trade and market capitalization played a more effective role in promoting financial development in middle-income countries compared to low-income countries (Demetrades, 2006).

Bist and Read (2018) conducted a study to examine the long-term relationship between financial development and economic growth. They employed panel data cointegration analysis and focused on 16 selected low-income countries, utilizing annual time series data spanning from 1995 to 2014. The findings derived from their OLS dynamic estimation indicate that financial development has a statistically significant positive impact on economic growth (Bist & Read, 2018).

The success of financial development is typically contingent on various factors. These include maintaining a stable macroeconomic environment, implementing appropriate regulations for the banking system in each country, and establishing an efficient, legal, and institutional financial market. While a high savings rate and increased investments are important, they alone do not guarantee the success of a financial system. The case of the Soviet Union serves as a pertinent example, where despite significant savings and investments, their allocation was not efficient or effective, resulting in suboptimal outcomes. A country's financial system plays a crucial role in ensuring that savings are utilized optimally, appropriately, and with careful analysis to minimize risk (Khalfaoui, 2015).

Several studies, including those by (McKinnon, 1973; Shaw, 1973; Fry, 1988) and (King & Levine, 1993), have examined the importance and contribution of banks to economic growth. Numerous researchers have also explored the relationship between financial development and economic growth, focusing on indicators such as the adjustment of financial development and economic growth (Srres et al., 2006), as well as the size and structure of the financial sector (Levine, 1997). These studies have provided evidence that underscores the connection

between financial development and economic growth. Moreover, these studies have utilized macro-level data, such as the ratio of financial size or external financing to GDP, and have found a significant and positive impact of financial development on economic growth. Additionally, they have highlighted the influence of financial development on capital accumulation through its effects on the savings rate (Pagano, 1933; Levine, 1997).

In their studies, many authors tried to analyze and investigate the effect of many macroeconomic and institutional factors on financial development. Many of them manage to identify a significant number of factors of financial development, which are as follows: inflation, trade openness, market capitalization, investment rate, interest rate, economic growth, level of gross income per capita of the population, natural resources, population level, religion, linguistic and ethnic characteristics, etc. The authors (Greenwood & Jovanovic, 1990) document that as the economy grows, the costs of financial intermediation decrease due to intense competition, promoting a greater degree of funds available for productive investment.

Financial development can indeed impact the rate of economic growth by considering the demographic structure of countries and by promoting productivity growth and capital efficiency. (Barra, Destefanis, & Lavadera, 2013) discovered in their research that countries with a younger population tend to have higher savings rates as a percentage of GDP compared to countries with an older population. Consequently, a financially developed economy with a higher savings rate is likely to experience greater growth (Levine, 1997). There is a compelling argument that a well-established and structured financial sector exerts a significant influence on economic growth, and the development of the financial sector can stimulate economic growth. The financial sector plays a crucial role in reducing transaction and information costs, as well as facilitating efficient resource allocation, which in turn promotes economic growth (Anderson, 2003).

Financial development can be assessed using various indicators, such as the depth, size, accessibility, and sustainability of the financial system. Additionally, examining the performance and activities of financial markets, banks, bond and stock markets, and other financial institutions can provide insights into financial development. A key observation is that countries with a higher degree of financial development tend to have a broader range of available financial services. A well-developed financial system offers the potential for higher returns with lower associated risks (Adnan, 2011).

The relationship between financial development and economic growth has been a subject of significant interest among researchers. Numerous studies have sought to analyze this relationship and understand the effects they have on each other. Various theorists have highlighted the role of financial development in enhancing the identification of investment opportunities, reducing investments in unproductive assets that are highly liquid, mobilizing savings, fostering technological innovation, and promoting risk-taking behaviour. Through these analyses, it becomes evident that financial development exerts a positive impact on economic growth (Levine, 1997). According to the author Xu (2000), who conducted the research, a multivariate vector-autoregressive method (VAR) was employed to analyze the effects of financial development on investment and domestic production in 41 countries between 1960 and 1993. Based on the obtained results, the hypothesis that financial

development causes economic growth and has minimal impact on it was rejected. There is strong evidence indicating that financial development is a significant factor in promoting economic growth, and investment also serves as a crucial channel through which financial development affects economic growth (Xu, 2000).

3. Meta-Analysis of Scientific Research

This section of the paper will review a series of articles. Subsequently, a meta-analysis of the research will be conducted, incorporating works from various authors who have examined similar topics to the one we have analyzed and will examine the findings derived from these studies.

Table 1. Meta-analysis of the research

Author	Year	Variables	Methods	Findings
(Takyi & Obeng, 2013)	1988-2010	GDP, Inflation, trade openness, GDP per capita, interest rate	Latency of the Autoregressive Distribution (ARDL)	Consistent with the empirical literature, the study has demonstrated that trade openness and GDP per capita are statistically significant factors influencing financial development in Ghana, with a positive effect. On the other hand, inflation and interest rates are also significant determinants of financial development, but they exert a negative impact, both in the long term and in the short term.
(Benyah, 2010)	1975-2006	M3, trade openness, financial openness and GDP	Fixed effect model	The results presented in this study indicate that trade openness is a statistically significant determinant of financial development in Africa and has a positive impact on it. However, financial openness and the GDP growth rate were found to be insignificant factors in the context of financial development.
(Baltagi, Demetriades, & Law, 2008)	1980-2003	Private credit, GDP per capita, Trade openness, financial openness	GMM model	The findings suggest that trade and financial openness have a positive association with increased negative trade expenditure. This implies that closed economies can benefit from opening their trade and capital accounts.
(Cojocaru, D, & Miller, 2012)	1990-2008	GDP, private credit, domestic credit, inflation, liquid liabilities, initial GDP	GMM model	The main conclusion that emerges is that credit to the private sector plays a significant and positive role in promoting economic growth. Additionally, domestic credit has positive effects as well.
(Aydin, Arbak, Naceur, & De Goren, 2015)	1985-2009	Credit to the private sector, bank deposits, stock market turnover, GDP per capita,	Random effects panel regressions and the Hausman test.	Based on the obtained results, it can be concluded that the majority of variables included in the model have a positive impact, except for inflation,

Author	Year	Variables	Methods	Findings
		inflation, market openness index, investment portfolio and remittances		which has a negative impact. However, the results show that bank deposits have a more significant influence. Furthermore, having an open capital account seems to mitigate the inflationary effects.
(Raza, Shahzadi, & Akram, 2014)	1990-2012	Credit to the private sector, population growth, GDP, market openness, FDI, law and order index	Panel data, fixed effect model and random effect model	The findings indicate that credit to the private sector in all countries is influenced by factors such as population growth, real GDP growth, trade openness as a percentage of GDP, net direct investment as a percentage of GDP, and the dominance index of the law (represented as RL). All of these factors are significantly associated with economic growth.
(Adamopoulos, 2010)	1965-2007	GDP, general stock market index, private sector credit and industrial production index	Vector error correction model (VECM) and Granger causality tests.	Based on the results, it can be concluded that economic growth has a positive impact on stock market development and credit market development, particularly when considering the positive effect of industrial production growth on economic growth in the case of Ireland.
(Al-Malkawi, Marashdeh, & Abdullah, 2012)	1974-2008	GDP, financial size of the firm and private credit	ARDL Bound Testing Approach.	The results indicate a negative and statistically significant relationship between financial development, as measured by M2, and economic growth. Additionally, the findings suggest the presence of bidirectional causality between the two variables.
(Calderon & Liu, 2003)	1960-1994	M2, GDP, credit	Granger causality and panel data.	Based on the analysis conducted in 109 industrial and developing countries, it can be concluded that the indicators examined in the research have an impact on financial development.
(Shabbir, Jami, Bashir, Aslam, & Hussain, 2018)	1995-2015	Inflation, trade openness, market capitalization, investment rate and interest rate	Regression analysis and correlation analysis.	The empirical findings demonstrate that all variables, including inflation, trade openness, market capitalization, investment rate, and interest rate, have a significant impact on financial development.
Asratie-Mazengia, 2021	1980-2019	Inflation, reserve requirements, real exchange rate, interest rate, trade openness and GDP	Autoregressive Distributed Lag Model (ARDL).	Based on the obtained results, it is evident that the majority of variables have a positive impact on economic development and growth, while a smaller portion of variables have a negative impact.
(Ibrahim & Sare, 2018)	1980-2015	Private credit, domestic credit, trade openness, inflation,	Generalized system of moments rules.	The findings indicate that human capital has a strong influence on financial development. Moreover,

Author	Year	Variables	Methods	Findings
		GDP per capita, gross fixed capital formation and savings		trade openness has a more significant impact on private credit compared to domestic credit.
(Bhattacharya, 2003)	1970-1971 1998-1999	GDP dhe M3	OLS model	The results indicate that, during the period under review, it is M3, representing the development of the financial sector, that has influenced GDP rather than the other way around. In other words, the expansion of the financial sector has played a crucial role in driving economic growth.

Source: Data analyzed by the authors (2023).

4. Scientific Research Methodology and Specification of the Econometric Model

The primary objective of this study is to analyze the determinants of financial development in countries undergoing transition. The research will utilize secondary data obtained from reputable sources such as the World Bank, International Monetary Fund, OECD, European Central Bank, and others. Additionally, the empirical findings of various authors' studies on the determinants of financial development will be examined, along with relevant books by experts in the fields of finance, economics, and management. The study will employ panel data spanning a period of 16 years (2005-2020) and will be analyzed using econometric models to extract significant data. The paper's significance lies in its aim to provide real and sustainable results that can shed light on the determinants of financial development in transition countries. The study will encompass 10 countries in transition.

Authors such as (Barra, Destefanis, & Lavadera, 2013), (Takyi & Obeng, 2013), (Romer P. , 1990) (Shabbir, Jami, Bashir, Aslam, & Hussain, 2018) (Valickova, Havranek, & Hovarth, 2015) (Adamu & Kargo, 2011) (Elsherif, 2015) (Astratie, 2021) er authors analyzed in their studies the determinants of financial development and economic growth. The countries in transition that will be analyzed are: Kosovo, Albania, Macedonia, Russia, Serbia, Bosnia and Herzegovina, Ukraine, Armenia, Azerbaijan and Montenegro.

This study utilizes panel data and incorporates various variables to construct three econometric models, with separate hypotheses formulated for each model. The validity of these hypotheses is assessed through the application of several statistical tests, including linear regression, random effects, fixed effects, Hausman-Taylor regression, GMM model (Arellano-Bond estimation), Generalized Estimating Equations (GEE model), ARCH-GARCH model, and Nelson's E-GARCH model. These tests are employed to verify the accuracy and reliability of the hypotheses in question.

Research Questions:

1. *How have GDP per capita, interest rates, inflation, non-performing loans, natural resources and market liberalization affected the broad money of countries in transition?*
2. *What effect have GDP per capita, interest rates, inflation, non-performing loans, natural resources and market liberalization had on bank loans in countries in transition?*

3. *What is the impact of GDP per capita, interest rates, inflation, non-performing loans, natural resources and market liberalization on bank deposits in countries in transition?*

The hypotheses of this study are as follows:

H1*: Non-performing loans, natural resources and inflation have negatively affected the broad money of countries in transition.*

H2*: GDP per capita, interest rates and market liberalization have positively influenced the broad money of countries in transition.*

H3*: Non-performing loans, natural resources, inflation and interest rates have negatively affected bank loans in countries in transition.*

H4*: GDP per capita and market liberalization have positively influenced bank loans in countries in transition.*

H5*: Non-performing loans, GDP per capita, inflation and interest rates have had a positive impact on bank deposits in countries in transition.*

H6: *Natural resources and market liberalization have adversely affected bank deposits in bank deposits of countries in transition*.

Table 2. Description of the variables included in the econometric model

Variables	Description of variables	Data source
Dependent variable (Y)	Broad Money (M2)	World Bank Annual Reports (2005 – 2020)
Independent variable (X_1)	Loans (L)	World Bank Annual Reports (2005 – 2020)
Independent variable (X_2)	Deposits (D)	World Bank Annual Reports (2005 – 2020)
Independent variable (X_3)	Non-performing Loans (NPL)	World Bank Annual Reports (2005 – 2020)
Independent variable (X_4)	Natural Resources (NR)	World Bank Annual Reports (2005 – 2020)
Independent variable (X_5)	Market Liberalization (ML)	World Bank Annual Reports (2005 – 2020)
Independent variable (X_6)	Gross domestic product per capita (GDP per cap)	World Bank Annual Reports (2005 – 2020)
Independent variable (X_7)	Inflation (INF)	World Bank Annual Reports (2005 – 2020)
Independent variable (X_8)	Interest Rate (IR)	World Bank Annual Reports (2005 – 2020)

Source: Data analyzed by the authors (2023).

The econometric models of this study are as follows:

Model 1:

$$M2 = \beta_0 + \beta_1 NPL_t + \beta_2 NR + \beta_3 ML_t + \beta_4 GDP\ cap_{it} + \beta_5 INF_t + \beta_6 IR + \gamma_{it} \quad (1)$$

Model 2:

$$L = \beta_0 + \beta_1 NPL_t + \beta_2 NR + \beta_3 ML_t + \beta_4 GDP\ cap_{it} + \beta_5 INF_t + \beta_6 IR + \gamma_{it} \quad (2)$$

Model 3:

$$D = \beta_0 + \beta_1 NPL_t + \beta_2 NR + \beta_3 ML_t + \beta_4 GDP\ cap_{it} + \beta_5 INF_t + \beta_6 IR + \gamma_{it} \quad (3)$$

Where:

M2 – Broad money

L – Loans
D – Deposits
NPL – Non-performing loans
NR – Natural resources
ML – Market liberalization
GDP per cap – Gross domestic product per capita
INF – Inflation
IR – Interest rate
γ – stochastic variables (other factors not considered in the model)
i – code dhe t – time period

The main independent variable in this study is NPL (Non-Problem Loans).

Non-performing loans represent a significant risk indicator for banks, highlighting the burden of bad debts in credit risk management. When assessing this risk, banks need to differentiate between on-balance-sheet and off-balance-sheet assets. The variable of non-performing loans was also included in the author's study, emphasizing its importance in understanding the financial health and risk exposure of banks (Khalfaoui, 2015).

The second independent variable in this study is natural resources

Natural resources are widely recognized as a significant and influential factor impacting the pace of financial development in countries endowed with such resources. Authors such as Bhattacharyya, Holder (2014) and H.L. (2011) have included this variable in their research, highlighting its importance in understanding the relationship between natural resource abundance and financial development.

The third independent variable in this study is market liberalization

Market liberalization refers to the process of removing or reducing restrictions and barriers to the free exchange of goods and services among nations. These barriers encompass tariffs, such as duties and surcharges, as well as non-tariff barriers like regulations and licensing quotas. Numerous authors, including (Astratie, 2021; Shabbir, Jamil, Bashir, Aslam, & Hussain, 2018), and many others, have examined market liberalization as a variable in their scientific research. This variable has been extensively analyzed to understand its impact on trade, economic growth, and the overall development of nations.

The fourth independent variable in this study is GDP per capita

GDP per capita, or gross domestic product per capita, serves as a crucial indicator of economic performance and is frequently utilized as a general measure of average living

standards or economic well-being, despite some acknowledged limitations. It is calculated by dividing a country's GDP by its population. This variable has been analyzed in the papers of authors such as (Takyi & Obeng, 2013; Baltagi, Demetriades, & Law, 2008; Ibrahim & Sare, 2018. These authors have examined the relationship between GDP per capita and various economic phenomena, shedding light on its significance in understanding and assessing the economic conditions and standards of living within different countries.

The fifth independent variable in this study is inflation

Inflation refers to the general increase in the price level within a country and serves as an indicator of macroeconomic instability. Economies with high inflation rates are likely to have smaller, less active, and less efficient banks, which can contribute to financial crises. This variable has been analyzed by various authors in their research, including (Demirgüç-Kunt & Detragiache, 2005; Astratie, 2021; Bittencourt, 2011).

The sixth independent variable in this study is the interest rate

The interest rate represents the cost that a lender imposes on a borrower, typically expressed as a percentage of the principal amount borrowed. It can take various forms, such as a nominal interest rate, a real interest rate, or the prevailing interest rate in the market. This variable has also been included in the research conducted by authors such as (Astratie, 2021; Shabbir, Jamil, Bashir, Aslam, & Hussain, 2018).

5. Econometric Analysis and Study Findings

In the subsequent section of this paper, we will analyze the econometric analysis specific to countries in transition. This analysis will involve examining descriptive statistics, conducting correlation analysis, and utilizing various econometric models that have previously been applied in the analysis of developing economies. Our objective is to test hypotheses and address the research questions posed in this study. To achieve this, we will process all the obtained results using the STATA program, as our data consists of secondary data. By employing rigorous statistical techniques and econometric models, we aim to generate meaningful insights into the dynamics of financial development in transition countries.

Table 3. Descriptive statistics for the first econometric model for countries in transition

Variables	Obs.	Mean	Std. Deviation	Minimum	Maximum
M2	160	48.56	17.35	0	90.1
NPL	160	10.14	11.85	0	59.8
NR	160	5.56	9.18	0	42
ML	160	83.32	23.61	0	138.6
GDP per cap	160	3.09	5.63	-15.2	33
INF	160	4.74	5.94	-2.4	48.7
IR	160	5.20	7.36	-12.9	47.9

Source: Authors' calculations in the Stata program (2023).

Based on the table above, we observe that broad money has the highest average value of 48.56, while GDP per capita has the lowest average value of 3.09. The standard deviation is highest for market liberalization, with a value of 23.61, and lowest for GDP per capita, with a value of 5.63. Additionally, we have provided information on the minimum and maximum values as well as the number of observations, which is 160 for all variables.

In the following table, we will analyze the correlation among all the factors included in the research, illustrating the relationships that exist between these variables.

Table 4. Correlation analysis for the first econometric model for countries in transition

Variables	M2	NPL	NR	ML	GDP per cap	INF	IR
M2	1.0000						
NPL	0.1840	1.0000					
NR	-0.3708	-0.2447	1.0000				
ML	0.2172	0.1495	-0.0975	1.0000			
GDP per cap	-0.2391	-0.1054	0.3262	0.1394	1.0000		
INF	-0.2346	0.2439	0.3082	0.0163	-0.0050	1.0000	
IR	-0.0193	-0.2107	0.0006	-0.0842	-0.0769	-0.1319	1.0000

Source: Authors' calculations in the Stata program (2023).

From the table, it can be observed that the Pearson correlation between M2 and problem loans is 0.1840, indicating a very weak positive correlation between these two variables. The correlation value between M2 and natural resources shows a weak negative correlation at -0.3708, suggesting that as natural resources increase, M2 tends to decrease.

The correlation between M2 and market liberalization shows a weak positive correlation of 0.2172. This suggests that as market liberalization increases, there is a tendency for broad money to increase as well, as it allows for greater trade and income generation. Regarding the correlation between M2 and GDP per capita, we observe a weak negative correlation of -0.2391. This implies that as GDP per capita increases, there is a tendency for M2 to decrease.

The Pearson correlation value between M2 and inflation is -0.2346, indicating a weak negative correlation. This suggests that as inflation increases, there is a tendency for M2 to decrease. The correlation between M2 and the interest rate shows a very weak negative correlation of -0.0193. This implies that as the interest rate increases, there is a slight tendency for broad money to decrease.

In the following section, we will analyze the econometric results for the six statistical tests that were applied in this research. Each of these tests holds significant importance for our study.

$$\mathrm{M2} = \beta_0 + \beta_1 \mathrm{NPL} + \beta_2 \mathrm{RN_{it}} + \beta_3 LT + \beta_4 \mathrm{GDPcap_{it}} + \beta_5 \mathrm{INF_{it}} + \beta_6 \mathrm{NI_{it}} + \gamma_{\mathrm{it}}$$

$$M2_{it} = \beta_0 42.99 - 1.9339 NPL_{it} - 0.3118 RN_{it} + 0.1515 LT_{it} - 0.6430 GDPcap_{it} - 0.7896 INF_{it} - 0.2661 NI_{it} + \gamma_{it}$$

Table 5. Econometric results and empirical findings for the first econometric model for transition countries

Variables	Linear Regression	Random Effects – GLS Regression	Fixed–Effects Regression	Hausman – Taylor Regression	GEE Model	GMM Model
M2	-	-	-	-	-	
NPL	-1.933903* (0.092)	0.0077061 (0.908)	.0058478 (0.929)	.0012574 (0.985)	.0068349 (0.913)	-.111658** (0.016)
NR	-0.3118567** (0.055)	-.3758886 ** (0.021)	-.3787969** (0.027)	-.3529939** (0.031)	-.3769803** (0.016)	-.3124256** (0.016)
ML	0.1515058 *** (0.006)	.403221*** (0.000)	.4160889*** (0.000)	.4084714*** (0.000)	.4087635*** (0.000)	.1571579 *** (0.023)
GDP per cap	-.6430325 *** (0.008)	-.6868812 *** (0.000)	-.6913366 *** (0.000)	-.6940067*** (0.000)	-.68881*** (0.000)	-.3875169 *** (0.000)
INF	-.789643 *** (0.003)	-.4744555*** (0.000)	-.4697356*** (0.000)	-.4680584*** (0.000)	-.4723487*** (0.000)	-.3435212 *** (0.000)
IR	-.2661773 (0.165)	.001406 (0.990)	.0101224 (0.928)	.0131985 (0.905)	.0052631 (0.961)	-.0693799 (0.332)
Const.	42.9904*** (0.000)	21.50387 *** (0.000)	20.54484 *** (0.000)	32.37643*** (0.001)	21.03237*** (0.000)	
R Square	0.2467	0.5567	0.5569			
Adj.R^2	0.2168	0.1814	0.1786			

*Explanation: P-values are shown in parentheses: *** indicates statistical significance at the level of 1%; ** indicates statistical significance at the 5% level, and * indicates statistical significance at 10%.*
Source: Authors' calculations in the Stata program (2023).

From the obtained data, we see that the largest number of variables have turned out to be significant at the levels of statistical significance of 1%, 5%, and 10%. The interpretation of our results will be done through linear regression.

β0 – If all other factors are held constant, the value of the loan is expected to be 42.99 units. This statement is deemed correct since the significance value (P-value = 0.000 < 0.01) indicates statistical significance at the chosen level.

β1 – If NPLs increase by one unit holding all other factors constant, then M2 will decrease by -1.933 units. This statement is correct as the significance value (P-value = 0.091<0.10) is at the level of statistical significance.

β2 – If natural resources increase by one unit, holding all other factors constant, M2 will decrease by -0.311 units. The statement is correct since the significance level is within the confidence interval because 0.055<0.05.

β3 – If market liberalization increases by one unit holding all other variables constant, then M2 will increase by 0.1515 units. This statement is correct as the significance value is at the level of statistical significance (P-value = 0.006<0.001). The positive and significant relationship between market liberalization and financial development indicates greater trade growth than a country. Trade with foreign countries also increases foreign exchange which boosts the economy as well as develops the banking sector.

β4 – If GDP per capita increases by one unit holding all other variables constant, then M2 will decrease by -0.6430 units. The statement is correct as the significance value 0.008<0.001 is at the level of statistical significance

β5 – If inflation increases by one unit, holding all other factors constant, M2 will decrease by -0.7896 units. The statement is correct as the significance value (P-value = 0.003<0.001) 001 is at the level of statistical significance. The negative relationship between inflation and financial development is an important element for the performance of the financial economy since price stability is a basic element for financial development. Moderate inflation rates with little volatility create bankruptcy problems for financial institutions, as they do not engage in price wars to maximize their deposits. So, the high rate of inflation slows down the progress in financial development.

β6 – If the interest rate increases by one unit, holding all other factors constant, then M2 will decrease by -0.2661 units. This statement is not correct since the significance values (P-value = 0.165>0.05) are not at the appropriate level of confidence.

The table below will analyze descriptive statistics for the second econometric model for countries in transition.

Table 6. Descriptive statistics for the second econometric model for countries in transition

Variables	Obs.	Mean	Std. Deviation	Minimum	Maximum
L	160	38.98	21.21	0	87.3
NPL	160	10.14	11.85	0	59.8
NR	160	5.56	9.18	0	42
ML	160	83.32	23.61	0	138.6
GDP per cap	160	3.09	5.63	-15.2	33
INF	160	4.74	5.94	-2.4	48.7
IR	160	5.20	7.36	-12.9	47.9

Source: Authors' calculations in the Stata program (2023).

In this table, we can observe that our sample consists of 160 observations. The table provides information on the average value, standard deviation, minimum value, and maximum value for each variable. These statistics help us understand the central tendency, variability, and range of values within the dataset. Furthermore, the table indicates that the correlation analysis will be conducted for the variables included in the study for the second econometric model in transition countries. This analysis aims to explore the relationships and associations between these variables.

Based on the obtained results, it can be observed that there are relationships between all the variables. The correlation between credit and non-performing loans is very weak, with a positive correlation coefficient of 0.0512. This indicates a slight positive association between these two variables. On the other hand, the correlation between credit and natural resources is negative, indicating a weak negative correlation coefficient of -0.2283. This suggests that as the level of natural resources increases, the level of loans tends to decrease. These correlation values provide insights into the relationships between the variables under

consideration and can help in understanding their interdependencies in the context of the second econometric model for transition countries.

Table 7. Correlation analysis for the second econometric model for countries in transition

Variables	L	NPL	NR	ML	GDP per cap	INF	IR
L	1.0000						
NPL	0.0512	1.0000					
NR	-0.2283	-0.2447	1.0000				
ML	0.2411	0.1495	-0.0975	1.0000			
GDP per cap	-0.3689	-0.1054	0.3262	0.1394	1.0000		
INF	0.0042	0.2439	0.3082	0.0163	-0.0050	1.0000	
IR	-0.1031	-0.2107	0.0006	-0.0842	-0.0769	-0.1319	1.0000

Source: *Authors' calculations in the Stata program (2023).*

The Pearson correlation between credit and market liberalization is a weak positive correlation of 0.2411, so with the growth of the market, we also have an increase in credit. This is because the market is expanding and financial means are needed, and we can do this by lending credit to banks. The correlation value between credit and GDP per capita is -0.3689, so we have an average negative correlation, whereas GDP per capita increases, credit decreases.

The correlation value for credit and inflation presents a very weak negative correlation of 0.0042, where the increase in inflation causes the increase in credit, but at a very low level. The correlation between credit and the interest rate is a weak negative correlation of -0.1031, and with the increase in the interest rate, the level of credit decreases because individuals' interest in getting credit decreases due to high-interest rates.

The following table will present the econometric results for the six statistical tests analyzed in the research and for the second econometric model for countries in transition.

$$\text{Kredit}_{it} = \beta_0 + \beta_1 \text{NPL}_{it} + \beta_2 \text{RN}_{it} + \beta_3 \text{LT}_{it} + \beta_4 \text{GDPcap}_{it} + \beta_5 \text{INF}_{it} + \beta_6 \text{NI}_{it} + \gamma_{it}$$

$$\text{Kredit}_{it} = -0.5614\text{NPL}_{it} - 0.2591\text{RN}_{it} + 0.1122 - 0.5449\text{GDPcap}_{it} + 0.1825\text{INF}_{it} + 0.2408\text{NI}_{it} + \gamma_{it}$$

Analyzing the data in Table 8, we see that most of the variables included in the model are significant, with the exception of natural resources and inflation, which are not significant at the 1%, 5%, and 10% confidence levels. Our coefficients will be interpreted through the GMM model.

β1 – If NPLs increase by one unit, holding all other factors constant, then NPLs will decrease by -0.56 units. The statement in our case is correct, as the significance value (P-value = 0.000 < 0.001) is at the level of statistical significance. Non-performing loans are those that negatively affect a financial institution, such as banks, causing them problems and, in some cases, preventing them from giving more loans.

Table 8. Econometric results and empirical findings for the second econometric model for transition countries

Variables	Linear Regression	Random Effects – GLS Regression	Fixed–Effects Regression	Hausman – Taylor Regression	GEE Model	GMM Model
L	-	-	-	-	-	
NPL	-.1396636 (0.320)	-.259736* (0.061)	-.2715143** (0.059)	-.2696157** (0.054)	-.2579203** (0.059)	-.56141*** (0.000)
NR	-.1898119 (0.339)	.1589556 (0.614)	.3236262 (0.381)	.1498006 (0.643)	.1397638 (0.647)	-.2591288 (0.265)
ML	.2626791 *** (0.000)	.523831*** (0.000)	.5575335 *** (0.000)	.5237365 *** (0.000)	.5184282*** (0.000)	.1122215* (0.076)
GDP per cap	-1.511381*** (0.000)	-1.511471 *** (0.000)	-1.547691*** (0.000)	-1.508378 *** (0.000)	-1.507346*** (0.000)	-.5449*** (0.001)
INF	-.0698886 (0.827)	-.1302383 (0.645)	-.1308764 (0.648)	-.1305044 (0.646)	-.1294414 (0.642)	.1825097 (0.237)
IR	-.3869334 (0.101)	.1306009 (0.575)	.2239148 (0.358)	.1289693 (0.583	. 117895 (0.606)	.24084* (0.082)
Const.	26.81106 *** (0.000)	1.912005 (0.825)	-1.918159 (0.801)	1.026724 (0.933)	2.500035 (0.763)	
R Square	0.2464	0.3681	0.3698			
Adj.R^2	0.2165	0.1664	0.1426			

*Explanation: P-values are shown in parentheses: *** indicates statistical significance at the level of 1%; ** indicates statistical significance at the 5% level, and * indicates statistical significance at 10%.*
Source: *Authors' calculations in the Stata program (2023).*

β2 – If natural resources increase by one unit and we continue to hold other variables constant, then credit will decrease by -0.25 units. The statement is not correct as the significance level is not in the confidence interval (P-value = 0.265 > 0.10).

β3 – If market liberalization increases by one unit while holding other factors constant, credit will increase by 0.1122 units. The statement is correct because the P-value (0.076 < 0.10) is at the level of statistical significance. It is known that when the circulation of the domestic market increases, even more financial means are needed for the operation and growth of that market, so the share of credit growth is also affected.

β4 – If GDP per capita increases by one unit and we continue to hold other variables constant, then credit will decrease by -0.54 units. This statement is correct because the significance value (P-value = 0.001 < 0.05) is at the level of statistical significance. The impact of GDP per capita shows that the more production expands within a country's economy, the more financial resources will be provided by domestic banks to the productive sectors, which will increase the level of development of the financial sector. This means that the level of production per person will drive the level of development of the financial sector within the country since the allocation of resources for productive purposes is vital for the growth of production. The more capital accumulated within the member states, the more funds will be used by banking institutions in the form of loans.

β5 – If inflation increases by one unit, holding all other factors constant, then the credit will increase by 0.1825 units. This statement is not correct because the P-value of 0.237 > 0.10 is not at the level of statistical significance.

β6 – If the interest rate increases by one unit while holding other variables constant, then the loan will increase by 0.24 units. The statement is correct because (P-value = 0.082 < 0.10) the significance value is at the level of statistical significance. In cases where interest rates rise more, banks tend to also increase the levels of loans that have a lot of leverage in terms of profit from interest rates.

The following tables will analyze the data extracted from descriptive statistics for the third econometric model for countries in transition.

Table 9. Descriptive statistics for the third econometric model for countries in transition

Variables	Obs.	Mean	Std. Deviation	Minimum	Maximum
D	160	5.615	4.136723	0	18.3
NPL	160	10.14463	11.8514	0	59.8
NR	160	5.561635	9.181123	0	42
ML	160	83.32	23.61848	0	138.6
GDP per cap	160	3.0925	5.639378	-15.2	33
INF	160	4.749686	5.947746	-2.4	48.7
IR	160	5.20125	7.364029	-12.9	47.9

Source: Authors' calculations in the Stata program (2023).

We further see that the variable with the highest mean in the third model is non-performing loans (10.14463), continuing with the standard deviation, where the market liberalization variable has the highest standard deviation (23.61848) and the variable with the highest maximum value is market liberalization (138.6).

Table 10. Correlation analysis for the third econometric model for countries in transition

Variables	D	NPL	NR	ML	GDP per cap	INF	IR
D	1.0000						
NPL	0.1604	1.0000					
NR	0.3837	-0.2447	1.0000				
ML	-0.0837	0.1495	-0.0975	1.0000			
GDP per cap	0.0423	-0.1054	0.3262	0.1394	1.0000		
INF	0.4955	0.2439	0.3082	0.0163	-0.0050	1.0000	
IR	0.1193	-0.2107	0.0006	-0.0842	-0.0769	-0.4555	1.0000

Source: *Authors' calculations in the Stata program (2023).*

From the data presented in the tables, we see that we have a portion of the Pearson correlation analysis for our variables. The correlation between deposits and non-performing loans is a weak positive correlation of 0.1604, because as non-performing loans increase, the level of deposits increases because banks are reluctant to lend because of problems with those loans and therefore decide to keep them in the form of deposits for a while. The Pearson correlation value between deposits and natural resources is 0.3837, i.e., an average positive correlation where the increase in natural resources also increases the level of deposits.

Deposits and market liberalization have a very weak negative correlation (-0.0837) because, with the growth of the market, the level of deposits decreases due to the fact that money is

released into circulation due to the market and is not kept in the form of deposits. The correlation value for deposits and GDP per capita is 0.0423, a very weak positive correlation.

The correlation between deposits and inflation is an average positive correlation of 0.4955, where with the increase in inflation we have an increase in deposits. Because inflation causes the value of money to fall, individuals prefer to keep their money in the form of deposits rather than invest in times of inflation. The Pearson correlation value between deposits and the interest rate is positive at 0.1993, so we have a very weak positive correlation between these two variables.

The table below presents very clearly the econometric results for the third econometric model and will show the impact of each variable on deposits.

$$Deposits_{it} = \beta_0 + \beta_1 NPL_{it} + \beta_2 RN_{it} + \beta_3 LT_{it} + \beta_4 GDPcap_{it} + \beta_5 INF_{it} + \beta_6 NI_{it} + \gamma_{it}$$

$$Deposits_{\ it} = \beta_0 6.3745 + 0.1851 NPL_{it} + 0.01851 RN_{it} - 0.0441 LT_{it} + 0.0074 GDPcap_{it} + 0.2580 INF_{it} + 0.1436 NI_{it} + \gamma_{it}$$

In the following, we will present the econometric results which will be commented on by Fixed – Effects Regression where most variables are significant at the 1%, 5% and 10% confidence level.

β_0 – If all other factors are constant, then the value of the deposit will be 6.37 units. The statement is correct since the values are within the confidence interval (P-value = 0.002 < 0.01).

β_1 – If non-performing loans increase by one unit, holding other variables constant, then deposits will increase by 0.01851 units. The statement is correct because the significance value is at the level of statistical significance (P-value = 0.025 < 0.05).

β_2 – If natural resources increase by one unit while holding all other factors constant, deposits will increase by 0.018 units. The statement is correct because the significance value is within the preferred range (P-value = 0.052 < 0.10).

β_3 – If market liberalization increases by one unit, keeping other variables constant, then deposits will decrease by -0.044 units. This statement is correct, as the significance value (P-value = 0.003 < 0.01) is at the level of statistical significance.

β_4 – If GDP per capita increases by one unit while holding other factors constant, deposits will increase by 0.0074 units. The statement is not correct as the significance value is not at the level of statistical significance (P-value = 0.873 > 0.10).

β_5 – If inflation increases by one unit while holding other variables constant, then deposits will increase by 0.2580 units. This statement is correct, as the significance value is at the level of statistical significance (P-value = 0.000 < 0.001).

β_6 – If the interest rate increases by one unit while holding other variables constant, deposits will increase by 0.1436 units. The statement is correct because the significance value is in the confidence interval (P-value = 0.002 < 0.010).

Table 11. Econometric results and empirical findings for the third econometric model for transition countries

Variables	Linear Regression	Random Effects – GLS Regression	Fixed–Effects Regression	Hausman – Taylor Regression	GEE Model	GMM Model
D	-	-	-	-	-	
NPL	.0626754*** (0.008)	.0601119** (0.010)	.0185155 (0.025)	.0330986 (0.185)	.0320979 (0.185)	-.0207641 (0.257)
NR	.1066693*** (0.001)	.1111789*** (0.001)	.0185155** (0.052)	.1117305** (0.038)	.1256105** (0.013)	.0951717** (0.024)
ML	-.0117003 (0.288)	-.0143203 (0.207)	-.0441201*** (0.003)	. -.0367785*** (0.007)	-.034878*** (0.008)	-.0160963 (0.185)
GDP per cap	.0211707 (0.663)	- .0160951 (0.736)	.0074737 (0.873)	.009517 (0.834)	.0054271 (0.902)	.0056601 (0.849)
INF	.3953349*** (0.000)	.3753006*** (0.000)	.2580042*** (0.000)	.2770426*** (0.000)	.2815766*** (0.000)	.1264334*** (0.000)
IR	.2309547*** (0.000)	.2177598*** (0.000)	.1436711*** (0.002)	.1499682*** (0.000)	.1561375*** (0.000)	.0787551*** (0.004)
Const.	2.224557** (0.031)	2.622205** (0.014)	6.374545*** (0.000)	4.228463** (0.016)	5.334828*** (0.000)	
R Square	0.4569	0.1740	0.2117			
Adj.R^2	0.4353	0.4562	0.3638			

*Explanation: P-values are shown in parentheses: *** indicates statistical significance at the level of 1%; ** indicates statistical significance at 5% level, and * indicates statistical significance at 10%.*
Source: *Authors' calculations in the Stata program (2023)*

6. Econometric Results of Nelson's E-Garch Model for Countries in Transition

Below are the econometric results of the Nelson E-Garch statistical test for countries in transition. Through this econometric model, it will be analyzed whether non-performing loans have influenced the volatility of financial development, bank loans, and bank deposits in countries in transition. We will continue to try to answer how non-performing loans and other determining factors have affected the volatility of broad money in countries in transition.

Table 12. Econometric results of Nelson's E-Garch model between non-performing loans and financial development for countries in transition

Z-Score	Coef.	Std. Error	Z	P>|z|	95% Conf. Interval	95% Conf. Interval
NPL	.6893401	.0220162	31.31	0.000	.6461891	.732491
_cons.	41.32941	.2662377	155.22	0.000	40.80759	41.85122
ARCH L1.	1.499238	.1993422	7.52	0.000	1.108534	1.88941
EARCH L1.	2.29766	.2779191	8.27	0.000	1.752948	2.842371
E-GARCH (L1)	.4817554	.0624605	7.71	0.000	.3593351	.6041757
E-GARCH (L2)	.622679	.0518426	12.01	0.000	.5210694	.7242887
cons.	.0022809	.3161598	0.01	0.994	-.6173809	.6219427

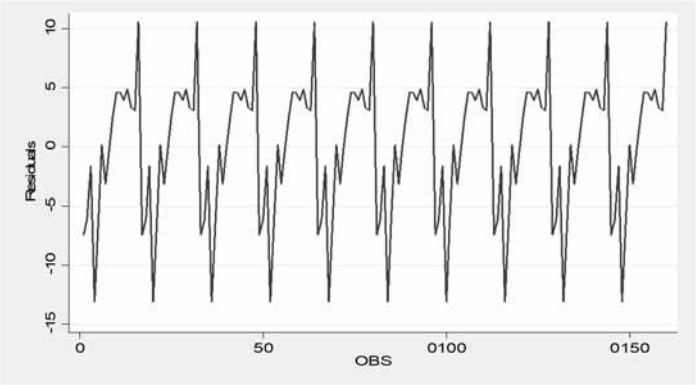
Source: Authors' calculations in the Stata program (2023).

According to the econometric results of the statistical test, we can conclude that we have a positive and significant correlation (P-value = 0.000 < 0.05). So, with the increase in non-performing loans, we also have an increase in the instability of financial development in countries in transition.

In the time constant (L1), we have a positive and significant correlation of 0.000 < 0.05. When NPLs in 2019 increase by one unit, then broad money volatility in 2020 increases by 0.48 units. This econometric result shows that the countries in transition have not made an effective use of problem loans, and therefore we have come to increase the instability of financial development and decrease the monetary base.

Such an effect also exists in the constant (L2), where we have a positive and significant correlation of 0.000 < 0.05. When non-performing loans increase by one unit, then the volatility of financial development increases by 0.62 units. This economic phenomenon shows that the transition countries in the dynamic time lag (L2) have had problems with the management of non-performing loans, and as a result, the rate of non-performing loans has increased in these countries, which has automatically caused an increase in the share of volatility in financial development.

Figure 1. Volatility of time series data for variable Z-Score and financial development for countries in transition



Source: Authors' calculations in the Stata program (2023).

In the following we will try to answer the question, how did non-performing loans and other determining factors influence the volatility of loans in transition countries?

From the obtained results, we can conclude that non-performing loans affect the decline in the value of financial development. So, with the increase in non-performing loans, the volatility of bank loans in transition countries increases by 0.00 < 0.05.

In the constant (L1), we have a positive and significant correlation (P-value = 0.000 < 0.05). Therefore, if non-performing loans increase by one unit, then the value of bank loan volatility will increase by 0.71 units. Based on this, we say that countries in transition have not had an adequate policy for the management of problem loans, and this has resulted in an increase in the instability of small loans.

Table 13. Econometric results of Nelson's E-Garch model between non-performing loans and bank loans for countries in transition

Z-Score	Coef.	Std. Error	Z	P>|z|	95% Conf. Interval	95% Conf. Interval
NPL	-.3617398	.0078309	-46.19	0.000	-.377088	-.3463916
_cons.	51.08706	.	.	.	.	.
ARCH L1.	2.261413	.294789	7.67	0.000	1.683637	2.839189
EARCH L1.	4.152617	.440956	9.42	0.000	3.288359	5.016874
E-GARCH (L1)	.7134858	.072826	9.80	0.000	.5707481	.8262234
E-GARCH (L2)	-.0832269	.1690017	-0.49	0.622	-.4144641	.2480103
E-GARCH (L3)	.4484542	.1388322	3.23	0.001	.1763482	.7205603
E-GARCH (L4)	-.0122881	.0481043	-0.26	0.798	-.1065708	.0819945
E-GARCH (L5)	-.4014008	.2395052	-1.68	0.094	-.8708224	.0680209
_cons.	1.452908	1.458118	1.00	0.319	-1.404951	4.310766

Source: *Authors' calculations in the Stata program (2023).*

Such an effect also exists in the constant (L3), where we have a positive and significant correlation of 0.001 < 0.05. So, when non-performing loans with dynamic time delay (3) increase by one unit, then the volatility value of bank loans will increase by 0.44 units, which is not a good situation for transition countries.

It will continue with the question of how non-performing loans and other determining factors have affected the volatility of deposits in countries in transition?

Table 14. Econometric results of Nelson's E-Garch model between non-performing loans and bank deposits for countries in transition

Z-Score	Coef.	Std. Error	Z	P>|z|	95% Conf. Interval	95% Conf. Interval
NPL	.682653	.0275418	2.48	0.013	.0142843	.1222463
_cons.	5.287741	.4331654	12.21	0.000	4.438752	6.613673
ARCH L1.	-.1619336	.1553748	-1.04	0.297	-.4664626	.1425954
EARCH L1.	1.231135	.2108666	5.84	0.000	.8178445	1.644426
E-GARCH (L1)	.0337822	.130326	0.26	0.795	-.2216521	.2892165
E-GARCH (L2)	-.7934372	.1439486	-5.51	0.000	-1.075571	-.5113031
_cons.	.3787113	.8950604	0.42	0.672	-1.375575	2.132997

Source: *Authors' calculations in the Stata program (2023).*

From the results obtained from Nelson's E-Garch model, we can conclude that non-performing loans affect the increase in volatility value. So, with the increase in non-performing loans, the volatility of bank deposits increases by 0.013 < 0.05.

In the constant (L2), there is a negative and significant correlation of 0.000 < 0.05. When non-performing loans in the dynamic time lag period (2) increase by 1 unit, then bank deposits will decrease by -0.79 units in the current period. According to this econometric result, we can conclude that for this period, the countries in transition have faced bad administration of problem loans, which has also influenced the increase in the volatility of bank deposits.

7. Conclusions and Recommendations

Financial development plays an important role in economic development. Financial development promotes and stimulates economic growth through the accumulation of physical capital and technological advancement by increasing the rate of savings, providing investment information, optimizing the allocation of capital, mobilizing and pooling savings, and facilitating and encouraging foreign capital inflows. From our analysis, it was clearly understood that financial development is a very important element for every country in the world. From the research done, it was noticed that countries in transition attach great importance to financial development and are committed to this part. Since the purpose of our research was to analyze the determinants of financial development for countries in transition, we tried to consider in the study the variables that would best help us get an answer for our study. Also, during this research, three econometric models were built, and for each econometric model, separate analyses were made to reach the answer we wanted at the end of the research.

The findings of the study for countries in transition show that for the first econometric model only the GDP per capita variable has a positive impact on broad money and is significant at the 1%, 5% and 10% levels, while non-performing loans and natural resources, market liberalization, inflation and interest rate have negatively affected broad money and are not significant. In the second econometric model where bank loans are the dependent variable, market liberalization is significant and has a positive impact on bank loans. While GDP per capita, non-performing loans, natural resources, inflation and interest rates had a negative impact on bank loans. While in the last econometric model where the dependent variable is bank deposits, the variables GDP per capita, non-performing loans, natural resources, inflation and interest rate positively affected bank deposits and were significant at the 1%, 5% and 10% levels. While market liberalization negatively affected bank deposits in countries in transition. From all the results and analysis obtained from this research, we had the opportunity to see the value and importance of each variable included in the research and to see how they influenced each other and the weight they had on financial development. In some cases, we had the opportunity to see how some of the variables had started to fall in recent years due to the situation from the COVID-19 pandemic that has hit the world and damaged it in many aspects and this was also observed in our study. However, these countries must choose the right policies that help them eliminate these barriers and strengthen the economy. Regarding the recommendations that we will give in this paper, there are some that we believe are important for these countries, and they are: Through this study, it is recommended that the governments of different countries around the world design strategic macroeconomic policies that will positively affect the financial development of countries in transition. Likewise, the other recommendation would be for the governments of these countries to pay more attention to the development of the financial system, competition, increased efficiency, and the proper distribution of financial resources in these countries because it will positively affect financial development and the function of sustainability more than economic growth. It is recommended that state institutions promote increased financial and economic development for countries in transition, as all countries have been hit economically by many factors caused by the COVID-19 pandemic. Another recommendation is for banks to be careful about interest rates so as not to raise them to an unbearable level

for individuals because this is hurting them. Also, be more careful with the part about problem loans because these have caused problems with the performance of banks and broad money.

Non-performing loans have negative effects on the financial development of transition countries. These effects have a negative impact on the banking sector, the country's economy, and foreign investments. Non-performing loans reduce the availability of loans for individuals, businesses, and investment projects. This can stagnate economic activity, hinder new investments, and affect the increase in unemployment. Non-performing loans weaken the banking system of a country. Banks facing risky creditors must limit their lending and may need to increase reserves for expected losses. This can weaken the financial situation of banks and bring uncertainty to the banking system. In some cases, non-performing loans in the banking sector can lead to the extension of financial and economic crises. In these situations, governments may be forced to intervene to control the situation and rescue banks that are in difficulty. This increases the state's debt and slows down economic development. Non-performing loans usually lower the confidence of investors in the financial markets of a country. This can result in low inflows of foreign direct investment and excessive speculation, which negatively affect the stability of the financial market. The main recommendations for managing non-performing loans and improving the financial development of countries in transition are as follows: strengthening supervision and transparency, the country's authorities must strengthen the supervision of the financial sector and ensure a climate of transparency in the market. This helps identify risks early on and prevent non-performing loans. Implementation of regulatory and risk management policies: banks and financial institutions must accurately implement regulatory policies and manage credit risk. Responsibility for creditors and investors must be essential to avoiding the outbreak of financial crises. Promotion of financial education and financial management: education of citizens and businesses in the field of finance and financial management is crucial. This helps increase awareness and better cope with credit and financial risk. Encouragement of investment in infrastructure: continuous investment in infrastructure helps increase economic activity and improve the financial situation. This type of investment also creates opportunities for a return on investment and sustainable economic growth. Support for productive and innovative sectors: governments and other institutions must support productive and innovative sectors to help diversify the economy and increase competitiveness. By implementing the above recommendations, countries in transition can better cope with the challenges of non-performing loans and improve financial stability, economic growth, and sustainable development.

Inflation has significant effects on the financial development of transition countries. If the level of inflation is controlled and stable, there are some advantages, but when inflation is high and unstable, there are negative consequences that can deeply impact the economies of these countries. The central banks of transition countries should use careful and predictable monetary policies to control inflation and maintain the stability of the currency's value. The use of monetary policy instruments such as interest rates and bank reserves helps to prevent excessive inflation. Governments should pursue responsible fiscal policies, control budget deficits, and follow sustainable public debt strategies. Financial institutions and experts should closely monitor inflation and identify its sources. This monitoring helps identify the factors influencing inflation and take appropriate measures to control it. Market liberalization

attracts foreign direct investments as it creates a favourable environment for investors in countries in transition. This increase in foreign investments can help modernize infrastructure, develop different economic sectors, and boost employment. Market liberalization can increase competition, making companies more efficient and offering better and cheaper products and services. This can benefit consumers and lead to economic growth. An important aspect of market liberalization is preventing market dominance by large and monopolistic companies. This can be achieved through antitrust policies and by promoting healthy competition in the market. In some cases, market liberalization may negatively affect different economic sectors, leaving them at risk of losing competitiveness. Therefore, it's essential for governments to support vital sectors to progress and stimulate their development. For countries in transition with abundant natural resources, the extraction and sale of these resources can bring in increased revenue for the state. This can aid in financing infrastructure projects, public services, and other investments in the economy. It is crucial for countries in transition to diversify their economies and not rely solely on natural resources. This means developing other economic sectors such as technology, manufacturing, tourism, etc. to avoid the risks of an undiversified low economy. Transition countries must use their revenues from natural resources carefully and sustainably. These revenues should be wisely invested in infrastructure projects, education, healthcare, and other economic sectors to improve overall development in transitional countries.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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Iana Paliova[1]

CHALLENGES OF BULGARIA'S FISCAL POLICY TOWARDS GREEN TRANSITION IN THE EUROPEAN UNION[2]

The article is dedicated to the challenges of the fiscal policy of Bulgaria in the context of the European Union's (EU) priorities for a green, climate-neutral economy's transition. The article analyzes the fiscal aspects of the EU Green Deal and related initiatives NextGenerationEU, Fit for 55 packages, RePower Plan and Just Transition Mechanism for the EU program period 2021-2027. It examines the objectives of the EU Green Deal's implementation in the context of the EU Strategy for Financing the Transition to a Sustainable Economy. It studies the mechanisms, tools and alternative approaches in the application of EU funding and modern financial instruments to stimulate the green transformation of the EU economy.

The research assesses the opportunities for the green transition in Bulgaria through the application of national and European financial instruments. The study assesses the effects of the fiscal instruments for mitigating and adaptation to climate change on the fiscal deficit of Bulgaria. The study shows that the fiscal policy with EU funding and national co-financing for green policies under the National Recovery and Resilience Plan and the Partnership Agreement for 2021-2027 could augment the green transition and have a net positive impact on the fiscal balance. The study also outlines the possible risks and negative impacts on budgetary aggregates.

Keywords: Environmental Sustainability; Government Policy; Economic Integration
JEL: Q56; Q58; F15

Introduction

The EU economic growth paradigm implemented during the Multiannual Financial Framework (MFF) for 2021-2027 is focused on growth recovery and the transition to a climate-neutral and digital economy, but better linked to the EU social goals. In April 2021,

[1] *Iana Paliova, PhD, Chief Assistant Professor in Economic Research Institute at the Bulgarian Academy of Science and Public Sector Consultant at the International Monetary Fund, +359 884 026984, e-mail: i.paliova@iki.bas.bg; ipaliova@abv.bg.*

[2] *The article is based on the author's study Paliova I. (2023). Theoretical and policy aspects of the green transition: fiscal perspectives (pp.19-126). In the collective book: Bobeva D., Zhelyazkova V., Aleksandrova S., Paliova I. (2023). The green transition in the European Union and the challenges facing the financial sector and public finances of Bulgaria, Paisii Hilendarski University Press, ISBN 978-619-202-878-7 (in Bulgarian).*

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the EU-27 reached an agreement on the EU climate legislation, which sets out a framework for climate action to increase security for society and increases the EU's ambition for 2030, with a new target of reducing net greenhouse gas emissions by 55%. Consequently, the Green Deal and EU financial instruments for climate change mitigation and adaptation, pollution control and natural resource management have become among the highest priorities of the EU Member States (MS) during the EU 2021-2027 program cycle.

On January 14, 2020, as part of the EU Green Deal[3], the European Green Deal Investment Plan was presented by the European Commission (EC)[4], which plans to mobilize at least EUR 1 trillion of public and private investments over the next decade.[5] Since 2005 the EU Emissions Trading Scheme (ETS) has generated substantial revenue to mitigate climate change, but additional public and private resources through the new EU initiatives have been needed to achieve the EU goals for climate neutrality by 2050. The Recovery and Resilience Facility (RRF) under NextGenerationEU[6] and the European Green Deal Investment Plan introduce financial instruments through public policies to stimulate environmental investments and to manage decarbonisation in the MS.

In this regard, the purpose of the study is to analyse the fiscal aspects of the EU's new initiatives for the decarbonisation of the EU economy during the program period 2021-2027 and to assess the challenges for Bulgaria's fiscal policy for the implementation of the EU Green Deal and initiatives with a focus on the assessment of the impact of green policies on Bulgaria's fiscal deficit.

1. Budget Aspects of the EU Green Transition Initiatives

The transition to a green economy in the EU depends on the political decisions of the EU institutions, parliaments and MS governments and the effectiveness of fiscal institutions in the implementation of public policies for energy decarbonisation and climate change mitigation and adaptation, including through the uptake of the European Structural and Investment Funds (ESIF) and the new EU funding instruments for the program period 2021-2027.

To achieve its targets for the reduction of carbon emissions by 55% till 2030, the EU has established a number of legal initiatives, which the MS should implement in their legislation and medium-term budgetary frameworks.[7] The energy crisis in the EU, following Russia's

[3] EU Green Deal, Official site of the European Commission, https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en.
[4] EU Green Deal investment Plan, https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_24
[5] Official website of the European Commission, clarifications on the European Green Deal Investment Plan and the Just Transition Mechanism, https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_24.
[6] Official website of the European Commission, https://next-generation-eu.europa.eu/index_en.
[7] The new financial instruments include: (a) Recovery and Resilience Facility (RRF) and Support of Cohesion and Territories in Europe (EU-REACT) for investments and reforms; (b) Just Transition Fund (JTF) to stimulate the transition to a climate neutral economy linked to the EU social goals; (c) Horizon 2020 program to stimulate research and innovation; (d) Solvency Instrument Support Facility and the

military invasion of Ukraine, has contributed to new challenges for the MS national budgets, and the European Commission (EC) approved a REPowerEU Plan to provide additional EU resources under their national recovery and resilience plans of the MS to accelerate the environmental transition through new more ambitious targets for energy from renewable sources (RES) up to 45% by 2030.[8]

In the program period 2014-2020, the focus has been on the effects of the MS fiscal policy on sustainable growth, with environmental policies implemented through the ESIF and the Investment Plan for Europe (the so-called Junker Plan).[9] The plan unlocked public and private investment in the real economy of EUR 315 billion over a three-year fiscal period to drive economic growth and the environmental transition. The effects of environmental policies at the EU level were measured by the harmonization of national environmental and social policies, as well as technical standards with the EU legislation; creation of administrative capacity at the level of public administration for the implementation of the EU policies and effective participation in decision-making at the EU level.[10]

From January 2020, the European Green Deal sets out a clear direction for an overarching policy framework for the green transformation of the EU MS economies with significant public funding through national budgets. The goal is to reduce greenhouse gas emissions by 55% by 2030 and to achieve climate neutrality by 2050. Thus, strengthening the links between national structural reform programs and the existing EU funding mechanisms becomes an important condition not only for the 2014-2020 program period but also for 2021-2027.

The EU Green Deal policies use a combination of the EU and national government fiscal policy incentives to remove spillovers and apply the polluter pays to national budgets so that the costs of society are reflected in public and private investment decisions. Specific fiscal initiatives are targeted at relevant sectoral regulatory barriers, such as obstacles to the financing and implementation of energy efficiency investments in the construction sector.

The different nature of the current global economic situation calls for caution and care in considering the economic implications of the fiscal expansion from 2020, and a return to the medium-term budgetary objective. The COVID-19 pandemic and the EU green transition priority also demanded the taking of a historically new step of EU integration to finance the EU budget with new own resources.

The EU budget for 2021-2027 includes, in addition to the ESIF, the instruments of NextGenerationEU of EUR 806.9 billion in 2022 prices to support the MS public investment

InvestEU program (based on the Investment Plan for Europe, the so-called Juncker Plan) to stimulate private investments; and (e) an EU Health program to prevent the recurrence of the public health consequences of the COVID-19 pandemic.

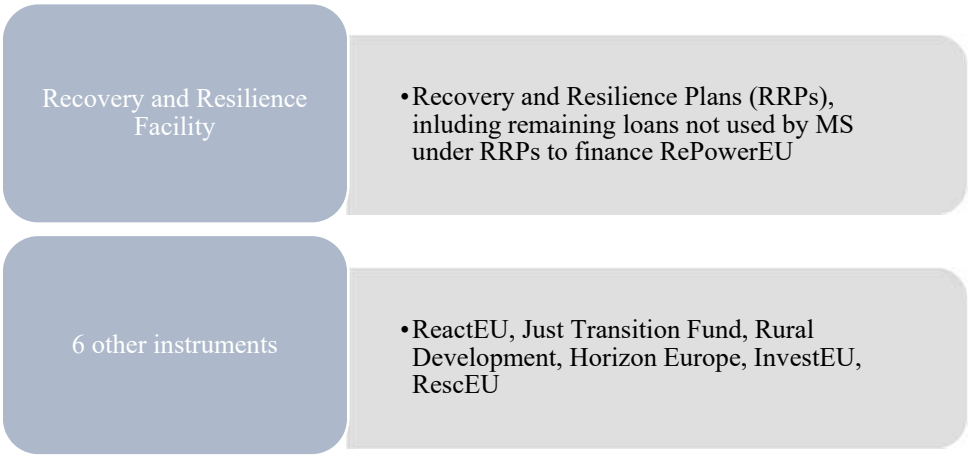
[8] Official site of the EC, https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/repowereu-affordable-secure-and-sustainable-energy-europe_en.

[9] Official site of the European Commission, https://economy-finance.ec.europa.eu/eueconomyexplained/graphs-economic-topics/investment-plan-europe-juncker-plans-impact-real-economy_en.

[10] European Commission, EU. (2017). Reflection Paper on Deepening the Economic and Monetary Union.

and reforms. In the period 2021-2026, the RRF (EUR 723.8 billion in 2022 prices, of which EUR 338 billion in grants and EUR 385.8 billion in low-interest loans)) and other 6 instruments (EUR 83.1 billion) of NextGenerationEU are to support the public investment and reforms foreseen in the MS national recovery and resilience plans for transition to a green and digital economy, as well as to mitigate the social impact. About 37% of NextGenerationEU is earmarked for climate changes measures. The other 20% is aimed at the development of digitalization. The React-EU (EUR 47.5 billion) is the first instrument under NextGenerationEU, which has already been used by the MS in their fiscal frameworks in the 2014-2020 program period.

Figure 1. NextGenerationEU financial instruments



Source: European Commission, https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility_en.

A new financial source for the EU budget is raising funds by borrowing on capital markets by the EC for the first time in the EU history for the purposes of NextGenerationEU[11], which will be issued in tranches and paid through the contributions of the countries to the EU Budget until 2038.

From January 1, 2021, a new EU-owned resource has been introduced, which is a national contribution based on the amount of non-recycled plastic packaging waste. This resource is to contribute to the achievement of the EU-wide objectives set out in the waste strategy. The contribution is calculated by applying a flat rate of €0.80 per kilogram to each MS's estimated amount of non-recycled plastic packaging waste (in kilograms) for the given year.[12]

[11] Official website of the European Commission, https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility_en.

[12] Council Decision (EU, Euratom) 2020/2053/14 December 2020 on the system of own resources of the European Union and repealing Decision 2014/335/EU, Euratom. In accordance with the European Plastics Strategy, national contributions to the EU Budget should stimulate the reduction of pollution from plastic packaging waste in the MS.

Another source of the EU budget is the revenues from auctions under the EU Emissions Trading System (ETS). According to the EC's proposal, 20% of the EU ETS revenue is included in the EU budget as its own resource, and the remaining 80% is used by the MS through their national budgets. The revenue from the trading of emission allowances used by the MS is part of the MS budgetary revenues and at least 50% of the total revenue should be used for the purposes of decarbonisation and the fight against climate change consequences. In order to achieve the target of reducing EU emissions by 55% by 2030, the EC has set a target for the industries covered by the EU ETS to reduce their emissions by 61% compared to 2005 (the year the ETS was established). This continues to put upward pressure on emission allowance prices and increases the costs of the green transition.

The revenues of a new ETS for non-ETS sectors should be a substantial funding source for the EU budget and MS national budgets for green policies. The new EU initiative Fit for 55 presented by the EC on 14 July 2021 introduced measures for non-ETS sectors, for emissions in agriculture and forestry sectors, for the creation of a Social Climate Fund (SCF) and new CO_2 emission performance standards for road transport and the building stock. A separate ETS is being created for the sectors of buildings and road and marine transport. On the other hand, some studies indicate the dependence of transport modes in the EU Member States on fossil fuels, as well as the level of digitalization of the transport sector, the obstacles to the functioning of sustainable multimodal transport services and the danger of imperfect market structures in the field of transport in the – the underdeveloped regions in the EU (Koralova-Nozharova, 2021).

The EC also created two funds Innovation Fund and Modernization Fund financed by ETS allowances to support green transition.[13]

The Modernisation Fund helps modernize MS energy systems, reduce greenhouse gas emissions in energy, industry, transport and agriculture and support the achievement of their climate and energy goals for 2030. Until June 2023 the EC has approved EUR 197 million for Bulgaria from the Modernisation Fund. The confirmed investments for other MS are for Romania (EUR 1.1 billion), the Czech Republic (EUR 1 billion), Poland (EUR 47 million), Croatia (EUR 88 million), Latvia (EUR 5 million) and Lithuania (EUR 1 million).[14]

The Innovation Fund supports innovative technologies in sectors covered by the EU ETS, including innovative renewables, carbon capture and use and energy storage, as well as the decarbonisation of the maritime sector, covering four topics: "general" decarbonisation; "industry electrification and hydrogen"; "clean tech manufacturing"; and "mid-sized pilots".[15] [16].Until June 2023 the Innovation Fund has awarded large-scale projects in Austria,

[13] In 2023 the overall size of the Innovation Fund has been increased from 450 million ETS allowances to approximately 530 million ETS allowances, https://climate.ec.europa.eu/eu-action/funding-climate-action/innovation-fund/what-innovation-fund_en.

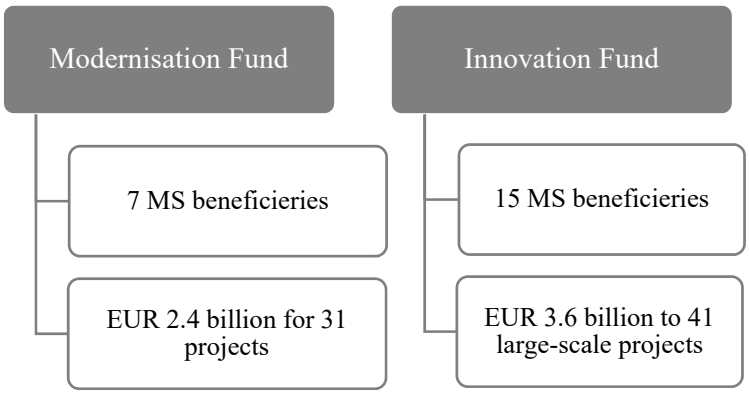
[14] Official website of the Modernization Fund, https://modernizationfund.eu/european-green-deal-eu-modernization-fund-invests-e2-4-billion-to-accelerate-the-green-transition-in-seven-eu-countries/.

[15] Official site of European Commission, https://ec.europa.eu/commission/presscorner/detail/en/ip_23_3787.

[16] Decarbonisation of the maritime sector through the Innovation Fund has been added to Fit for 55 decisions of the European Council of 29 June 2022, https://www.consilium.europa.eu/en/press/press-

Belgium, Croatia, Czechia, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain and Sweden, as well as Norway.

Figure 2. Beneficiaries of Modernisation Fund and Innovation Fund until mid-2023



Source: Official sites of Modernisation and Innovation Funds.

The RePowerEU Plan has been introduced as a new instrument of European green transition policies after Russia's military invasion of Ukraine on 24 February 2022. In the field of energy, the EC responded to the military escalation by RePowerEU Plan presented on 18 May 2022. The new plan changed the EU's energy and climate agenda.[17] It is based on the Fit for 55 packages and has been presented together with a range of other documents – the External Energy Strategy, the Solar Strategy, the Energy Savings Communication, the Solar Roof Initiative and the Biomethane Action Plan. Thus, additional funding of EUR 210 billion at the EU level is foreseen for the implementation of the RePowerEU Plan, with the MS having to add a separate part in their national recovery and resilience plans.

Funding for the RePowerEU plan is ensured from the remaining loans under the RRF of NextGenerationEU, as well as EUR 20 billion through the auction of additional ETS emission allowances under the Fit for 55 packages; over EUR 90 billion in savings from reduced fossil fuel imports by 2030; an additional 10 billion euros for new infrastructure for fossil fuels – terminals for the import of liquefied natural gas; floating storage regasification facilities; interconnections; other funds – European funds under cohesion policies, national fiscal measures, Innovation Fund, the Connecting Europe Mechanism; European Investment Bank (EIB).

For Bulgaria, an additional amount of EUR 480 million is envisaged.[18] In addition to the expected diversification of energy sources in the EU, the REPowerEU plan poses other

releases /2022/06/29/fit-for-55-council-reaches-general-approaches-relating-to-emissions-reductions-and-removals-and-their-social-impacts/.

[17] European Commission (2022) REPowerEU Plan, COM (2022) 230 final, 18 May. https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52022DC0230&from=EN.

[18] The funds for Bulgaria were announced by the Acting Minister of Economy and Industry at a conference "The Energy Transformation of Bulgaria in the Context of the Plan RePowerEU", organized

problems and challenges for the EU. It is still too early to make a long-term assessment, but for example, the short-term challenges of liquefied natural gas imports are related to the negative environmental impact of emissions from methane production and transport, global competition for supply and new investment in infrastructure that result in stranded existing assets. In addition, investment in new fossil fuel infrastructure diverts funding and policy focus away from renewables and energy efficiency. Thus, the risk of spending public funds on large fossil fuel projects that after a few years become sunk assets or new fossil fuel dependencies remains significant.

2. The Just Transition Mechanism of the EU and Bulgaria's National Just Transition Plans

Climate neutrality requires a radical restructuring of economies, structural changes in business models and new qualification and skill requirements for the affected workforce, mainly through government programs incorporated in the medium-term fiscal frameworks and national reform programs. The EC's position is that this must be recognized and addressed during the green transition where no one is left behind. At the same time, it is a matter of political commitment and administrative capacity of the MS governments to implement the projects set out in the national recovery and resilience plans, by August 2026, when the MS must report the results achieved, to receive the last payments under the NRRP by the end of 2026.

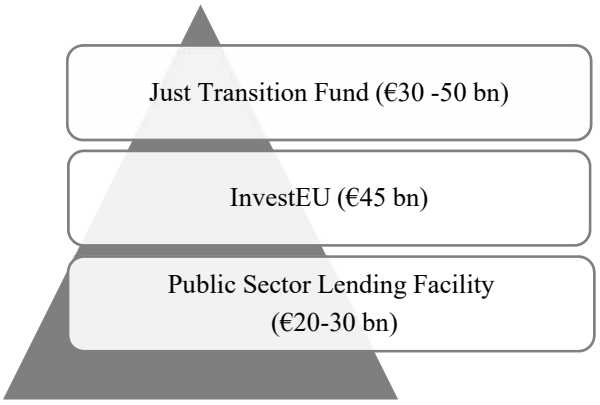
According to the EU Green Deal, coal-fired power plants must be closed by 2030 across Europe, which would be a challenge for the energy sector of Bulgaria and some other MS, especially with the new realities of the war in Ukraine and reduced supplies of Russian gas for Europe. At the same time, this issue is addressed individually for each MS through the national recovery and resilience plans and their national just transition plans which will be financed by the so-called Just Transition Mechanism (JTM). The MS and their regions are assisted through the Just Transition Platform, which is managed by the EC. The platform continues and expands the work of the existing Coal Regions in Transition Platform, which already supports fossil fuel regions in the EU to achieve the transition. It provides technical and advisory support in the preparation of territorial transition plans through an expert network facilitating the exchange of information between MS. There is a reprieve for countries such as Poland and Bulgaria, for which coal-fired power generation is a significant share of their energy mix.

The JTM provides targeted support to generate the necessary investment in the affected territories with three pillars – the Just Transition Fund (JTF), InvestEU (a dedicated just transition scheme), and a new Public Sector Lending Facility (PSLF) for additional investments that are mobilized by the European Investment Bank (EIB). Through the JTM

by the Union of Economists and UNSS on 27.02.2023, https://www.mi.government.bg/news/balgariya-sthe-poluchi-nad-480-mln-evro-ot-plana-repowereu-za-nova-energijna-infrastructura/.

the EC plans to financially support the affected sectors of the member states with at least EUR100 billion to ensure their transition to climate-neutral production.[19]

Figure 3. Just Transition Mechanism



Source: Official site of Just Transition Mechanism.

The JTM finances projects to support EU regions most affected by the transition to a low-carbon economy. The ESIF funds can also be used through national recovery and resilience plans and operational programmes financed by the European Regional Development Fund (ERDF) and the European Social Fund Plus (ESF+). Each pillar of the JTM provides support through various grant and funding instruments to offer a full range of support options in line with the need to mobilize investment for the benefit of the most affected regions. In order to ensure coherence between the three pillars, the JTF provides grants; the InvestEU program attracts private investment and the PSLF mobilizes public financing.[20] The JTM complements the Modernization Fund funded by the EU ETS with additional EUR 14 billion (depending on carbon price levels) in 2021-2030 for low-carbon investments in ten beneficiary MS, including Bulgaria (Romania, Bulgaria, Hungary, Latvia, Lithuania, Estonia, Czech Republic, Poland, Slovakia, Croatia).

Bulgaria has the right to receive EUR 1.2 billion (from an initial EUR 2.7 billion in 2018 prices) from the JTM to green the energy sector, but the uptake is slow due to pending legislative changes.[21] Funds from the JTM are grants, but must be effectively used under the

[19] Official website of the Council of Ministers for the Just Transition Mechanism, https://www.nextgeneration.bg/#modal-four.

[20] In addition, the EC proposed to revise the regulations on the Research Fund for Coal and Steel to make it possible to use part of the assets of the European Coal and Steel Community, which are in liquidation. This should help sustain the annual research program of at least EUR 40 million, as well as to enable the funding of major cutting-edge research and innovation projects in the field of clean steel production. Research activities in the coal sector focus on regions in transition in line with the principles of the JTM.

[21] Official website of the Council of Ministers for the Just Transition Mechanism, https://www.nextgeneration.bg/#modal-four.

National Recovery and Resilience Plan (NRRP) and the Partnership Agreement of Bulgaria for 2021-2027, which is a challenge with the frequent changes and new priorities of the governments.

Despite the considerable public resources foreseen for the green transition, the main question facing Bulgaria is whether the country can abandon the production of coal, which continues to be an important energy source in the energy mix, especially in the current geopolitical situation. For the moment in Bulgaria, coal-fired generated energy provides about 43% of the country's energy mix for 2022, followed by nuclear power (33%) and renewables (18%)[22]. The use of the resources foreseen by the EC JTM is a challenge for the coal plants in Bulgaria, as it is related to their restructuring towards the production of green energy according to national territorial just transition plans in the affected regions.

The EC approved the financing of Bulgaria's national transition plans for the three main regions with coal-fired power plants (Pernik, Stara Zagora and Kyustendil) to be financed by the JTF. Additionally, the World Bank provided technical assistance to eight other regions in Bulgaria that have an indirect social, economic and environmental impact from the restructuring of carbon-intensive industries. Depending on the decision of the EC funding for the eight regions can be approved by the JTF or the ESIF, depending on the plans' compliance with the EU funding requirements.

The change in the Energy Act for the modernization of coal plants is a prerequisite for the use of the financial instruments under the NRRP, but a fair transition depends not only on the available financial resources to support the investments, but also on directing these funds to the right projects. On the other hand, financing of state-owned enterprises can have a negative impact on the fiscal and debt positions, if it is not used according to the EU regulations and deadlines. To finalize these projects after the EU deadlines the European financing will need to be replaced by national resources, which may increase government fiscal deficit and debt levels.

In relation to the challenges of the 2021-2022 EU energy crisis, the EC Strategy for Financing a Sustainable Economy decided to consider natural gas and related technologies and nuclear power as transitional technologies in the green transition, which should help countries like Bulgaria for a more gradual transition to renewables. The new EU Taxonomy Delegated Act from July 2022[23] already covers those energy activities and other activities (e.g. agriculture) not yet covered by the first EU Climate Taxonomy Delegated Act. The new Delegated Act sets out timelines and intermediate steps for these economic activities, including for existing investments that contribute to the ecological transition process in relation to the European

[22] Ministry of Energy (2023), Bulletin on the state and development of energy of the Republic of Bulgaria in 2022, https://www.me.government.bg/uploads/manager/source/VOP/Buletin_Energy-2023-25.04.2023_1_1.pdf.

[23] Official site of the EC, Taxomony Complementary Climate Delegated Act, https://finance.ec.europa.eu/publications/eu-taxonomy-complementary-climate-delegated-act-accelerate-decarbonisation_en

Council Conclusions of 11-12 December 2020, recognizing the role of transition technologies.[24]

The provision of significant public resources through Next GenerationEU and the ESIF in the period 2021-2027 should encourage public and private investment, which is also set out in the EU Strategy for Financing the Transition to a Sustainable Economy. However, as mentioned above the EU funding earmarked for green investments, far exceeds the capacity of the public sector. The green transition requires ensuring synergy between public and private financial flows to relevant economic activities. "By sharing risk between public and private investors, market failures that hinder the financing of sustainable infrastructure and the innovation-driven transition can be effectively overcome."[25]

3. Green Policies of Bulgaria with National and European Funding

The green transition implies the inclusion of public green investments in the fiscal framework and budget to ensure the implementation of priorities for the decarbonisation of the economy through public policies. The absorption of EU funding through the national budget and fiscal policy is one of Bulgaria's important instruments for the transition to a green economy. For the program period of the MFF of the EU 2021-2027, Bulgaria's budget from the EU budget amounts to EUR 17.7 billion, of which EUR 10.9 billion under the Partnership Agreement for 2021-2027, EUR 6.3 billion grants from the RRF, within NextGenerationEU, and EUR 0.5 billion under the RePowerEU Plan. Bulgaria decided not to borrow from the RRF, which was in the amount of 4 billion euros. With the EU funding, Bulgaria has significant public resources for the period 2021-2027, which provide an additional fiscal stimulus for restoring economic growth and implementing the green transition policies.

After three years of derogation of the Maastricht criteria for fiscal deficit and government debt, since 2023 the public green investments in Bulgaria should be implemented upon recovery of their observance. The RRF and REACT-EU account for more than 95% of Next Generation EU grants. The requirement for MS' national recovery and resilience plans[26] is to be fully consistent with the proposed territorial just transition plans under the JTM.[27] A prerequisite for a positive evaluation of the plans has been a thematic concentration of at least

[24] European Commission (2021). COM (2021) 390 final. Strategy for Financing the Transition to a Sustainable Economy, p. 7.
[25] European Commission (2021). COM (2021) 390 final. The Strategy for Financing the Transition to a Sustainable Economy, p. 13.
[26]The criteria for the distribution of the financial resource among the member states for 70% of the grants take into account the population, the reciprocal of its GDP per capita and the average unemployment rate over the last 5 years (2015-2019) compared to the average for the EU. For the remaining 30%, the unemployment indicator for the period 2015-2019 is replaced in the formula with the observed loss of real GDP in 2020 and the observed cumulative loss of real GDP for the period 2020-2021, which will be calculated by 30 June 2022.
[27]April 30, 2021 was the initial deadline for the official submission of the National Recovery and Resilience Plan to the EC. In 2022, the plans are refined and adapted to take into account the final allocation of funds in 2023.

37% for green investments and 20% for digitalization. As a rule, the maximum volume of loans for each MS should not exceed 6.8% of its GNI.

Bulgaria's National Recovery and Resilience Plan (NRRP)[28] outlines goals and necessary investments in four areas – a green, innovative, connected and fair Bulgaria with the largest share of the total budget for green policies. The plan concentrates 58.9% of the total planned expenses for achieving climate objectives, while 25.8% will foster digital transition.[29] Bulgaria's set national target for the share of energy from RES in gross final energy consumption is 27.09% by 2030, far lower than the increased EU target to 45% (from 40%) with the RePowerEU Plan.[30] Another goal is the cumulative reduction of energy intensity of the economy by 10% and carbon intensity by 10%. The creation of a National Fund for decarbonisation and direct involvement of local communities in the management of decarbonisation activities could help in decarbonisation processes. The plan also sets a high level of ambition for the digital transition, using almost 1/4 of the total projected expenditure, setting goals by 2025 for 100% of households to have access to a high-speed Internet connection; 50% of the population to have at least basic skills in the field of digital technologies and 35% of enterprises to have implemented digital technologies by 2025.

The establishment of a system for management and control of funds under the NRRP approved at the beginning of July 2022 should help in the implementation of the projects, however, a number of internal and external risks should be addressed. Due to often changes in the governments during the period 2021 –2022 the implementation of Bulgaria's NRRP was lagging behind as the process of approving the important legislative changes and the implementation of the planned projects under the NRRP have been slowed down.

Bulgaria's Partnership Agreement for 2021-2027 was adopted by the EC at the beginning of July 2022 and is the twelfth agreement for the 2021-2027 EU program period after those already adopted for Greece, Germany, Austria, the Czech Republic, Lithuania, Finland, Denmark, France, Sweden, the Netherlands and Poland. The 2021-2027 Partnership Agreement of Bulgaria has been approved with a budget of EUR 10887 million funded by ESIF and JTF.[31]According to the Partnership Agreement for 2021-2027, the ESIF funding will be devoted to achieving the goals of transition to a green economy and the effects of public policies on sustainable development through the initiatives Smarter Europe (14%), Greener Europe (19%), Connected Europe (14%), Social Europe (23%) Europe and Europe

[28] Approved on 7 April 2022 by the European Commission.

[29] Official site of the European Commission, https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility/recovery-and-resilience-plan-bulgaria_en.

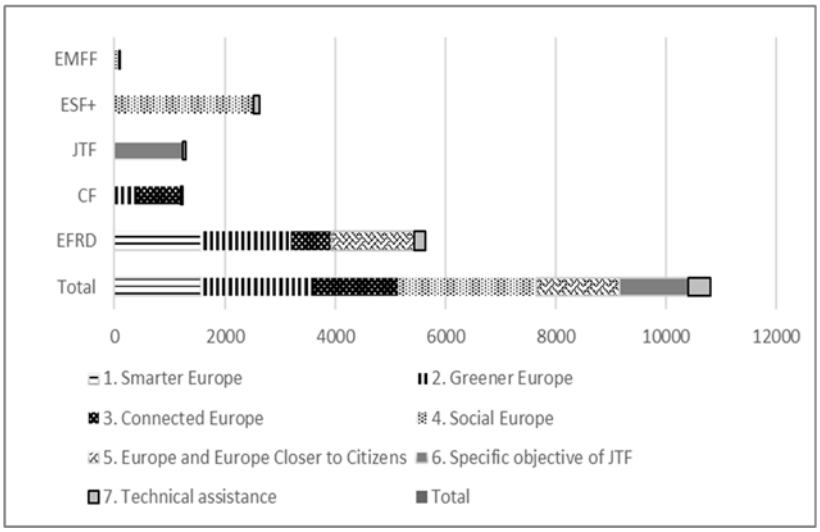
[30] https://www.iea.org/policies/15691-repowereu-plan-joint-european-action-on-renewable-energy-and-energy-efficiency.

[31] According to the General Provisions Regulation for the period 2021-2027, member states must fulfil the so-called horizontal and thematic enabling conditions in the implementation of cohesion policy programmes. One of the enabling conditions requires compliance with the EU Charter of Fundamental Rights. When drawing up their programmes, Member States must assess whether the enabling conditions are met. If the EC is not agreed with this assessment, it cannot reimburse the costs associated with the parts of the relevant program until the conditions are met. Member States must ensure that they continue to meet these conditions throughout the program period.

Closer to Citizens (14%), JTF (12%) and technical assistance to improve administrative capacity (4%) (Figure 4a and Figure 4b).

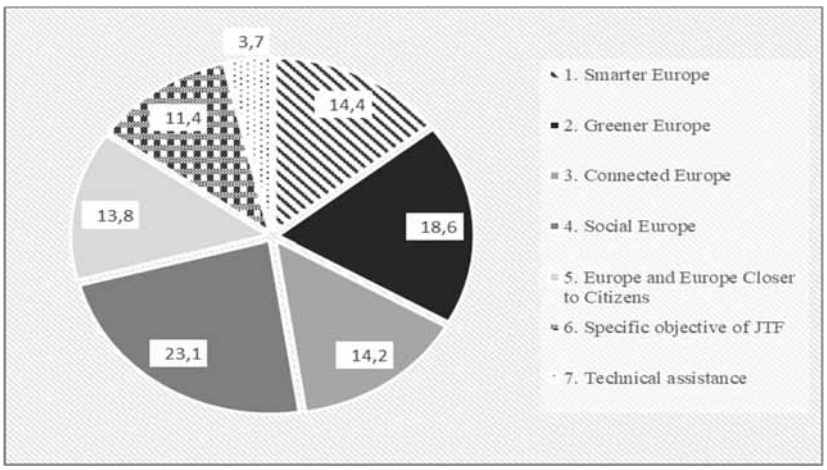
Figure 4 1. Funding and structure of programs under the Partnership Agreement of Bulgaria for the period 2021-2027

a) Funding by ESIF and JTM (in millions of euros)



Note: ERDF — European Regional Development Fund, ESF+ — European Social Fund Plus, CF — Cohesion Fund, JTF — Just Transition Fund, and EMFF — European Maritime, Fisheries and Aquaculture Fund

b) Structure of Programs under the Partnership Agreement of Bulgaria for the period 2021-2027 (% of total budget)



Source: Bulgaria's Partnership Agreement for 2021-2027.

The two operational programs "Transport and Transport Infrastructure" and "Regions in Growth" will continue to play an important role in climate change adaptation related to smart mobility and traffic management information systems, and ensuring traffic safety and the development of the urban environment. As the green economy aims at restructuring a number of activities of so-called "brown" industries, education should also help prepare the workforce for a green, climate-neutral economy. To this end, with the "Jobs for the Future" measures, the workforce should be trained for new jobs.

Significant public resources are planned for the green transition at the EU level, but its successful implementation in Bulgaria and other member states will depend on the effective implementation of the projects set out in the 2021-2027 Partnership Agreement and the NRRP, as well as whether the private sector will support the projects with additional investments. The EU procedures are complex, which implies good government institutional support of the beneficiaries. For Bulgaria, the limited capacity to offer good projects and the coherence of the actions of the public and private sectors as beneficiaries may also be a problem for the period 2021-2027. The absorption of ESIF funds for Bulgaria under the EU MFF for 2021-2027 and the projects under the NRRP might be delayed, due to the completion of the projects of the previous program period 2014-2020 by the end-2023 (according to the t+3 rule, payments up to 3 years after the end of the program period).

4. Assessments of the Impact of Green Policies on the Fiscal Deficit of Bulgaria

Literature review

At the EU level, the green economy is considered in different contexts – political, theoretical, and financial aligned with the EU Green Deal.[32] The United Nations Environment Program (UNEP) defines a "green economy" as one that "results in improved human well-being and social equity while significantly reducing environmental risks and natural resource scarcity".[33] In 2011 the definition has been supplemented with the word "green" referring to an economy that ensures the transition to an economy that is low carbon and resource efficient and socially inclusive (UNEP 2011). In the same year, the OECD and the United Nations Environment Program produced comprehensive reports on the green economy.

The Fiscal Monitor of the International Monetary Fund (IMF, October 2019) suggests that carbon taxes levied on the extraction of fossil fuels in proportion to CO_2 content of their extraction are the most powerful and effective to reduce energy consumption and move to cleaner alternatives, as well as domestic fossil fuel CO_2 emissions. At the beginning of the 1990s Scandinavian countries introduced carbon tax to reduce carbon emissions. Several studies examine the real mitigation effects of carbon tax and the results are not identical. Some researchers analysed the impact of the carbon tax in Finland, Denmark, Sweden and the Netherlands (Lin, Li, 2015; Anderssen, 2017). Carbon tax imposed a significant positive

[32] Official website of the EC, https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en.
[33] United Nations Environment Program (2011), Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradications.

impact on Finland's per capita CO_2 emissions growth, while in Denmark, Sweden and Netherlands it was not significant (Lin, Li, 2015). CO_2 emissions from the Swedish transport sector have been reduced by around 6 p.p. on average per year from the carbon tax (Anderssen, 2017). In Norway, the carbon taxes contributed to only a 2% reduction in CO_2 emissions, while the effect from measures for lower energy intensity and other energy mix measures was around 14 % (Bruvoll, Larsen, 2015).

Some researchers note that emissions trading schemes can be politically more feasible than carbon taxes, especially when permits are freely allocated to affected firms (Black et al., 2021). Till now some old EU MS like Denmark, Finland, France, Ireland, Portugal, Sweden, as well as Norway have implemented carbon tax and ETS, while the new MS only ETS (Parry et al., 2022). Some studies show small or non-significant carbon reduction from the introduction of the EU ETS. A study for an aggregate of 14 EU countries and the United Kingdom calculated a carbon leakage rate of 15% (Misch, Wingender, 2021). The reasons for this small effect could result from the free allocation of permits during the first phases of the EU ETS, an overallocation of permits and the role of innovation (Joltreau, Sommerfeld, 2019). Some studies underline that ETS for the transport sector may increase further the cost of the green transition due to the fossil fuel dependence of transport modes in the MS, as well as the low level of digitalisation of the transport sector, the obstacles to the functioning of sustainable multimodal transport services and the risk of imperfect transport market structures in more the less developed regions in the EU (Kolarova-Nosharova, 2021).

The other fiscal instrument implemented for emissions reduction is environmental taxes on energy, transport and pollution. Higher revenues from environmental taxes show higher reductions in CO_2 emissions, PM10 emissions, and energy consumption and production from fossil sources (Miller and Vela, 2013). The findings of a comprehensive analysis of the impacts of the environmental tax reform in Germany displayed that energy taxes reduced uncertainties about the benefits of energy-efficiency investments and the payback period for energy-efficient products was reduced. The reduction in employers' social contribution payments tended to reduce the costs of labour-intensive innovation processes. The reform also had a signalling effect, strengthening awareness of the need for more efficient and rational energy use (Knigge, Görlach, 2005). Another study suggests that an environmental tax may actually reduce the level of uncertainty over future returns provided that it is of sufficient magnitude and longevity (Jaffe et al., 2002). A study for Bulgaria outlines that the high level of environmental taxes in Bulgaria suggests applying the principle of "neutrality of the tax rate, which is also supported by the EC, i.e., the increase in environmental taxes should be compensated by a reduction in other taxes (corporate, income taxes or social security contributions (Ivanova V. et al., 2019, Paliova, 2022). Applying different models, it turns out that taxes rather than capital requirements for banks have a higher direct effect on reducing emissions (Bobeva et al., 2023).

Regarding the impact of crisis events from climate change, the results of studies are straightforward with a negative impact on public finances in the long-term. Studying two extreme weather events in the EU and four in the United States since 1990 the results show a negative impact of crisis events on public finances to range from 0.3% to 1.1% of GDP (Heipertz, Nickel, 2008). Other researchers outlined that mitigation efforts should reduce the risk and economic and fiscal expenditure from climate change in the long term, but are also

expected to result in upward pressure on public finances in the short and medium term (Zenios, 2021). Most models of climate change impacts and adaptation to date are based on climate change scenarios that provide a limited set of possible future climate conditions – invariably specified as average annual conditions such as temperature and moisture (Aleksandrova-Zlatanska, 2019).

Study's Methodology

To assess the impact on the fiscal position of European funding and national co-financing for green policies we use the following equation:

$$FS\ (Green\ adj) = Rev\ (Green) - Exp\ (BG\ Green) - NC\ (Green)$$

where:

Rev (Green) – Income from European funds for "Green Bulgaria" (% of GDP)

Exp (Green) – Expenditures on account of European funding for "Green Bulgaria" (% of GDP)

NC (Green) – National co-financing of Green Budget projects (% of GDP)

FS (Green adj) – Adjustment of fiscal position "Green Budget" (% of GDP) (improvement (+)/ deterioration (-))

The revenues are calculated as a relative share of the revenues for the "Green Bulgaria" program in the total European funding for the relevant program period (defined in the ESIF budget and under the NRRP for the period 2021-2026) and are distributed by year with the structure of the tranches of the EC funding. The expenditures for green public investments are financed with European funds and with national co-financing. The latter is calculated as a relative share of European funding for "Green Bulgaria" and is distributed by year with the structure of expenditures for European projects for the relevant period. The implementation of European projects for the previous period determines the dynamics of absorption, which is usually lower at the beginning of the period and increases gradually as the program period progresses. We are taking into account the deadline end of 2026 for public expenditure and policies under the RRF. We also take into consideration that the originally allocated funds have been reduced by 578 million euros, due to the higher rate of economic growth for 2021. The national funding is set at 15% of the total budget for the "Green Budget", which is based on the parameters set in the Partnership Agreement of Bulgaria for 2021-2027 and the RRF for 2021-2026.

We measured the impact of green policies on fiscal balance, estimating revenues from environmental taxes, sales of greenhouse emissions allowances and the respective public expenditures for climate change mitigation policies, net EU financing and national co-financing for green policies and public spending on crisis events. The respective revenues and expenditures for green policies were calculated as a share of GDP and are distributed by year with the structure of the previous years. Regarding revenues from sales of greenhouse emissions allowances, the study used the assumption that the ETS expands to new sectors with Fit 55 and that the EC plans a decrease in greenhouse emissions allowances, but the

prices increase, which would keep their share as % of GDP in budgetary revenues and expenditures. Then, we incorporated our estimates for the impact of green policies in the budget revenues and expenditures and projections for fiscal balance by 2025. The estimates for 2023-2025 used projections for revenues and expenditures as a share in GDP and economic growth of the Economic Research Institute at the BAS.[34]

We measure primary budget balance, calculating: (a) the structural components of the budget revenues and expenditures by clearing the cyclical elements from the net budget revenues and expenses at constant prices (without interest payments); and (b) cyclical components in the budget revenues and expenditures. For the calculation of structural components, the seasonally adjusted series for net real budget revenues and expenditures on a quarterly basis at constant prices in Bulgaria (Q1 2002-Q4 2022) were filtered by HP filter (Hodrick, Prescott, 1997) with a smoothing parameter $\lambda = 1600$ and calculated as a share of GDP. Simulations were made at $\lambda = 500$ and 1000 to ignore the subjectivity of the conclusions. They did not substantially change the conclusions about cyclically adjusted budget parameters.

The output gap (*Ygap*) is calculated by the formula: $Ygap = (Y - Y^*)/ Y^*$ (%), where Y is actual GDP and Y^* is potential GDP. Potential (trend) GDP Y^* is defined as actual GDP smoothed cyclically with the Hodrick–Prescott filter (HP filter) at a smoothing parameter $\lambda = 1600$ (standardly used in quarterly data and corresponds to an eight-year length of a business cycle).

The government debt forecast is based on estimates of the impact of environmental revenue and green investments on primary structural deficit and interest payments for 2023-2025. The increase in government debt as % of GDP takes into account the debt at the end of the current year plus the change in the primary budget balance plus interest costs and debt repayments for the respective year. The increase in the debt can be less or greater than the fiscal deficit for the respective year and takes into account the need to increase the funds in the fiscal reserve for upcoming repayments under maturing debt. The assumptions of the government debt strategy for debt redemption and new debt issuance, and the projected increase in primary fiscal balance, were used. We also assumed that a gradual reduction in primary structural fiscal balance would require the issuance of net new debt less than its share of GDP. The other assumption was that with the persistent primary structural deficit and debt increase by 2025, the interest expenditures would also slightly increase as a share of GDP.

Study's Results

The results show a positive impact of European funding and national co-financing for green policies on revenues between 0.7 to 1.3%, its absorption for the respective period being less at the beginning of the period and increasing at the end of the period under the payment rule up to 3 years after the end of the program period. The negative impact of national funding for green policies is within 0.1 – 0.3% of GNI, which is offset by ESIF grant income and the

[34] See also Economic Research Institute of the Bulgarian Academy of Sciences. Annual report for 2022, 2023. Economic development and policies in Bulgaria: Assessments and expectations.

net impact of EU-funded green policies, which are positive for both periods by between 0.6% and 1% of GDP (Table 1). It is assumed that 20% of the total ESIF budget for the period 2014-2020 and 25% for the period 2021-2027 finance green policies. For comparison, the estimate in the NRRP for the impact of the funds from the RRF on the fiscal deficit is between 0.1% and 0.6% of GDP on an annual basis.

Table 1. Bulgaria: Impact of green policies financed with European funding on the fiscal position (% of GNI)

a) for the period 2021-2027

	2021	2022	2023	2024	2025	2026	2027
1. European funding for green policies (net)	1.1	1.2	1.3	1.3	1.0	1.1	0.9
2. National co-financing	0.3	0.3	0.3	0.3	0.3	0.3	0.3
3. Impact on the fiscal position (3=1-2)	0.8	0.9	1.0	1.0	0.7	0.8	0.6

b) for the period 2014-2020

	2014	2015	2016	2017	2018	2019	2020
1. European funding for green policies (net)	1.1	1.3	1.0	0.8	0.8	0.7	0.7
2. National co-financing	0.2	0.3	0.2	0.2	0.2	0.1	0.1
3. Impact on the fiscal position (3=1-2)	0.9	1.0	0.8	0.6	0.6	0.6	0.6

Note: Estimates use data of European Commission, Ministry of Finance
Source: Own calculations.

The impact of sales of greenhouse emission allowances on the fiscal balance is neutral as they are revenues of the state budget, but they are also used for the purposes of green transition policies in the respective fiscal year. The impact of the ecological taxes on revenues is between 2.6% and 3% of GDP and 9-10% of the total tax revenues. The empirical estimates of the study also display that the country has reached the level of environmental taxes in total taxes recommended by the EC and uses the biggest part of revenues from greenhouse emissions for climate mitigation actions. In our other study, we assessed the impact of ecological taxes and public expenditures on greenhouse emissions (Paliova, 2022). The latter study found statistical significance and a direct relationship between environmental taxes on transport and the reduction of greenhouse emissions, but not for environmental taxes on energy and the reduction of greenhouse emissions. The author agrees with other studies presented in the literature review, suggesting that an increase in environmental taxes should be compensated by a reduction in other taxes (corporate, income taxes or social security contributions (Ivanova et al., 2019) and that taxes rather than capital requirements for banks have a higher direct effect on reducing emissions (Bobeva et al., 2023).

The study shows that expenditure for green policies will also increase due to the increase of crisis events resulting from climate change. Similar to another study for the EU and USA crisis events (Heipertz, Nickel, 2008; Zenios, 2021), our research also gives evidence that public spending on crisis events will have a negative impact on fiscal balance in the medium and long term. Public expenditures to cover the damage from the crisis caused by climate change in some years reached 0.2% of GDP, and in the future, it is expected to increase.

Other studies on the impact of fiscal policy on the transition towards a low-carbon economy in Bulgaria do not find a statistical significance of government spending, structural deficit and debt on the components of GDP in the short term (Zlatinov, 2020).

Table 2. Bulgaria: The impact of green policies on budget revenues and expenditures (% of GDP)

	2018	2019	2020	2021	2022	2023	2024	2025
Impact on the revenue from sales of greenhouse emission allowances (+)	0.5	0.8	0.8	1.2	1.2	1.2	1.2	1.2
Impact on the revenue from environmental taxes (+)	2.62	2.99	3.03	3.03	3.03	3.03	3.03	3.03
Net impact of green policies financed with EU funding and national co-financing (+)	0.6	0.6	0.6	0.8	0.8	1.0	1.0	0.6
Impact of green policies financed by receipts from greenhouse emission allowances (-)	0.5	0.8	0.8	1.2	1.2	1.2	1.2	1.2
Impact of expenditures for climate change-related crisis events (-)	0.2	0.01	0.02	0.1	0.1	0.1	0.1	0.1
Impact on fiscal balance	3.02	3.58	3.61	3.73	3.73	3.93	3.93	3.53

Note: Estimates used a database of Eurostat for Fiscal notification 04-2023, NSI, EU ETS, Electricity System Security Fund, Ministry of Finance. Damages from crisis phenomena until 2020 are based on reported data to NSI, and it is assumed that they are within 0.1% of GDP on average annually.
Source: Own estimates.

Table 3. Projection of fiscal balance during green transition

	2018	2019	2020	2021	2022	2023	2024	2025
Budget balance (1-2+3)	2,3	2.1	-3.7	-3.9	-2.9	-3.0	-3.0	-2.8
Of which								
(1) Primary budget balance (1.1+1.2)	2.8	2.6	-2.7	-3.4	-2.5	-2.5	-2.4	-2.2
(1.1) Primary structural budget balance	*2.7*	*2.4*	*-3.0*	*-4.4*	*-2.8*	*-2.6*	*-2.4*	*-2.2*
(1.2) Cyclical component	*0.1*	*0.2*	*0.3*	*1.0*	*0.3*	*0.1*	*0.0*	*0.0*
(2) Interest expense	*-0.5*	*-0.5*	*-0.5*	*-0.5*	*-0.4*	*-0.5*	*-0.6*	*-0.6*
Budget balance on a cash basis % of GDP	*0.1*	*-1.0*	*0.2*	*-2.8*	*-0.8*	*-3.0*	*-3.0*	*-2.8*

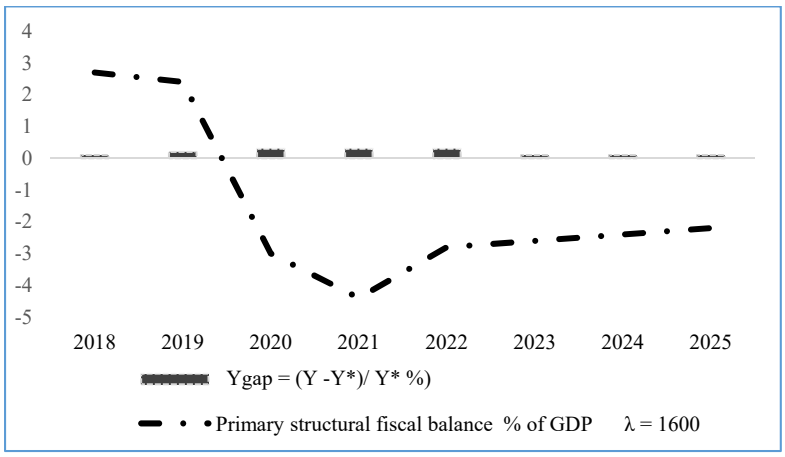
	Real net revenue λ = 1600	Real net expenditure λ = 1600	Budget balance λ = 1600	Budget balance as % of GDP λ = 1600	Real net revenue % of GDP λ = 1600	Real net expenditure % of GDP λ = 1600
2018	36667,55	34380,54	2287,01	2,3	37,7	35,9
2019	39594,22	37485,48	2108,74	2,1	39,1	37,5
2020	33719,60	37526,14	-3806,54	-3,9	34,7	39,1
2021	38476,32	41908,91	-3432,58	-3,3	36,7	40,5
2022	39920,17	43083,44	-3163,27	-2,9	36,7	40,0
2023	45279,14	48556,72	-3277,58	-3,0	37,3	40,0
2024	45723,43	49399,93	-3676,50	-3,0	37,0	40,0
2025	46060,90	49496,98	-3436,08	-2,8	37,2	40,0

Note: The estimates for 2023-2025 used projections for revenues and expenditures as a share in GDP and economic growth of the Economic Research Institute at the BAS.
Source: Own estimates.

The cyclical position of the economy, which is formed by the negative deviation from the potential and the sensitivity of the budget position to the economic cycle (0.3%), is reflected

in a correction to a higher value of the structural budget balance. In 2023, the negative deviation from potential is expected to narrow further, with the economy approaching its potential and the cyclical component making very little positive contribution. The econometric estimates for the structural components of the budget parameters and, accordingly, the primary structural fiscal balance, which reflects the government's medium-term intentions and their trend, show that in the period 2020-2023, their trend is expected to correspond to changes in business activity, which is also positive for the implementation of green policies (Figure 5).

Figure 5. Bulgaria: Primary structural fiscal balance and output gap (Ygap)



Note: Ygap represents the direction of the deviation of the actual GDP from the potential GDP and characterizes the phase of the business cycle in which the economy is located. Conceptually, the main reason to worry about the primary structural deficit is when it is projected to grow faster than the economy. On the other hand, fiscal policy can contribute to economic recovery when it is countercyclical in the medium term, which is when changes in the structural balance and the output gap, such as the deviation of actual GDP from potential GDP, move in the same direction.
Source: Own estimates.

The main fiscal measures to cope with the consequences of COVID-19 in 2020 had an additional negative impact on the fiscal deficit and at the same time were insufficient to support businesses. As a result, in 2020 GDP growth rate shrunk to 3.4%. In 2021, additional fiscal measures together with other factors, such as improvement in economic activity and exports, positively impacted economic growth, surging to 7.6%. The fiscal measures have been continued in 2022 as a derogation from the fiscal rules for compliance with the Maastricht criteria for the fiscal deficit. As a result, Bulgaria generated a cumulative fiscal deficit, which is mainly due to the government's active spending policy for businesses and

households. These trends threaten fiscal sustainability in the long term if new sustainable revenue sources with low cyclical dependence are not introduced.[35]

In 2022 expenses for acquisition of military equipment and related infrastructure had an additional negative effect on the fiscal balance on an accrual basis. The fiscal deficit on an accrual basis for 2022 (in the ESA 2010 terms) amounted to 2.8% of GDP, while the deficit on a cash basis was 0.8% of GDP. The deficit of the central government decreased on an annual basis, mainly due to the low implementation of the EU investment-related projects and the limited capital expenditure with national funding. The surplus of social security funds was a result of larger transfers from the central government.

Our estimates show that the one-off fiscal expenditures will be gradually phased out in order for the primary structural deficit to return to the medium-term budgetary objective of 1%. Introducing economic instruments as part of a wider package of measures can provide an opportunity to establish them and ensure coherence with other policies.

The average level of public expenditure for the period 2021-2025, including payments from the RRF, is projected to be around 40% of GDP compared to the reference level of 37% for the period 2017-2019.[36] This is a significant increase, implying fiscal consolidation of expenditures, and elimination of one-off expenditures and diversification of VAT for some sectors. The priority for Bulgaria remains the fiscal consolidation in the coming years and the successful implementation of the projects with European funding, through which sustainable economic growth and green transition can be achieved.

Table 4. Forecast of the consolidated government debt until 2025 (% of GDP)

	2018	2019	2020	2021	2022	2023	2024	2025
Gross public debt ratio	22.1	20.0	24.5	23.9	22.9	24.5	26.0	27.0
Budget balance (1-2)	2,3	2.1	-3.7	-3.9	-2.9	-3.0	-3.0	-2.8
(1) Primary budget balance	2.8	2.6	-3.3	-3.4	-2.5	-2.5	-2.4	-2.2
(2) Interest expense	0.5	0.5	0.5	0.5	0.4	0.5	0.6	0.6
Net impact of green policies financed with EU funding and national co-financing (+)	0.6	0.6	0.6	0.8	0.8	1.0	1.0	0.6

Source: Own estimates.

	2018	2019	2020	2021	2022	2023
Government debt in BGN million	24305	24078	29595	33267	37848	42785
% of GDP	22.1	20.0	24.5	23.9	22.9	23.2
GDP	109964	120396	120553	139012	165384	184486

Note: Consolidated government debt includes the debt of central, local governments, and social security funds.
Source: Eurostat, Fiscal Notification April 2023.

The impact of the green policies on primary structural deficit shows that they will not have a direct impact on government debt. Our 2023-2025 government debt forecast shows that the debt level will continue to rise to a level of 27.0% by the end of 2025, doubling from its

[35] See also Economic Research Institute of the Bulgarian Academy of Sciences. Annual report for 2022, 2023. Economic development and policies in Bulgaria: Assessments and expectations.
[36] See also Economic Research Institute of the Bulgarian Academy of Sciences. Annual report for 2022, 2023. Economic development and policies in Bulgaria: Assessments and expectations.

lowest level of 13% of GDP in 2008, when after the introduction of the currency board in 1997 governments pursued strict fiscal discipline and used realized budget surpluses to reduce government debt. The results of our research show that the increase in government debt is not due to the green transition policies as part of the medium-term fiscal framework, as European funding for green policies will improve the fiscal position for the period in consideration.[37]

The assumption for a gradual increase of government debt leads to a slight increase of projected interest expenditures for its servicing, which will inevitably limit the fiscal space for other budget expenditures, if there is no change in the fiscal policy or if the implementation of the NRRP and the operational programs under the Partnership Agreement for 2021-2027 have not been accelerated. The strict fiscal discipline in Bulgaria built buffers that were used during periods of sudden macroeconomic shocks. However, the fiscal discipline was broken during the pandemic crisis and the expenses related to the decarbonisation of the economy in Bulgaria must be done effectively, using the possibilities of European funding and returning to the medium-term budgetary objective for fiscal deficit.

There are a number of internal and external risks in the implementation of green policies which may have a negative impact on fiscal balance. The main internal risks are political, administrative, economic and institutional, while the external ones are mainly related to the disruption of supply chains, the war in Ukraine and the EU's economic sanctions against Russia.

Administrative risks to the implementation of the NRRP relate to a lack of capacity, understanding and ability to prepare the reforms and implement the projects because the funds from the RRF will be provided only if the MS carry out the relevant structural reforms to decarbonise the economy. Problems with planning, awarding and execution of public procurement can put a large part of investment projects in difficulty.

In addition to political and administrative risks, purely economic risks such as high inflation and increased costs for electricity and labour could have a serious negative impact on the implementation of the NRRP. Inflation increases project costs, which will put both the European and national co-financing under pressure. Higher costs limit the number of quality contractors and suppliers of goods and services who can implement the projects. Another internal risk is the uncoordinated actions of state institutions and stakeholders regarding certain projects for the decarbonisation of the energy sector, which creates a negative public response and unpredictability for those employed in this sector.

The external risks relate to the economic and energy crises, wars, bankruptcies of enterprises and banks, bankruptcies of countries, problems in the supply chains of goods, geographical relocation of production and pandemics. The macroeconomic problems of countries that are important trading partners of Bulgaria could be another harmful factor.

[37] See the assessment in Table 1.

Conclusion

The study's assessments of the challenges of fiscal policy in the transition to a green economy led to the conclusion that the European funding and national co-financing for green public projects under the NRRP and the Partnership Agreement for 2021-2027 are expected to have a positive effect on budget revenues between 0.7 to 1.3% of GDP. The negative impact on the fiscal deficit of the national co-financing would be within 0.1-0.3% of the GDP, but it would be compensated by the income from the grants from the EU. Thus, the net impact of EU-financed green policies on the fiscal balance is expected to be positive between 0.6% and 1% of GDP in both program periods 2014-2020 and 2021-2027.

On the other hand, the failure to meet the targets of the green transition projects in accordance with the established EC rules for the RRF by 2026 and the Partnership Agreement for 2021-2027, could put pressure on spending and increase fiscal deficit because European funding could be replaced by a national resource. Problems with planning, awarding and execution of public procurement should be addressed.

Over the following years, the revenue side of the budget is also expected to be enhanced by fiscal instruments for climate change mitigation, including proceeds from the sales of greenhouse emission allowances (with around 1.2% of GDP) and environmental taxes with (around 3% of GDP) on an annual basis. The proceeds from sales of greenhouse emissions and environmental taxes and fees should finance measures to reduce greenhouse emissions and increase renewable energy sources and other policies related to green transition. The climate change adaptation actions should be strengthened as public expenditures to cover the damage from crisis phenomena are expected to increase, having a negative impact on fiscal balance.

The government should manage the internal and external risks identified in the study, and the emphasis should be placed on climate adaptation and mitigation projects, as well as projects for the decarbonization of the energy sector, which create a negative public response and unpredictability for those employed in this sector.

European procedures and regulations are complex and difficult to apply in the development and implementation of projects with European funding and assume good institutional support for the beneficiaries. Bulgaria needs to improve its institutional capacity to offer good projects and coherence of public and private sectors during the 2021-2027 EU programming period.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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Olesea Speian[1]

DEBT DYNAMICS UNDER UNCERTAINTY: EVIDENCE FROM THE REPUBLIC OF MOLDOVA[2]

Public debt management plays a pivotal role in ensuring fiscal stability and fostering economic growth, particularly amidst unprecedented challenges like the COVID-19 pandemic and energy crises. The main aim of this study is to provide accurate projections for public debt, offering valuable insights to guide sustainable debt management practices. Utilizing historical data from the Republic of Moldova spanning the period 2003-2023, the study employs the Monte Carlo simulation method to construct a fan chart. This chart presents a probability distribution of the general government debt-to-GDP ratio for the Republic of Moldova during 2023-2027. By generating multiple alternative scenarios for real GDP growth, real interest rates, and primary balances, policymakers can gain a comprehensive understanding of future debt trajectories and the potential impacts of various policy decisions. These projections are essential tools to facilitate informed decision-making and promote effective debt management strategies in the face of economic uncertainties and challenges.
Keywords: public debt; Monte Carlo method; Republic of Moldova
JEL: E17; H63; H68

1. Introduction

Public debt enables governments to finance essential infrastructure projects, fostering economic growth, job opportunities, and enhanced public services. Public debt instruments, such as government bonds, are often considered safe investment options. They provide individuals, institutions, and foreign governments with a low-risk avenue to invest their funds, diversifying their portfolios and reducing overall investment risk. However, public debt comes with certain drawbacks. Servicing and repaying the debt can divert funds from essential public services and infrastructure. High levels of debt may lead to dependency on external creditors, impacting a country's economic sovereignty. Excessive debt can make a country vulnerable to economic shocks and financial crises, leading to difficulties in refinancing and loss of investor confidence. Moreover, borrowing extensively from financial markets can raise interest rates, affecting private sector growth and economic development.

[1] *Olesea Speian, PhD student, Moldova State University, +373 069 074 318, e-mail: olesea.friscu@gmail.com.*
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Improper debt management can burden future generations with debt repayment obligations, limiting their economic opportunities. Hence, prudent debt management practices are essential to balance the benefits and costs of public debt.

Determining the level of sustainable public debt has been a pressing concern for countries, particularly in the context of the COVID-19 pandemic and subsequent energy crisis. Governments faced the challenge of managing increasing budget deficits, leading to fluctuations in public debt dynamics like never before. In 2020, the world witnessed the largest surge in debt levels since World War II, with global public debt reaching nearly 100% of GDP. However, in the following years, debt levels decreased at an unusually rapid pace, with both advanced and emerging economies experiencing a decline in public debt despite positive primary deficits. Conversely, low-income developing countries witnessed a slight increase in public debt due to currency depreciation, primary deficits, and nominal interest rates.

The landscape of global public debt exhibits diverse patterns, with Japan holding the highest government debt level of 261% of GDP in 2022, followed by Greece. The Republic of Moldova ranked 153rd out of 189 countries in terms of general government debt as a percentage of GDP, with a debt level of 34%, comparable to Nigeria and Sweden (IMF data, 2023). This illustrates that there is no inherent correlation between a country's debt level and its level of development. Consequently, there is no universal optimal level of public debt. Rather, the optimal level is achieved when the benefits of borrowing outweigh the associated costs.

Given the macroeconomic situation in the Republic of Moldova, where inflation reached 28.6% in 2022 and the budget deficit stood at 3.3% of GDP, there is a pressing need to closely monitor the level of public debt. Therefore, the main aim of this study is to provide essential projections for public debt, offering valuable insights for implementing sustainable debt management practices. To achieve this, the paper utilizes the Monte Carlo simulation method to construct a fan chart. This chart offers a probability distribution of the general government debt-to-GDP ratio of the Republic of Moldova for the period 2023-2027. The process involves generating various alternative scenarios for real GDP growth, real interest rates, and primary balances. These scenarios are then used to calculate the debt-to-GDP ratio using a deduction formula.

Accurate projection of public debt levels is of utmost importance for effective debt management. Such projections enable governments to make well-informed decisions and take necessary actions to ensure fiscal stability and debt sustainability. By understanding their future debt obligations, governments can engage in strategic fiscal planning and budgeting, ensuring sufficient resources are allocated for debt servicing and repayment. This, in turn, prevents fiscal imbalances and allows for better allocation of funds to critical public services and investments. Moreover, reliable debt projections enhance investor confidence and credibility. Investors as small medium enterprises and creditors rely on these projections to evaluate a country's creditworthiness and risk profile. By providing transparent and accurate debt projections, governments can inspire trust, attract investment, and access financing on favourable terms. Thus, accurate debt projection is an essential tool for governments, enabling them to plan effectively, maintain fiscal stability, and attract investment. It provides critical information for policymaking and fosters a climate of confidence and credibility on the global financial stage.

2. Literature Review

Public debt dynamics are a subject of extensive research within the fields of economics and finance. Several factors can influence the accumulation and sustainability of public debt, including but not limited to: (i) economic growth, (ii) inflation shocks, (iii) fiscal policy, (iv) political factors, and (v) external shocks.

Following a decline in economic activity, which led to lower economic growth rates, researchers and policymakers delved into the potential impact of higher public debt-to-GDP ratios on economic growth. A significant contribution to this field was made by Reinhart and Rogoff (2010), who provided extensive historical data series to analyze public debt-to-GDP ratios and economic growth. Their finding that public debt-to-GDP ratios above 90% are linked to significantly lower economic growth triggered a substantial debate. On the contrary, some studies suggest that there is no statistically significant correlation between the debt-to-GDP ratio and GDP growth (Corsetti et al., 2012; Boussard, Castro, Salto, 2013; Blot et al., 2015). However, the authors Panizza and Presbitero (2014), and Ash, Basu and Dube (2020) argue that the evidence for a causal effect from higher public debt-to-GDP ratios to economic growth is weak. Moreover, there is a lack of evidence for universal thresholds in the public-debt-to-GDP ratio beyond which growth falters across countries (Pescatori, Sandri, Simon, 2014; Eberhardt, Presbitero, 2015; Egert, 2015a; Yang, Su, 2018; Eberhardt, 2019; Bentour, 2021). However, a high level of debt negatively impacts economic growth (Cecchetti, Mohanty, Zampolli, 2011). According to the EU's fiscal rules, the annual fiscal deficit must be limited to 3% of GDP, and the overall government debt should not exceed 60% of GDP.

An increase in the price level directly diminishes the purchasing power of government debt, leading to a decrease in the real value of debt and the debt-to-GDP ratio. This relationship is observed due to the fact that higher prices result in an increase in nominal GDP, assuming other factors remain constant. Research conducted by Akitoby, Komatsuzaki and Binder (2014) demonstrates that in advanced economies an inflation shock is associated with a decrease of approximately 0.5 to 1 percentage point in the debt-to-GDP ratio. The impact of inflation shocks is more prominent and enduring when the maturity of the debt is longer. However, even with moderately higher inflation and some degree of financial repression, the reduction in the public debt burden remains marginal in most advanced economies. It is important to note that higher inflation is not expected to significantly decrease the real value of debt by more than a few percentage points of GDP, as found by Hilscher, Raviv and Reis (2014). Regarding the inflation target, Krause and Moyen (2016) emphasize that only permanent adjustments in the target have a significant impact on real public debt. Moderate changes in the target are unlikely to yield substantial effects. Furthermore, the benefits of not communicating a change in the inflation target are relatively small.

Government spending and taxation policies have a direct impact on public debt. Expansionary fiscal policies, including increased government spending and tax cuts, can lead to higher deficits and subsequent increases in debt. On the other hand, fiscal consolidation efforts, such as austerity measures and tax reforms, can help reduce public debt over time (IMF, 2022a). According to Von Hagen and Wolff (2006) fiscal rules, such as the excessive deficit procedure and the stability and growth pact, are intended to constrain government behaviour. By setting limits on budget deficits and public debt levels, these rules attempt to

prevent excessive borrowing and the accumulation of unsustainable levels of government debt.

Political stability and the quality of governance have a notable impact on the dynamics of public debt. Political instability, corruption, and weak institutional frameworks can impede fiscal discipline and contribute to elevated levels of debt. Transparent and accountable governance structures, on the other hand, are associated with improved practices in debt management. The relationship between political instability and higher public debt has been frequently observed, as governments may turn to increased borrowing to ensure stability or fund populist programs. For instance, Alesina and Perotti (1996) found evidence of higher public debt in developing countries experiencing political instability. The role of political fragmentation in understanding public debt dynamics is significant. Moreover, corruption amplifies this relationship, especially in societies where corruption is perceived to be prevalent. In such contexts, a high level of political fragmentation contributes to a substantial increase in public debt. Conversely, when corruption levels are high, low political fragmentation fails to effectively reduce public debt. Additionally, the impact of political fragmentation on debt dynamics appears to be somewhat asymmetric. The effects of fragmentation are more pronounced and meaningful during periods of decreasing debt. However, this observation primarily holds true in normal times when public debt remains relatively low, below 50% of GDP. In countries with already elevated levels of public debt, political fragmentation alone cannot account for further increases. Similarly, low political fragmentation proves ineffective in reducing public debt beyond that threshold (Crivelli et al., 2016).

During economic or financial crises, natural disasters, or external shocks, governments often experience a significant impact on their public debt dynamics. These unforeseen events can necessitate increased borrowing to fund recovery efforts, stabilize the economy, or mitigate the adverse effects of the crisis. As a result, public debt tends to accumulate at a higher rate during crisis periods compared to non-crisis periods (Koh et al., 2020). One specific type of crisis that has been extensively studied is the banking crisis. It is widely recognized that banking crises are frequently accompanied by substantial increases in government debt. Such crises, especially those affecting the banking sector, often lead to significant expansions in public debt levels. This is primarily due to the fiscal costs associated with crisis management, including bank bailouts and economic stimulus measures, which require governments to borrow more funds to address the crisis repercussions (Kumar, Woo, 2010). Moreover, research suggests that a rise in overall debt, whether it is government debt or private debt, significantly elevates the risk of a crisis occurring in the following year. Additionally, when both government and private debt increase simultaneously, the likelihood of a currency crisis becomes even higher compared to situations where there are increases in only government or only private debt (Ayhan Kose et al., 2021). These findings emphasize the link between crises and the accumulation of government debt, highlighting the need for effective crisis management and debt sustainability strategies to mitigate the adverse consequences on economies and financial systems.

It is important to note that the influence of these factors can vary across countries and over time. Researchers continue to explore the complexities of public debt dynamics and the interplay between these factors. By understanding these influences, policymakers can make

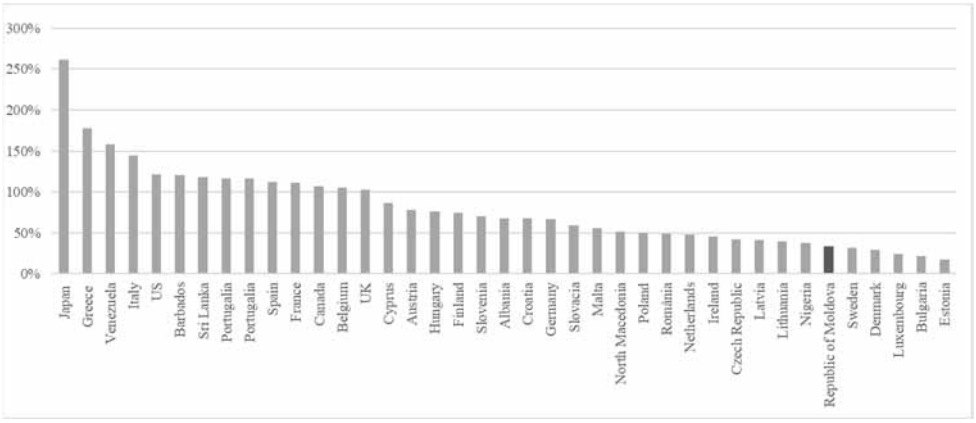
informed decisions to promote sustainable debt management practices and ensure long-term fiscal stability.

High levels of public debt can impose a burden on future generations because governments may be compelled to raise taxes or borrow more to repay their debts. This can lead to increased financial pressure on future citizens as they may have to shoulder the consequences of previous borrowing decisions (Qehaja, Gara, Qorraj, 2022). Additionally, significant government debt can foster an anticipation of higher future taxes, which, in turn, may discourage individuals from saving and investing. This expectation of increased taxation can dampen the incentive for people to save their money and invest it in productive endeavours, potentially hindering economic growth and prosperity (Qehaja-Keka, Qehaja, Hoti, 2023).

3. Public Debt in the Republic of Moldova

The distinction between developing and developed countries regarding public debt levels is not straightforward. At the global level, Moldova's general government debt is relatively low compared to many other countries (Figure 1). While some developed countries may have significantly higher or lower levels of public debt relative to their GDP.

Figure 1. General government debt to GDP, 2022



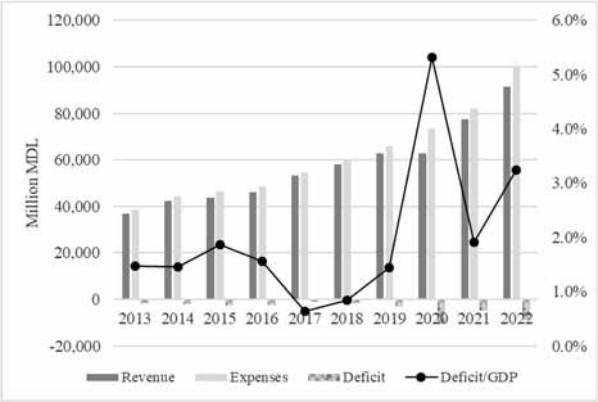
Source: Authors' elaboration based on IMF data (2023).

Moreover, comparing public debt levels between countries should take into account not only the absolute debt figures but also the economic context and the capacity to service the debt. Factors such as economic growth prospects, revenue generation capabilities, fiscal discipline, and debt management practices all play a crucial role in determining the sustainability of a country's debt.

Prior to the outbreak of the COVID-19 pandemic, the macroeconomic outlook was optimistic, projecting an economic growth rate of approximately 3.8% for the year 2020. However, the situation drastically changed after the pandemic hit, leading to a significant

decline of 8.3% in economic growth. This decline was primarily attributed to the shock in demand and production within the economy. The COVID-19 crisis has brought about extreme uncertainty in the field of macroeconomics, as it has exerted immense pressure on public finances. Budget revenues fell below the projected levels, while there was a surge in spending to implement additional measures in various areas like health, social protection, and the overall economy. Consequently, the national public budget deficit reached its highest negative levels in 2020, making it the most substantial deficit experienced in the past decade, largely influenced by the impacts of the COVID-19 pandemic (Figure 2).

Figure 2. Execution of the National Public Budget



Source: Authors' elaboration based on government open data portal (2023).

In 2021, there was a notable economic rebound driven by the resumption of external financing, but it was accompanied by an energy crisis towards the year's end. This energy crisis presented fresh challenges for governance and the business environment, resulting in a cascading effect on energy resource prices in the regional market and food prices in the domestic market. By the end of 2021, the inflation rate exceeded expectations, surpassing the target range set by the National Bank of Moldova (5% +/- 1.5%), reaching 13.9%. In the early months of 2022, the surge in food and energy prices led to a higher cost of goods and services in the domestic market. The ongoing conflict in Ukraine added further pressure to the situation.

The sources of financing for the national public budget deficit of the Republic of Moldova are represented in Table 1.

According to Table 1, except for the year 2019, debts account for the largest portion of financing sources for the budget deficit. External debt takes precedence over internal debt in funding the budget deficit. In 2022, the main creditors of the Government of the Republic of Moldova are the World Bank, the European Bank for Reconstruction and Development, the European Investment Bank, the International Monetary Fund, and the European Union. Domestic financing sources for the budget deficit comprise government securities issued in the domestic market.

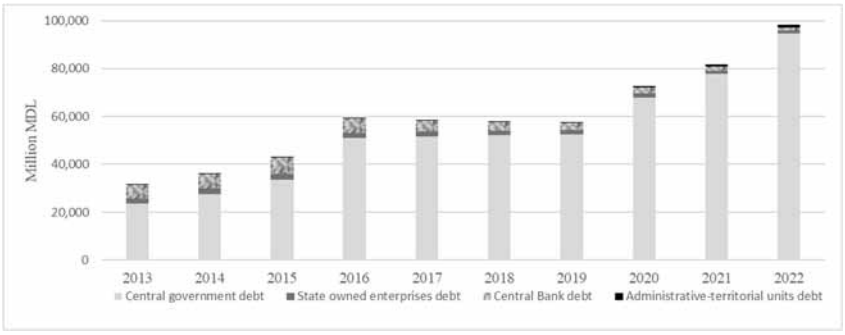
Table 1. Sources of financing for the national public budget (million MDL)

Indicator	2018	2019	2020	2021	2022
Budget deficit	-1 613,0	-3 026,4	-10 619,8	-4 640,5	-8 868,6
Sources	1 613,0	3 026,4	10 619,8	4 640,5	8 868,6
Financial assets	319,3	521,9	-471,9	-2 386,8	-9 580,7
Debts	943,7	567,4	13 227,4	12 443,0	12 920,3
Change in cash balance	350,0	1 937,1	-2 135,7	-5 415,7	5 529,0

Source: Authors' own elaboration based on government open data portal (2023).

In recent times, there has been an increase in the stock of public sector debt (Figure 3).

Figure 3. The evolution of Public Sector Debt



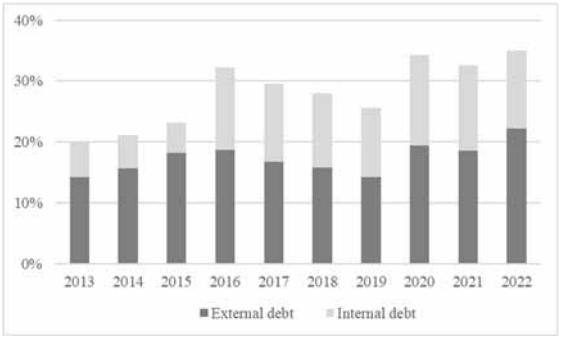
Source: Authors' own elaboration based on Government Open Data Portal (2023).

According to Figure 3 in 2022, the stock of public sector debt reached a record level of 98.5 billion, representing a 3.1-fold increase compared to the situation at the end of 2013. Until 2020, a general debt-to-GDP ratio of over 30% was recorded in 2016, when in October 2016, government securities amounting to MDL 13.3 billion (US$672 million) were issued to fulfil guarantees provided for emergency loans given by the National Bank of Moldova to insolvent banks. The bonds have maturities ranging from 1 to 25 years and carry a fixed annual interest rate of 1.4% for maturities up to 10 years, and 5.3% for longer maturities (IMF, 2016).

Central government debt accounts for the largest share of the total public sector debt, constituting 96% in 2022. Within the state debt, the majority share is held by external state debt, representing 64% (Figure 4).

Starting from 2016, there has been an increase in the share of domestic debt, driven by the issuance of government securities to fulfil state guarantees. The same trend of growth or decline in both domestic and external debt is highlighted. The maximum level of general debt-to-GDP ratio was reached in 2022, with 35.3 billion MDL for internal debt and 60.8 billion MDL for external debt (Ministry of Finance, 2023). It is worth noting that the classification of domestic and external debt is not based on residency criteria.

Figure 4. The evolution of General Government debt to GDP



Source: Authors' own elaboration based on Government Open Data Portal (2023).

The energy crisis in 2022 has affected the level of public debt in the Republic of Moldova in a similar way to the COVID-19 pandemic in 2020. The government allocated significant funds to address the crisis, including importing natural gas and supporting the energy sector. These additional expenditures have led to a significant increase in the budget deficit and, consequently, an increase in the public debt. Additionally, the energy crisis has had a negative impact on the overall economy and, therefore, on the government's tax revenues. Reduced production and disruptions in energy supply have affected businesses and, consequently, tax revenues. This has resulted in a decline in tax revenues and, therefore, an increase in the public debt. Inflation expectations have become a challenge for the National Bank of Moldova. To mitigate the impact of the price shock on the economy, it implemented restrictive monetary policy measures by raising in 2022 the base rate nine times, from 8.5% to 21.5% (Gutium, Speian, 2022).

In order to assess the sustainability of the central government debt, the government annually approves the Medium-Term Debt Management Strategy. In its development is used an analytical tool, created jointly by the World Bank and IMF in 2009 (World Bank and IMF, 2019). This tool enables the evaluation of both the costs and risks associated with financing budget deficits and 69 countries utilize this. In this context, the Ministry of Finance monthly in statistical bulletins publishes the results of the risk indicators established in the Debt Management Strategy.

According to the Debt Sustainability Analysis, Moldova's external debt is assessed to have a low risk of distress, while the overall public debt is considered to have a moderate risk of distress, which remains unchanged from the May 2022 Debt Sustainability Analysis. The current debt-carrying capacity is evaluated as strong, indicating that Moldova's public debt is sustainable. However, it is essential to address the increasing financing needs arising from the economic and humanitarian impact of the war in Ukraine, as well as the projected medium-term developmental spending requirements. Despite the overall sustainability, the trajectory of public debt is still exposed to risks, especially shocks to real GDP growth. To mitigate these risks, it is crucial to diversify growth drivers and maintain a commitment to prudent fiscal policy (IMF, 2022).

4. Methodology

The stock of public debt at a given time is determined by several factors, including the debt level from the previous period, gross disbursements, and debt repayment or amortization. This relationship can be expressed as:

$$D_t = D_{t-1} + GD_t - M_t \quad (1)$$

Where, D_t is the stock of debt at time t, D_{t-1} is the stock of debt at time t-1, GD_t represents gross disbursements at time t, M_t denotes debt repayment at time t.

To analyze the sources of financing, we examine the following equation:

$$S_t = R_t + GD_t + NDAssts_t \quad (2)$$

Where, S_t represents the total funds available to finance the government's activities, R_t denotes revenues received by the government, including taxes, fees, and other forms of income and $NDAssts_t$ represents net disposal of assets.

Similarly, the uses of financing can be expressed through the following equation:

$$E_t = G_t + IP_t + M_t \quad (3)$$

Where, E_t represents the uses of financing, G_t denotes primary expenditure, which is the total of government spending, excluding the interest payment on government debt and IP_t represents interest payments.

To ensure balance, the equation (2) should be equal to (3), resulting in the equality:

$$GD_t - M_t = G_t + IP_t - R_t - NDAssts_t \quad (4)$$

Assuming net disposal of assets is zero, we can substitute equation (4) back into equation (1) to obtain:

$$D_t = D_{t-1} + IP_t - PB_t \quad (5)$$

Where, PB_t represents the primary balance, which is the difference between revenues and primary expenditure. The primary balance is a crucial indicator of a government's fiscal position, as it shows the government's ability to meet its essential expenditure needs without considering interest payments on its existing debt.

Introducing the concept of an implicit interest rate as:

$$i_t = \frac{IP_t}{D_{t-1}} \quad (6)$$

Where, i_t represents the implicit interest rate, equation (5) can be rewritten as:

$$D_t = D_{t-1} + i_t * D_{t-1} - PB_t \quad (7)$$

To facilitate analysis, if we divide both sides of equation (7) by GDP_t and multiply and divide by the GDP_{t-1} only $\frac{i_t * D_{t-1}}{GDP_t}$ ratio, we can obtain:

$$\frac{D_t}{GDP_t} = (1 + i_t) * \frac{GDP_{t-1}}{GDP_t} * \frac{D_{t-1}}{GDP_{t-1}} - \frac{PB_t}{GDP_t} \quad (8)$$

Considering 1 plus n_t as the nominal rate of growth of GDP:

$$1 + n_t = \frac{GDP_t}{GDP_{t-1}} \quad (9)$$

Where, n_t represents the nominal GDP growth rate, equation (8) can be reformulated as:

$$d_t = \frac{1+i_t}{1+n_t} * d_{t-1} - pb_t \quad (10)$$

Where d_t is debt-to-GDP and pb_t is primary balance to GDP.

If we assume that the nominal interest rate and the nominal growth rate consist of a real interest rate component, real growth, and inflation, we can express:

$$1 + i_t = (1 + r_t) * (1 + \pi_t) \quad (11)$$

$$1 + n_t = (1 + g_t) * (1 + \pi_t) \quad (12)$$

Where, r_t represents the real interest rate, g_t denotes the real growth of GDP, π_t represents inflation.

By utilizing equations (11) and (12), the debt dynamics formula can be reformulated as:

$$d_t = \frac{1+r_t}{1+g_t} * d_{t-1} - pb_t \quad (13)$$

Equation (13) provides a method to calculate the stock of debt at a specific time, incorporating the debt level from the previous period, the interest rate on the debt, the growth rate of the economy, and the primary balance during the current period.

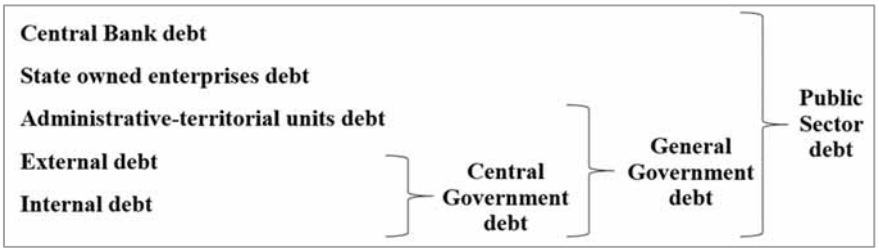
Given the uncertainties involved in analyzing debt dynamics, Monte Carlo simulation as a useful method to address this matter. There are two main steps for producing a fan chart:

- Firstly, we require a substantial number of debt trajectories, ranging from hundreds to even thousands. These paths are constructed by introducing perturbations to the key variables influencing the debt dynamics in our baseline scenario. These variables encompass interest and GDP growth rates, and the primary balance. The shocks are sampled from a normal distribution with a specific standard deviation. Standard deviation is calculated based on the historical data.
- Secondly, once we have generated these alternative debt paths, we examine, at each point in the projection period, the intervals in which the debt falls within a specific percentage of cases. Starting with the interval that encompasses 90% of the cases, we then identify the intervals in which the debt falls within 80%, 70%, and so on, of the cases. It is essential that these intervals are centered, meaning that each interval excludes an equal number of paths above and below it.

Moldova's public sector debt encompasses the central government debt, which includes obligations owed by the national government, as well as the debt incurred by local government authorities. Additionally, it includes the debt of state and municipal enterprises, which refers to companies that are either fully or majority-owned by the government. Furthermore, the debt of the Central Bank of Moldova is also considered as part of the public sector debt. The reporting requirements extend to all debt-generating instruments of the

public sector, which are contracted for a period of one year or more. This includes all conditional obligations arising from contracts for the provision of state guarantees, guarantees of local government units, guarantees of state/municipal enterprises, and guarantees of wholly or majority publicly-owned companies (Figure 5).

Figure 5. Coverage of Public Sector Debt in the Republic of Moldova



Source: Speian (2022).

Internal debt – the total amount of obligations and unpaid interest incurred on behalf of the Republic of Moldova by the Government through the Ministry of Finance from residents. In regards to government securities acquired by non-residents on the domestic market, they are also included in the domestic debt.

External debt – the total amount of obligations and unpaid interest incurred on behalf of the Republic of Moldova by the Government through the Ministry of Finance from non-residents. Government securities issued on international financial markets and acquired by residents are included in the external debt.

Administrative-territorial units debt – commitments in the form of loans, as well as unpaid interest, incurred and utilized by local authorities.

Debt of state-owned enterprises and companies – commitments in the form of loans, as well as unpaid interest, incurred and utilized by state-owned enterprises/municipalities and companies.

Central Bank debt – includes loans from the IMF utilized by the Central Bank of Moldova.

5. Empirical Results

Using IMF data (2023) for the Republic of Moldova spanning the period from 2003 to 2027, the author constructed a fan chart using the Monte Carlo simulation method. The process involved following steps:

- The calculation of the standard deviation for real GDP growth, real interest rate, and primary balance utilizing historical data ranging from 2003 to 2022 (Table 2).
- The construction of 500 alternative scenarios for real GDP growth, real interest rate, and primary balance. Excel formulas were utilized to generate uniformly distributed random numbers.

Table 2. Standard deviation of variables

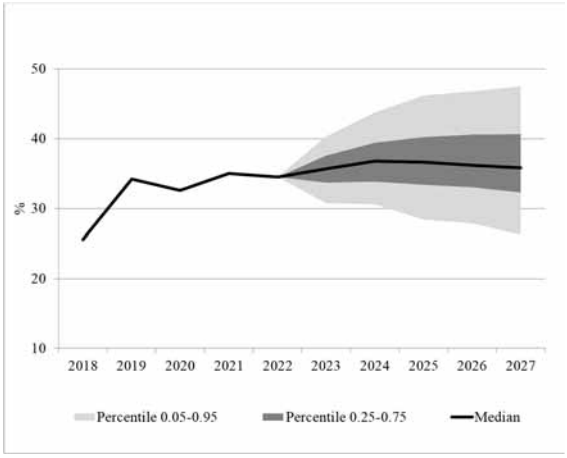
Variable	Standard deviation
Real GDP growth	5,5
Real interest rate	5,0
Primary balance	2,0

Source: Authors' own calculation.

- The calculation of the debt-to-GDP ratio using formula (13).
- Computation of percentiles to ascertain the range of values within which the calculations were conducted.

Based on these aforementioned steps, the author constructed a fan chart depicting the general government debt-to-GDP ratio (Figure 6).

Figure 6. General Government Debt to GDP



Source: Authors' own elaboration.

Figure 6 presents the probability distribution of the general government debt-to-GDP ratio for the period 2023-2027. Based on the chart, it indicates that there is around 5% probability that the ratio in 2027 will be above 40 percentages and below 30 percentages. On the other hand, the chart suggests that there is approximately a 95% probability that the general government debt-to-GDP ratio in 2027 will reach the level of 36 percentages. Thus, there is a probability that the forecast of the general debt as a percentage of GDP will align with the anchoring level, 37 percentage of GDP, specified in the IMF staff country report on Moldova (2023). According to the report, the program's target for public debt is 45% of GDP.

Given the projected growth rate of the national economy, which is estimated at 2% in 2023 and 5% in 2027 (IMF data, 2023), along with the expected decline in the inflation rate to 5% in 2027 and the assumption of an overall balance similar to that of 2022, there is a higher

likelihood that the debt-to-GDP ratio will not significantly differ from the results observed in 2022.

Conclusions

Public debt plays a crucial role in the economy, enabling governments to secure funds for public spending and stimulate economic growth. In recent times, there has been a global increase in public debt-to-GDP. As a result, it is of utmost importance to ensure that the debt remains sustainable to prevent adverse consequences for the economy and the well-being of future generations.

There is no "magic" debt threshold that guarantees economic growth. The debt-to-GDP ratio varies from one country to another, and there is no direct correlation between a country's level of development and its debt-to-GDP ratio. Indeed, each country typically establishes its own debt ceiling, often outlined in the annual state budget law, which it aims to adhere to.

At any specific point in time, the total outstanding debt is relatively certain. However, the uncertainty lies in the factors that influence the future evolution of debt dynamics, such as interest rates, economic growth, and the primary balance, among others.

In 2027 the forecasted results indicate that the general government debt of the Republic of Moldova is expected to remain at a similar level to that of 2022

This projection reflects the government debt remain sustainable. Although, it is essential for policymakers to closely monitor the factors influencing public debt dynamics, such as economic growth, interest rates, and fiscal balances, and take necessary measures to ensure debt remains within sustainable limits.

The methodology presented for calculating a debt stock provides a valuable tool for policymakers and investors to assess the level of public debt in a country. In each distinct macroeconomic scenario, the debt profile varies from what we anticipate under the baseline scenario, representing a likely trajectory deviation. These alternative scenarios are used to assess how the debt trajectory changes if certain variables, like interest rates, economic growth or primary balance deviate from the baseline expectations. These shocks help to gauge the sensitivity of the debt dynamics to different economic conditions.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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Assel Tapalova[1]
Zhanarys Raimbekov[2]
Gulzhakhan Zhunussova[3]
Altynbek Zhakupov[4]
Zhanar Yerzhanova[5]

EXPORT POTENTIAL AND ORIENTATION OF THE ECONOMY OF THE BORDER REGIONS OF KAZAKHSTAN[6]

The main purpose of this paper is to analyze the current export potential of Kazakhstan, highlight its shortcomings, and implement solutions that will help to avoid them, form the poles of economic development, as well as explore ways to develop and improve them. This paper is aimed at the study of the economy of the border territories of Kazakhstan, it used the method of logical analysis, the method of comparative analysis, the method of analysis of scientific literature, the method of synthesis, the method of deduction, as well as the economic and statistical method. The result of this work is the definition and development of the theoretical and practical foundations of the activities of border territories, their impact on the economy of this region, as well as the creation of an algorithm and methods for the development of the poles of economic development.
Keywords: Growth pole; border region; emigration; economic potential; economic space.
JEL: E00

1. Introduction

The problems of forming the economic growth belt of the border territories always remain relevant. The characteristic states that mostly face such issues are those that have many neighbouring countries. The interdisciplinary methodology of the study of border territories

[1] *Assel Tapalova, L. N. Gumilyov Eurasian National University, Republic of Kazakhstan assel.tapalova@gmail.com.*
[2] *Zhanarys Raimbekov, L. N. Gumilyov Eurasian National University, Republic of Kazakhstan zhanarys.raimbekov@outlook.com.*
[3] *Gulzhakhan Zhunussova, Kazakh University of Technology and Business, Republic of Kazakhstan gulzhakhan.zhunussova@proton.me.*
[4] *Altynbek Zhakupov, L. N. Gumilyov Eurasian National University, Republic of Kazakhstan altynbek.zhakupov@hotmail.com.*
[5] *Zhanar Yerzhanova, Zhangir Khan West Kazakhstan Agrarian Technical University, Republic of Kazakhstan zhanar.yerzhanova@protonmail.com.*
[6] This paper should be cited as: *Tapalova, A., Raimbekov, Z., Zhunussova, G., Zhakupov, A., Yerzhanova, Z. (2023). Export potential and orientation of the economy of the border regions of Kazakhstan. – Economic Studies (Ikonomicheski Izsledvania), 33(2), pp. 64-76.*

is one of the properties that establish priority areas of scientific and practical research and work in this area. Quite a large number of works concern the socio-economic factors of the development of neighbouring states, and the prospects of using abroad (Satkangulov, 2021; Komilova et al., 2021). Usually, the border prerogatives created by the locality of neighbouring countries differ in terms of GDP per capita and its average monetary income, average monthly salary and several other important indicators (Zaitsev, 2016). The accentuation of these characteristics is quite an important feature of the socio-economic development of the border territories. The socio-economic factors and properties formed in the border territories of Kazakhstan determine the movement of goods and people across the state border and eventually develop international migration. Through these rapid border movements, the structure of the demographic settlement of citizens is changing. Thus, the age structure of settlement is being reformed, as well as settlements based on gender carried out in a large number of cities and villages in the border territories (Doroshenko, 2020). Having considered the trends that have formed historically, it can be argued that they are characterised by the settlement and development of border territories, and the formation and fixation of the toponymic landscape. The scale, direction, and nature of migrations have an impact on the ethnic composition of citizens, their language, traditions, as well as psychology. Thus, historians, linguists, cultural scientists, and psychologists are constantly involved in the study of border territories (Mekinya, Isagaliev, 2020). The basis of the available materials is also very different but economic and geographical works enjoy a fundamental prerogative. The development of transport properties on the activity of socio-economic indicators has been studied on the territory of the Kazakhstan border region. The paper studies the general and local characteristics of the development of socio-economic properties of the modification of Kazakhstan border territories provided that their geographical location and typology are used. In the process of studying the Kazakhstan border area with some other countries, a systematic assessment of the effectiveness of the socio-economic modernisation of the region and the establishment of specific ways of its development is of particular importance (Akhaev, 2020).

In the form of topical issues and problems of innovation implementation in the integration processes of the Eurasian Economic Union, the factors of industrial unification of countries are considered in the example of the Russian-Kazakh border region, and the development of a "value chain" in various sectors of the economy of economic entities, that is, two countries, is also studied on modern examples. The mentioned typology is important and necessary when creating modern and effective concepts of cross-border cooperation (Ydyrys, Kozhambek, 2020). Consideration and study of institutional cooperation on the Kazakh borders allow asserting that the border regions, whose activities are declared by the system of regulatory acts, are valid and appropriate only in a situation where the trends of cross-border cooperation meet them. The study of such activities allows identifying several regional economic growth zones of cross-border cooperation on the borders of Kazakhstan. The Chinese influence on the spatial development of Kazakhstan is formed as one of the important areas of current cross-border cooperation. Moreover, the active increase in the number of Kazakh-Chinese trade operations is based on a small percentage of fuel suppliers of raw materials, while referring to the regions of the European part, then a considerable consumer capacity is decisive for them. Attention needs to be paid to the fact that the current station may change due to an increase in the efficiency of investment activities of the PRC

in Kazakhstan, in addition, a whole list of important transport concepts and logistics development will take place, which turn regulates mutual trade relations (Alshimbaeva et al., 2020; Tashpulatov et al., 2020).

In the study, special attention is paid to the issue of export potential and the general orientation of the economy of the border territories of Kazakhstan. Having studied the general concepts and trends that formed the basis of the economic development of this region, the following groups of risks associated with this process can be identified in the border territories of Kazakhstan, among them are socio-cultural, transport, and economic risks. The economic aspect of working with the existing trends includes the innovative development of cross-border economic development belts and the potential for the mentioned territories. The novelty of this research lies in the comprehensive analysis of the export potential and orientation of the economy in the border regions of Kazakhstan. The research utilizes a combination of logical analysis, comparative analysis, analysis of scientific literature, synthesis, deduction, and economic and statistical methods. This interdisciplinary approach allows for a comprehensive examination of the export potential and economic orientation of the border regions. The research includes a comparative analysis of the economic potential and modernization processes in post-Soviet countries, with a focus on the influence of Russian resources. This comparative approach provides valuable insights into the unique characteristics and challenges faced by Kazakhstan and other CIS countries in their economic development.

The key research questions were the introduction of the concept of "poles of economic development" and its historical development; the influence of border regions on the general development of the economy, in particular in relation to neighbouring countries such as Russia, China, Uzbekistan, Kyrgyzstan, Turkmenistan, Iran, and Azerbaijan, was investigated; the connection of export potential with the orientation of the economy to specific regions is emphasized; the influence of emigration both on the border regions and on the national economy is analyzed; the theoretical aspects of the economic potential, including the influence of Russian resources and a comparison of trends in the CIS countries and Europe, were investigated.

2. Materials and Methods

The research is based on the use of several methods and methodological approaches for conducting research in the field of economics, namely, the impact of the activities of the border regions of Kazakhstan on the development of the poles of economic growth, including the analysis of this industry and the identification of the main problems. It is worth focusing on the fact that in the course of the study, an economic and statistical method was used, which provided an opportunity to generalize the phenomenon of indicators and patterns in the field of socio-economic development of border territories since the development of the economic development belt, to highlight the results of such economic potential and its impact on the socio-political stability of the region. The study also used the method of comparative analysis, which consists in reviewing and evaluating international experience in this area, which allowed identifying ways that will positively affect the establishment and development

of the poles of economic growth. One of the most important methods used in this study is the method of analyzing scientific literature, including scientific dissertations, theses, and textbooks, which allows full reviewing and studying of the works of both national and foreign scientists. The significance of this method is determined by the fact that this sphere covers the orientation of the economy of border territories of Kazakhstan, in turn, has a considerable impact on the economy of the entire state, therefore, for its effective application it is necessary to get acquainted directly with the theoretical aspects and provisions on this plane. The deduction method was also useful since it allows covering this topic from a general concept to a specific one, namely from the broad concept of "economy" to a narrow "economic growth belt", in a logical chain way. Due to the synthesis method, it is possible to combine the factors identified in the course of the study that affect the activities of border territories in the field of economics, to identify a more accurate result in the study.

Based on the above, the following tasks can be formed:

- to analyze the export potential of Kazakhstan's border territories;
- to establish ways and methods for the development of the poles of economic growth in the border region;
- to determine the advantages of the modern economic orientation of the border territories of Kazakhstan and its prospects;
- to highlight the shortcomings of the current activities of the border regions on the development of the poles of economic growth and consider methods of their elimination.

The research on this topic is carried out in three stages:

1. At the first stage of establishing the theoretical foundations of the topic under consideration, the main defining approaches of scientists on the issue, papers of national and foreign authors are used for research, and a plan for analysis and research is drawn up, in particular, the main purposes and objectives are highlighted.
2. In the second stage, the experience and achievements of foreign countries in the field of economic development of border territories are studied, as well as the analysis of the current economic potential of these territories is carried out, promising ways and methods for its modification and development are highlighted, considering the latest trends and methods.
3. The third stage, which is the final one in the work, is to form a clear algorithm for the development of the poles of economic development, considering possible risks and obstacles.

3. Results and Discussion

The issue of Russian resources' influence on the improvement of the modification of the "post-Soviet space" economy is constantly being studied in both economic and economic-geographical works. The main focus of the problems under consideration is the sector of interdisciplinary vectors of border regions' spatial development in the context of restructuring

and transformation of the sectoral territorial totality of territories, which in turn are located close to the border of the Russian Federation. The results of prospective inter-border innovative and modernised procedures in the states of the European Union (for the creation of the so-called "Euro regions") show that the effectiveness of economic interaction of border territories can be applied only with the "multiplicative effect" of neighbouring countries with which Kazakhstan borders, interested in increasing the "competitive advantages" of neighbouring regions (Raimbekov, Rakhmetulina, 2020).

It is clear that the European border territories have received accelerated development, provided that "transnational capital" will be able to receive "economic preferences" from both sides of the borders. In this sense, it is worth investigating the interaction of Russian resources, which over the past 26 years have completely changed the "economic landscape" of the "post-Soviet" sector border regions with the Russian Federation. Of particular interest is the consideration of 81 vectors of geographical labour, among which it is worth noting the border territories of the Republic of Kazakhstan, which constantly carry out activities in various not only economic but also political, social, cultural, and educational vectors. Considering the historical development of the border regions of Kazakhstan, it can be argued that there was an active economic, social, and cultural exchange between the aforementioned territories. Quite recently, Russia and Kazakhstan formed an integral economic space. A large number of industrial projects were carried out in the context of the planning and administrative system of the former USSR countries. The regionalisation of the world economy, the development of economic blocs, and the rupture of relations with the West make the Eurasian tender of Russia and Kazakhstan practically non-competitive in the international arena. However, after 26 years, the concrete impact of economic interaction is carried out in an external dimension, for example, in increasing the percentage of joint ventures (financed directly by foreign investments), that is, in developing a "common market" of goods, capital, services and labour, new jobs, increasing the production of high-value-added products, tax deductions, technology transfer (Zhumalieva, 2021).

Kazakhstan is the world's largest landlocked country, located in Central Asia. It shares borders with Russia, China, Kyrgyzstan, Uzbekistan, and Turkmenistan. The population of Kazakhstan is around 19 million, and the official language is Kazakh. The country has a diverse economy, with natural resources such as oil, gas, and minerals playing a significant role in its growth. Kazakhstan is also known for its agricultural sector, including wheat, barley, and livestock production (Karshalova et al., 2017). The country has made significant progress in economic development since its independence from the Soviet Union in 1991, with a focus on diversifying its economy and attracting foreign investment. Russia has the longest border with Kazakhstan since its length is 7512 km, thus, this leads to the separate importance of cross-border cooperation between the two countries. According to the cross-border mutual economic activity of this region, 12 Russian (Altai Republic, Altai Territory, Novosibirsk, Omsk, Tyumen, Kurgan, Chelyabinsk, Orenburg, Samara, Saratov, Volgograd, Astrakhan regions) and 7 Kazakh (Aktobe, Atyrau, West Kazakhstan, Kostanay, Pavlodar, North Kazakhstan, East Kazakhstan regions) regions are involved in it. These territories of Russia and Kazakhstan have a considerable impact on the national economies of the above countries since they form the level of their competitiveness to a greater extent. The border regions are inhabited by more than 32 million people; thus, the total gross product of the Russian-Kazakh border region exceeds 350 billion dollars. Thus, the gross regional product

(GRP) of the border regions of Kazakhstan is 40% of the gross domestic product (GDP) of Kazakhstan, and the GRP of the border regions of the Russian Federation (RF) is 15% of the GDP of the Russian Federation.

The concentration of production and technological activities and the development of interconnected chains in such spatial planes (sub-regional international territories) allow turning the region into a bright core and source of integration processes. Thus, with the increase in the number of such regions, the stability of integration processes deepens and forms. An extremely relevant way of developing integration interaction is the establishment of the Customs Union of Russia, Belarus, and Kazakhstan in 2010. The implementation of the agreements signed in the context of the Customs Union allowed declaring export-import tariffs and from July 1, 2011, forming the transformation of all types of state control at the borders of the Customs Union, from internal to external (Akimova et al., 2020).

The expected results of the economic development of the border region Eurasian Economic Union countries are as follows

1) development of economic, social, and political interaction between the states at the subregional level in the context of the powers of local authorities;
2) compensation of the negative barrier effect of borders through local authorities and communities;
3) solving local problems with the assistance of cross-border cooperation (consisting of the economic and social mobility of citizens located within a radius of 100-150 km on both sides of the border)
4) integration of peripheral regions of the states by promoting industrial activity of priority areas of regional specialisation;
5) reforming the process of information transmission, exchange and distribution of appropriate examples of cross-border cooperation.

The study of the current poles of economic development indicates that Russian-Kazakh border economic relations are usually formed based on economic enterprises developed during the implementation of the planned administrative economy of the former USSR. This statement is interpreted through a combination of a large number of objective characteristics, among them the geopolitical position of the two countries, which have their specific features in the cultural, economic, and civilisational spheres, and are also characterised by mutual complementarity of their interests. The presence of a perfect level of scientific, educational, and technological properties that were developed and approved in Soviet times. Thus, there is a relatively extensive infrastructure that Kazakhstan and Russia are interconnected with each other (Voloshenko, Novikova, 2021).

A valuable and necessary source of cross-border interaction is the territorial differences of neighbouring countries regarding their position and place in the arena of the world economy, as well as the level and combination of internal prices, tax and investment legislation, income, etc., which allows effectively exchanging the appropriate amount of goods, including factors of production. Thus, economic orientation affects cross-border cooperation, is formed based on the differences of neighbouring countries and, therewith, the commonality of their

resource provision and geo-economic situation somehow performs an important function in the process of reforming the economy of border territories and improving the state of the economic growth belt. In the process of studying economic processes that form the economy of border regions, investment programmes of the capital of neighbouring countries play an important role. At the moment, it should be noted that the economic and geographical location of the bordering regions is being reformed as a result of the development of various transport routes that affect the development of the economic growth belt (Jakubik et al., 2017). It is necessary to investigate the factors that have a considerable impact on the competitiveness of the state's economy, as well as influence the development and expansion of the export potential of Kazakhstan border regions. To characterise these factors, it is necessary to separate internal and external factors. The export potential covers its content in two aspects because it is formed both on a general approach to the development of opportunities and considering the competitive conditions of the world market for the products exported. Thus, internal factors have to contain, first of all, resource and raw material potential, properties of industrial production and high-quality human resources; educational and investment and innovation potential, legislative property and regulatory framework of the activities of state institutions. External factors, in turn, are factors of the market totality of elements – capacity and market conditions, the conditions of competition in it, and the institutional property as the structure of international institutions of the direction of world trade flows. The export potential is unquestionably closely related to the competitiveness of products that are produced for sale on the world market. Considering that the national competitiveness of goods has a three-level system, it includes states, industry components, and individual enterprises and it can also be argued that there is a strong interaction between increasing the competitiveness of Kazakhstan's border territories on the world market and the growth of the export potential of the economy of the whole of Kazakhstan. The links of the economic potential as poverty to produce goods in demand both on the domestic and foreign markets, in turn, the competitiveness of the state economy follows from the content of the developed categories of competitiveness of many authors (Mekin, 2021).

The term "growth pole" was first formed by the French economist Francois Perry. They covered the term growth pole in the concept of closely located and dynamically developing spheres of the economy and individual enterprises, in which their own "momentum of development" is formed, unquestioningly influencing the territorial and organisational structure of the enterprise and its dynamics. The creation of such processes is due to the accumulation of innovations, which in turn are grouped around the sector, and occupy leading positions in the efficiency rating. Thus, provided that this industry is dynamic, that is, it can have a positive multiplier effect, it directly creates a pole of growth. Thus, the author covers the concept of the growth pole as a functional concept. The scientist completely abandoned the use of the principle of homogeneity and uniformity of development. The scientist interpreted economic space as an abstract phenomenon, that is, some kind of force field, the intensity of which is disproportionate and in which certain centripetal forces act, aimed at some centres, poles, or foci, and the forces created from them are centrifugal. Thus, each process has its force field, which is placed in the middle of the structure of other processes. Functional growth poles are associated with such phenomena. Notably, there are as many planes as there are systems of abstract relations that form each object of economic science. The theory of the French economist largely corresponds to some objective concepts of the

development of border regions among them, the concentration of production, the spatial hierarchy of production complexes and settlement systems (Butakova, Goryaninskaya, 2020).

This theory was developed in detail on the territorial aspect by the French scientist J. Budville. Its significance lies in the fact that the author was able to present Perry's theory in another sphere, that is, tied it to a specific geographical space (extremely important in the study of the economic potential of border territories) and, which is extremely important for regional science and research, he also gave a regional interpretation of the growth poles. He proved that the economic space is functionally connected with the geographical one since the latter plays an important role in the development of the economic potential of a certain territory. In other words, they formed a geographical justification for the functional concept and identified a common property between space and function – polarity. Thus, it can be argued that it is not necessary to call each regional central node a pole of growth but only one that has specific characteristics, that is, in which the propulsive leading sectors are distinguished, which has the opportunity to develop independently a long time, and also analyses and controls its environment and gives it impulses of development (Atamanyuk et al., 2012). The scientist believed that the regional pole of growth includes a set of developed and expanded sectors anchored in an urbanised zone and capable of stimulating further development of economic activity throughout its zone of influence. Thus, the poles of growth are cities or individual regions containing a system of interconnected propulsive industries. These spheres are characterised by a dynamic impulse that they send through the sectors associated with them along the line of demand and consumption. Thus, the author made comparisons and combinations of the matrices of the industry balance, investment, and infrastructure development and eventually formed a complex structure of the pole (Krupko, 2020).

The theory of growth poles, as originally proposed by François Perroux and Jacques Boudeville, expands upon the idea that growth and development can be concentrated in specific areas or regions. They argue that the creation of growth poles can help to stimulate economic activity in surrounding regions and promote innovation. H. R. Lasuen, who studied the sequence of urbanisation stages, based on the theory mentioned above, as well as the concept of diffusion of innovations (Lasuen, 1969). The scientist developed important features regarding the interpretation of the growth of poles, among them are:

1) the growth pole is a regional node of enterprises associated with the export sphere of the economy of specific regions, located in one or more economic clusters of the district;
2) the growth poles are growing as a result of impulses created due to national demand, which in turn are transformed due to the export sector of the region's economy and are perceived in competition between the poles;
3) the growth momentum is directed to peripheral, that is, secondary industries with the assistance of market relations between farms, and in peripheral areas – in the same way but considering the factors of location (Mekin, Isagaliev, 2020).

Considering the concept of a border region, it can be characterised as an administrative-territorial unit, which is next to the state level and located directly along the state border.

Currently, analyzing various theories of regional management, it can be confidently stated that the most relevant theory remains the poles of growth, which at the same time is understudied and not explained, despite a large number of scientific papers in this field. A large number of scientists cover the content of the theory of growth poles in the context of the regional economy as follows: this trend theoretically explains the disproportionality of the creation of various spheres of economic activity on the market plane. Based on this methodology, propulsive (dynamic) areas are necessarily formed between the industrial sectors of the border region. In turn, these formations provide for innovative modernisation of border territories, primarily due to the use of auxiliary, additional, and service industries that form poles of growth, and their accumulation in specific areas of a particular territory provokes the establishment of development centres. As a result of the introduction of a dynamic region in the region, as well as its future systemic reformation is carried out, as a rule, through the activities of structures and procedures of the market economy (Melnikov, 2021).

Referring to Kazakhstan, the growth poles began to stand out in the interim period, where the idea of allocating an accumulative effect in cooperation with important and effective development factors was formed. Experience has established that the use of the theory of poles of growth influenced the territorial structure of Kazakhstan. The considerable size of the country's territory led to the unquestioning implementation of the development and control of individual regions in the form of separate centres, which, according to the above theory, formed the settlement of the territory. Thus, this concept is spreading in the 21st century in proportion to the decrease in the population of the country. It is worth noting that Kazakhstan's space was initially quite polarised and, moreover, deformed into a system of a kind of poles of growth, in which an outstanding role usually belongs to the adjacent territory, which in turn uses the powers of the organising principle, as well as its cooperation with the nationwide network. It so happened that several centres, Almaty and Nur-Sultan, stand out sharply above other territorial units and represent a natural basis for introducing innovations or attracting them from abroad for future distribution throughout the country. Therewith, the organic mutual activity of the above global growth poles with other cities of the country is ensured by the national network. The components of the network include Astana, Shimket, Karaganda, Taraz, etc. The system of such formations has been developing in Kazakhstan for several decades, according to which market relations as a result of such processes were only positively influenced, in particular, they strengthened their system and abstracted from the negative qualities of other centres. The development of this mechanism is usually provided as a result of exchange processes of impulses with each other and not with the territory adjacent to each of these elements. Having formed a completely autonomous mechanism, its elements confidently surpass other structural formations both in innovation and in the speed of modernisation of public relations (Tireuov et al., 2020; Karnitis et al., 2022).

However, according to many scientists, such active development is a considerable disadvantage of the current system of growth poles since it is not consistent and is not proportional to other regions that also need to be modernised. Currently, regional centres cannot maintain the entire necessary plane with their influence on their entire region or region due to their large size, therefore, large territories have formed in the state, which are beyond the influence of the nationwide network of growth poles (Yanchuk, 2020).

The current regional economic policy of Kazakhstan is fully formed on the use of the theory of "growth poles", especially regarding border territories. Thus, it is possible to distinguish such a territorial organisation of the economy of the border regions of Kazakhstan:

The northern axis of development consists in the direction of Ust-Kamenogorsk – Semipalatinsk – Pavlodar – Astana – Kostanay (Kokshetau, Petropavlovsk) – Aktobe – Uralsk with access to Kaspiysk (Atyrau, Aktau) and Almaty (Taldykorgan, Dostyk) territorial and economic systems and along the perimeter of the axis – to the border regions of the Russian Federation.

The southern axis of development is formed near the border of the People's Republic of China (Dostyk, Khorgos) – Taldykorgan – Almaty – Taraz – Shymkent – Kyzylorda – Atyrau, Aktau with access along the entire perimeter to the border regions of Central Asian states (Uzbekistan, Kyrgyzstan, Turkmenistan, Azerbaijan).

The central axis will develop in the direction of Astana – Karaganda – Almaty with branches to Balkhash, Dostyk, and access to China, as well as to Zhezkazgan with the prospect of access to the seaports of Western Kazakhstan (Ignatieva et al., 2020).

The main regions of the established axes of development can be identified as central cities that are dynamically developing, and also embody large economic centres of territorial and economic systems that are competitive in the global, regional, and national division of labour. Regarding the development of economic potential in the border regions of Kazakhstan and their urbanisation, priority development of the regions is assumed in two forms:

- The main border centres at the national level, and in the future the Central Asian one, act as starting points in the Eurasian system of commodity, financial, technological, and cultural exchanges.
- The non-urbanised border regions of the national and regional levels concentrate economic potential, use it in their regions, are means of accelerating the process of increasing competitive regional clusters, and provide an opportunity for regions to enter national and foreign markets (Shahini et al., 2022).

Thus, in assessing this concept of economic development of the border regions of Kazakhstan in general, it is important to emphasise that comparing the trend of creating an algorithm to increase the economic stability of regions with modern views, now the main task is not to eliminate interregional imbalances but to provide conditions for optimal territorial organisation of the economic potential of border territories, as well as rational use of natural, economic, and labour resources, geographical location. It is necessary to modify the concept of uniform development of territories, the concept of polarised development, in which the poles of growth can become the most dynamically developed cities or border regions, united with regional and global markets and acting as "locomotives" for other less dynamic border regions of the country (Narynbaeva, Shakhman, 2021; Kerimkulov et al., 2015).

Depending on the functions of the border, the border regions, in turn, also receive characteristic features in the implementation of the integration process, among them: barrier and contact through which they (in combination with the contact function – transitional from one national economic complex to another) form their mutual adaptation. Under the influence

of integration processes, the barrier functions of borders are transferred to the external borders of integration entities. Internal borders become transparent, thus providing an opportunity for free communication of both border and national communities. In the process of contact, border barriers for the movement of goods, capital, and labour are abolished, and the regulatory framework for economic activity is unified. By increasing the considerable share of border regions on the world stage, the range of powers of local authorities is increasing, their competence is expanding in cooperation with the authorities of the respective territories of neighbouring countries. Cross-border cooperation allows for solving specific economic and social problems for the border areas, in particular, gradually overcoming the low level of economic development of these peripheral territories and increasing economic stability and potential (Minchichova, 2020; Kataeva et al., 2019).

The findings of this study have significant policy implications for the economic development of border regions in Kazakhstan. The proposed concept of economic development, along with the establishment of "poles of economic development," offers a promising framework for driving growth and prosperity in these regions. By focusing on the specific border regions and their connections with neighbouring countries, such as Russia, China, Uzbekistan, Kyrgyzstan, Turkmenistan, Iran, and Azerbaijan, the study highlights the importance of leveraging export potential and aligning economic orientation in each region. One key policy implication is the need for targeted measures and interventions to address the identified shortcomings and challenges faced by the border regions. These measures could include investment in infrastructure development, promotion of trade and investment opportunities, enhancement of cross-border cooperation, and facilitation of business activities. The study emphasizes the significance of addressing the impact of emigration on the economy of both border regions and national spaces. Policy measures aimed at mitigating the negative effects of emigration and harnessing the potential benefits can contribute to economic stability and development. The proposed policy implications highlight the potential for enhancing export potential, strengthening economic ties with neighbouring countries, addressing challenges related to emigration, and harnessing the theory of growth poles.

4. Conclusions

Having analysed this topic, it can be argued that the suggested concept of economic development of the border regions of Kazakhstan is expedient and promising. In addition, the concept of "poles of economic development" was formed, and the historical development of the theory of the pole of economic growth was also considered. The basis for writing the work is statistical data in the field of economics, which allowed for forming an understanding of the current economic state of the region and highlighting the main shortcomings according to the indicators. The influence of the activities of border regions on the development of the economy and the poles of growth of Kazakhstan on the borders with the following countries was also considered: Russia, China, Uzbekistan, Kyrgyzstan, Turkmenistan, Iran, Azerbaijan. A close connection was established between the export potential and the orientation of the economy in a particular region. In addition, the result of this work was the establishment of methods aimed at the development of the poles of economic development. An important component of the study was the analysis of the impact of emigration on the

economy of both border regions and national spaces. The determining factor in the work was the study of the theoretical aspects of the issue of economic potential, the influence of Russian resources on the processes of modernisation of the foundations of post-Soviet countries' economies, including Kazakhstan, as well as a comparison of current trends in the CIS countries with European ones. It has been established that the involvement of the theory of growth poles is extremely important since it consists of the innovative modernisation of border territories through auxiliary industries, positively influencing and provoking the development of the main economic structures of the region. Thus, this issue has been considered in all aspects and will facilitate subsequent research in this area since it combines both theoretical and practical foundations, which allows for covering the maximum number of important nuances for their study and future application.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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Gezim Jusufi[1]
Donat Rexha[2]
Besime Ziberi[3]

INNOVATIONS AND ENTERPRISES PERFORMANCE IN TRANSITION COUNTRIES, WITH SPECIAL EMPHASIS ON KOSOVO: CDM MODEL APPROACH[4]

The main aim of this study is to analyze the impact of innovation and enterprise performance in the transition countries with special emphasis in the case of Kosovo. The innovations play a crucial impact on firm development, especially for small and medium-sized enterprises in countries in transition. This study uses primary data with a specific sample thus the enterprises that operate in Kosovo in order to analyze the relationship between innovations and firm performance. This study was conducted within a six-month period, specifically January 2022 – June 2022. The research sample consists of 400 Kosovar enterprises. These enterprises are from different economic sectors, such as production, services, and in terms of size, 80% of them are SMEs. The study used the CDM (Crépon, Duguet and Mairesse) model which includes the fourth phase. The first phase of this model is about the tendencies of enterprises to carry out innovative activities, the second phase is about the enterprises that invested in research and development, the third stage of the model, the conversion of inputs into outputs is analyzed. In the end, the impact of innovation outputs on the performance of the analyzed enterprises is investigated. The study concludes that enterprises that export to the EU and the Western Balkans region are significant, so this positively affects the tendencies of these enterprises for innovative activities, whereas enterprises that are oriented only to the local market, do not present significance and even have a negative relationship with the enterprises' tendencies for innovations. A large part of the enterprises think that innovations have high costs and are even unaffordable therefore this represents a big obstacle for the development of innovations. The lack of qualified personnel and the lack of knowledge about markets and technology represent a big obstacle to the development of innovations, and it even negatively affects the decisions of these enterprises about innovations.

Keywords: Innovations; performance; transition countries; CDM model; enterprises
JEL: L25; L26; M20

[1] *PhD Gezim Jusufi, lecturer in Faculty of Law / "Kadri Zeka" University, Gjilan/Kosovo, email: gezim.jusufi@uni-gjilan.net.*
[2] *Donat Rexha, Prof.Ass.Dr, AAB College, Kosovo, e-mail: donat.rexha@universitetiaab.com.*
[3] *Besime Ziberi, Prof.Ass.Dr, AAB College, Kosovo, e-mail: besime.ziberi@universitetiaab.com.*
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1. Introduction

Innovation is widely regarded as one of the most important sources of sustainable competitive advantage in an increasingly changing environment, because it leads to product and process improvements, makes continuous advances that help firms to survive, allows firms to grow more quickly, be more efficient, and ultimately be more profitable than non-innovator (Atalaya, Sarvan, Anafarta, 2013). Anecdotal evidence suggests that innovation is closely linked to business performance. But how is innovation associated with superior performance? Geroski (1994, p. 130) suggests that there are two alternative views. The first view holds that the production of new products or processes strengthens a firm's competitive position in relation to its rivals. However, the profits and growth will be transitory and only last as long as the innovating firm can defend its position against rivals. The second view argues that the process of innovation transforms a firm fundamentally by enhancing its internal capabilities, making it more flexible and adaptable to market pressures than non-innovating firms (Neely, 1998). Open innovation is expressed through three different processes: the acquisition of external technology (inbound innovation); the external exploitation of technology (outbound innovation); and coupled innovation (Bigliardi, Ferraro, Galati, 2020).

The results of the BEEPS survey (Business Environment and Enterprise Performance Survey) reveal that firms that innovate by introducing one or more new products are more sensitive to the quality of the business environment compared with non-innovating firms. These differences in the perception of the business environment by firms that innovate and those that do not are particularly large when firms are asked to assess the importance of corruption, workforce skills and customs and trade regulations (BEEPS, 2014). The increasing pace of globalization, changing customer requirements, increasing competitiveness and rapid technological progress creates an environment in which a sustainable competitive advantage is difficult to achieve and maintain, therefore, it is necessary for all organizations to adapt to this pace (Stojanović, Stanković, 2021).

The CDM framework modelized the innovation process, which begins with the decision of whether to invest in research activities or not; and the degree to which a firm invests, which in turn creates innovation outputs (Le, 2020). Based on previous research dedicated to developed countries, the CDM framework was used in modelling the innovation process to identify potential innovation efforts and their effects on innovation outputs.

The main aim of this study is to measure the impact of innovation on the firm's performance in the case of Kosovo. The objective of the study is to measure the use of innovation and its impact on the enterprises in the Kosovo region. By analyzing the significant level of the enterprises that export to the EU and the Western Balkans region and enterprises that are oriented only to the local market, whether they have a positive or negative relationship with the enterprises' tendencies for innovations. A large part of the enterprises think that innovations have high costs and are even unaffordable. The lack of qualified personnel and lack of knowledge about markets and technology represents a big obstacle to the development of innovations, and it even negatively affects the decisions of these enterprises about innovations.

The research questions of this paper are:

1. What are the tendencies of Kosovar enterprises to carry out innovative activities?
2. What is the impact of market orientation and financial support on the development of innovations in Kosovo enterprises?
3. What are the factors that hamper the development of innovations and what is their impact on the innovative activities of these enterprises?
4. What is the impact of the internal capacity of the enterprise and of cooperation in the development of innovative activities of these enterprises?

2. Literature Review

According to Chen (2017), there are several views in the management literature regarding innovation. The first point of view is that innovation can directly affect the performance of enterprises, showing positive, no effect, or negative effect. The second point of view is that some moderating variables affect the relationship between innovation and business performance, and the main moderating variable is the industrial environment or market environment. The third view is that the mediating effect between innovation and enterprise performance, the main mediating variables include the change of industry, innovation output, IT investment, product matching and process matching, innovation, market position etc. The mechanism between innovation and enterprise performance can improve the performance of innovation.

Kijkasiwat et al. (2020) examine the moderating effect of firm size on the relationship between innovation and firm performance of small and medium enterprises in 29 countries in Eastern Europe and Central Asia. The study used partial least square structural equation modelling and indicated that firm size and financial capital both moderate and mediate the impact of innovation on firm performance, positively or negatively. Bach et al. (2019), conducted research based on research protocol systematization thus the study examined the Dissemination of knowledge in two stages: the summary of general corpus characteristics, and the content analysis performed according to the categories that emerged via the study's themes. The study concludes that initiatives for developing innovations have enhanced the performance of private companies.

Another study from (Ramadani, et al., 2019) has employed the CDM model using Business Environment Enterprise Performance Surveys (BEEPS) and provides a multistage empirical analysis of product innovation and firm performance in transition economies (TEs). The paper concludes that product innovation has a positive impact on firm performance in transition economies, complemented by a significant impact of specific control variables such as size, total labour cost and capital of the firm.

Firm performance for the empirical analysis of the study we employ Business Environment Enterprise Performance Surveys firm-level data conducted by the World Bank and the European Bank for Reconstruction and Development (EBRD) in 2002, 2005 and 2009. To examine the relationship between innovation activities, ownership structure and firm performance we apply the instrumental variable (IV) technique, which enables us to control

for the endogeneity between innovation activities undertaken by firms and their performance. Our findings suggest that the firm's size, R&D (Research and Development) intensity, foreign ownership, competition, skilled workers and export activity have a positive and significant impact on their incentive to undertake innovation activities.

Abazi-Alil (2014) evaluates innovation processes in developing countries, especially the relationship between innovation efforts and outcomes. Instead of capturing only investment in research and development as in Western firms, the innovation efforts of firms in developing countries include investments in in-house research and development, technology acquisition, and other informal innovation activities. A study from Exposito and Sanchis-Llopis (2018) measured the impact of product, process and organizational innovations on two alternative dimensions of business performance: finance and operations at SMEs (Small and medium-sized enterprises) in the case of Spain. The study concluded that the relationship between innovation choices in SMEs and business performance should be analyzed from a multi-dimensional approach thus it reveals significant implications for innovation policies and strategies for SMEs.

Bach et.al. (2019) measure the relationships between innovation and private company performance. The study employed the SLR (Systematic Literature Review) technique in order to map the studies conducted and concludes that the initiatives for developing innovations have enhanced the performance of private companies. The link between innovation practices and the SMEs' performance was analyzed also by Adam and Alarifi (2021). The study used an online questionnaire to collect the data from a sample of 259 randomly selected SME managers in Saudi Arabia, and the data was analyzed using the Smart PLS software. The study concludes Furth more than that the innovation practices adopted by SMEs to face the repercussions of COVID-19 had a positive impact on the performance and likelihood of business survival. A study from Hsueh and Tu (2004) investigates 1,047 enterprises in a random sample in order to find the relationship between firm performance and innovation. The study used logistic regression and found out that those three main areas of innovation which were grouped from the nine activities by principal component analysis all had a positive relationship with the operational performance of new enterprises.

As innovation is of great importance for firms' development a lot of studies are addressed in order to analyze the relationship and also to measure the impact of the innovation on the firm performance. Thus, the western Balkans countries in this regard are a part way as these countries deal with GDP growth below the average of EU countries. According to Rousseau et al. (2016), enterprises are often challenged to derive the anticipated performance benefits from innovative activities. Their results confirm a strong relationship between innovation and performance and reveal some contingencies. The discrepancy between performance outcomes is partly caused by stakeholder buy-in. Then hypercompetition is constant over time and across industries. Integrating product and process innovation yields stronger performance benefits than product innovation alone. Also, large enterprises reap greater performance benefits from innovation than small enterprises.

A study from Lm and Yy (2004) analyzes the innovation gap in EU countries and China and focuses on the problem of the innovation gap in the world economy, as there are in general countries with developed national innovation systems, playing the role of technology leaders,

and those with developing innovation systems, acting as innovation followers. (Le, 2019) measures the innovation processes in developing countries, especially the relationship between innovation efforts and outcomes the study includes the innovation efforts based on firms' characteristics, market features, and business environment. The study concludes that predicted innovation investment triggers innovation outcomes (jointly, product and process innovation outcomes) in the context of small and medium-sized enterprises.

Another study investigates innovation and firm performance using the structural equations model (SEM) for data analysis, specifically through the partial least square (PLS). The study finds out that digitization has positive and significant effects on innovation management and corporate performance and indicates that the barriers to digitalization as a moderating variable have been impeding development and digital transformation and reducing the results of innovation and corporate performance of Mexican SMEs (Valdez-Juárez., Ramos-Escobar, & Borboa-Álvarez, 2019). Another study has used the CDM model in order to establish the relationship between firm performance and innovation. The study reveals that R&D has a positive effect on process and product innovation (Henriquez, Crespo, Geldes, Ferreira, & Castillo-Vergara, 2023).

Another study investigates the impact of innovation on firms' performance, by taking into account the four innovation types (product, process, organizational, marketing) acknowledged by the Oslo Manual, as well as different aspects of performance (financial, product, innovative, market). The study used a survey of 50 firms operating in the Greek aluminium sector and employed the OLS (Ordinary least-squares model). The study concludes that all four innovation types are correlated with each other, revealing innovation's synergy effects on performance (Innovation and Firm Performance: The Case of the Greek Aluminium Industry, 2020).

The hypothesis that there is a U-shaped relationship between innovation and firm performance, in the short-term period was analyzed by (Hatzikian, 2015). In this study is applied the method for examining nonlinearities is the introduction of squared terms, using variables such as: the innovation intensity, the squared term of innovation intensity, the R&D personnel, the productivity, and the firm size as control variable. The study results are based on 372 questionnaires selected over a 2-year time period (2004-2006).

3. Methodology

3.1. Sample and econometric model

This research was conducted within a six-month period, specifically January 2022 – June 2022. The research sample consists of 400 Kosovar enterprises. These enterprises are from different economic sectors, such as production, services, and in terms of size, 80% of them are SMEs. The managers of these enterprises were interviewed by the authors of the paper at the locations of these enterprises. The interview lasted about 45 minutes. Four types of questionnaires were used, initially, the first questionnaire was used for all these enterprises, while the second, third and fourth questionnaires were used only for those enterprises that declared that they performed innovative activities. The number of enterprises which have declared that they have carried out innovations during the last three years is 289.

The multi-stage innovation model was created by Crepon et al. in 1998. This model is otherwise known as the CDM model. The CDM model was created from the initials of the three authors of the model: Crepon, Duguet and Mairesse. This model is quite comprehensive because it investigates or analyzes innovation activity, the transformation from inputs to commercialized output, and finally the impact of innovation activities on enterprise performance. Many authors such as Castellacci (2011); Reçica (2016); Czarnitzki and Delanote (2017); Yuan and Xiang (2018); Younas and ul Husnain (2022) have used this model to examine the impact of innovations on enterprise performance.

The first phase of this model is about the tendencies of enterprises to carry out innovative activities, that is, to make positive or negative decisions about innovations. In this phase, all enterprises are included. In the second phase of this model, those enterprises that invest in research and development, that invest in innovations, are analyzed. In the third stage of the model, the conversion of inputs into outputs is analyzed. After that, the impact of innovation outputs on the performance of the analyzed enterprises is investigated. The 4 equations of this model in this research can be presented as follows:

Stage 1: $i_i = x_{1i}\beta_{1i} + \varepsilon_{1i}$

Stage 2: $r_i = x_{2i}\beta_{2i} + \varepsilon_{2i}$

Stage 3: $k_i = x_{3i}\beta_{3i} + r_i\alpha_i + invmills_i\lambda_t + \varepsilon_{3i}$

Stage 4: $g_i = x_{4i}\beta_{4i} + k_i\alpha_i + \varepsilon_{4i}$

Table 1. Variables and their categories of Stage 1 and Stage 2

Dependent variables	Stage 1	Stage 2
Innovation activities	✓	
Total innovations expenditures		✓
Independent variables	**Stage 1**	**Stage 2**
Economic sector:		
Manufacturing (base category – other sectors)	✓	✓
Service (base category – other sectors)	✓	✓
Internal capacity of the enterprise:		
1- In the last three years, enterprises have had innovative activity that has been abandoned or is still ongoing, 0- otherwise	✓	✓
1- enterprises have foreign capital, 0- otherwise	✓	✓
Enterprise market orientation:		
1- EU Market, 0- otherwise	✓	✓
1-Western Balkan market, 0- otherwise	✓	✓
1-Local market, 0- otherwise	✓	✓
Enterprise innovation subsidies:		
1-The firm has received financial support for innovations from the EU, 0- otherwise		✓
1-The firm has received financial support for innovations from the national government, 0- otherwise		✓
Factor hampering innovations:		
1-If enterprises think that cost innovation is a big obstacle, 0- otherwise	✓	✓
1-If enterprises think that the lack of knowledge about the market and technology is a big obstacle, 0- otherwise	✓	✓
1-If enterprises consider that lack of market demand for innovation is a big obstacle to innovation activities, 0- otherwise	✓	

Source: Authors, 2023.

The second phase concerns only those enterprises which within the analyzed sample have made investments, specifically carried out innovative activities during the 3-year period. Therefore, the value of r_i can be calculated for the forms that have expenses for innovative activities. So not all sample enterprises are innovative. The value of i_i in the first stage is a latent variable and can have the value 1 if the enterprise is innovative, while the value 0 if the enterprise is not innovative. X_{1i} and β_{1i} are the independent variable vectors, while ε_{1i} i represents the error term. The same applies to the variables of equations three and four. Inverse Mills ratio estimates ($\lambda\hat{\imath}$) represents estimates of innovation input from Stage 2.

The table below gives the definitions of the output stage variables (stage 3 and stage 4). It should be emphasized that some of the variables that were used in the input phase were also used in the output phase.

Table 2. Variables and their categories of Stage 3 and Stage 4

Dependent variables	Stage 3	Stage 4
The amount of sales of new products to the firm and for the market in 2021	✓	
Percentage of sales growth over the past three years		✓
Independent variables	Stage 3	Stage 4
Enterprise innovation subsidies:		
1-The firm has received financial support for innovations from the EU, 0- otherwise	✓	✓
1-The firm has received financial support for innovations from the national government, 0- otherwise	✓	✓
Internal capacity of the enterprise:		
1-Lack of qualified personnel was highly important in hampering their innovation activities, 0- otherwise	✓	
1-Entreprises use only their internal capacities to develop new products or processes, 0- otherwise	✓	
Open innovation:		
1- Entreprises have had any cooperation on innovation activities with universities, 0- otherwise	✓	
1- Entreprises have had any cooperation on innovation activities with consumers, 0- otherwise	✓	
1- Entreprises have had any cooperation on innovation activities with research laboratories, 0- otherwise	✓	
Sources of information:		
1-Information from competitors, suppliers, and customers are highly important factor in developing their innovation activities, 0- otherwise	✓	✓
1-Information sources from industrial and professional associations are highly important in developing their innovation activities, 0- otherwise	✓	✓
Factor hampering innovations:		
1-If enterprises think that cost innovation is a big obstacle, 0- otherwise		✓
1-If enterprises think that the lack of knowledge about the market and technology is a big obstacle, 0- otherwise		✓
1-If enterprises consider that lack of market demand for innovation is a big obstacle to innovation activities, 0- otherwise		✓

Source: Authors, 2023.

First, the diagnosis of the empirical evaluation of the CDM model will be presented. Then the main findings for each equation of the CDM model will be elaborated. Diagnostics of the collinearity of this model provide information that there is a very low correlation between the independent variables, specifically the average of the Variance Inflation Factor (VIF) is

about 1.6 for all independent variables of the first two stages of the work model. The Hansan-Sargan test was used for the validity of the instruments used in the research equations. The Hansan-Sargan test strongly supports the validity of each equation of this model. Meanwhile, the issue of heteroscedasticity was analyzed by adjusting the standard errors.

4. *Results*

4.1. Results of Stage 1

Based on the following table where the statistics of the variables of the first stage of the model are provided, the values of the variables, their significance, etc, will be elaborated. This phase studies the tendencies of enterprises to develop innovations. In this phase, all enterprises are included, specifically the 400 enterprises that make up our sample. The first research variable has to do with the economic sector to which the enterprises belong. The economic sector represents significance and this means that all enterprises belonging to these two economic sectors have a tendency to carry out innovations. Likewise, the internal capacity of enterprises shows significance in this phase of the model. In particular, if the enterprise is an enterprise that was founded with foreign capital, this has a positive effect on the enterprise's tendency to carry out innovations.

Table 3. Results of Stage 1

Variables of Stage 1	Results
Economic sector:	
Manufacturing (base category – other sectors)	0.137*** (0.018)
Service (base category – other sectors)	0.189*** (0.012)
Internal capacity of the enterprise: 1- In the last three years, enterprises have had innovative activity that has been abandoned or is still ongoing, 0- otherwise	3.099*** (0.143)
1- enterprises have foreign capital, 0- otherwise	0.341*** (0.0462)
Enterprise market orientation:	
1- EU Market, 0- otherwise	0.147*** (0.0173)
1-Western Balkan market, 0- otherwise	0.255*** (0.0243)
1-Local market, 0- otherwise	-0.0231 (0.0366)
Factor hampering innovations:	
1-If enterprises think that cost innovation is a big obstacle, 0- otherwise	0.176*** (0.0052)
1-If enterprises think that the lack of knowledge about the market and technology is a big obstacle, 0- otherwise	-1.205*** (0.021)
1-If enterprises consider that lack of market demand for innovation is a big obstacle to innovation activities, 0- otherwise	-0.572*** (0.011)
Constant	0.497***
Wald Test (rho=0) p-value	0.02***
N	400

Robust standard errors in parentheses * p<0.1 ** p<0.5 *** p<0.01.
Source: SPSS regression outputs, 2023.

Interesting results have been achieved in the market orientation variable of these enterprises. A significant number of these enterprises are exporting enterprises, which export to EU countries and Western Balkan countries. Enterprises that export to the EU and the Western Balkans region are significant, so this positively affects the tendencies of these enterprises for innovative activities. Whereas enterprises that are oriented only to the local market, do not present significance and even have a negative relationship with the enterprises' tendencies for innovations.

Also, the factors that hinder innovations are significant in this paper. A large part of enterprises think that innovations have high costs and are even unaffordable therefore this represents a big obstacle to the development of innovations. The lack of knowledge about markets and technology represents a big obstacle to the development of innovations, and it even negatively affects the decisions of these enterprises about innovations. The lack of market demand for innovations represents a major obstacle to making innovation decisions. Also, this variable has a negative impact on the perceptions and decisions of these enterprises for innovations.

4.2. Results of Stage 2

Even in the second equation (phase 2), the economic sector has an important role in the innovations of these enterprises. So, enterprises, whether from the service sector or from the manufacturing sector, present a tendency and interest to invest in innovative activities. As for the internal capacity of the enterprises, the enterprises with foreign capital in this phase do not present significance, compared to the first phase where this category of enterprises presented significance. It does not matter at this stage whether the enterprises are foreign capital or local capital.

Results similar to the first stage were also achieved in the market orientation variable of these enterprises. Only enterprises oriented to the local market, or enterprises that are not exporters, do not present significance, while exporting enterprises present significance. Exporting enterprises invest in innovative activities because without investing they cannot reap results in the international market. A variable that was not addressed in the first phase is Enterprise innovation subsidies. Since at this stage only enterprises that have carried out innovations or invested in innovations have been analyzed, these enterprises have been asked whether they have had financial support for innovations from the EU or the national government. Both categories of the variable present significance in the second stage of this model. So, they positively affect the innovations of these enterprises. As for the factors that hamper innovations, all these factors negatively affect the innovations of these companies, but only the first category, which deals with the cost of innovations, is significant.

Table 4. Results of Stage 2

Variables of Stage 2	Results
Economic sector:	
Manufacturing (base category – other sectors)	0.203*** (0.0381)
Service (base category – other sectors)	0.324*** (0.0420)
Internal capacity of the enterprise:	
1- In the last three years, enterprises have had innovative activity that has been abandoned or is still ongoing, 0- otherwise	0.402*** (0.0531)
1- enterprises have foreign capital, 0- otherwise	0.0145 (0.0191)
Enterprise market orientation:	
1- EU Market, 0- otherwise	0.0821*** (0.0330)
1-Western Balkan market, 0- otherwise	0.118* (0.060)
1-Local market, 0- otherwise	0.0513 (0.067)
Enterprise innovation subsidies:	
1-The firm has received financial support for innovations from the EU, 0- otherwise	0.619*** (0.044)
1-The firm has received financial support for innovations from the national government, 0- otherwise	0.648*** (0.049)
Factor hampering innovations:	
1-If enterprises think that cost innovation is a big obstacle, 0- otherwise	-0.208*** (0.0510)
1-If enterprises think that the lack of knowledge about the market and technology is a big obstacle, 0- otherwise	-0.0881 (0.0723)
1-If enterprises consider that lack of market demand for innovation is a big obstacle to innovation activities, 0- otherwise	-0.0344 (0.0147)
constant	12.22***
Wald Test (rho=0) p value	0.01***
N	400

Robust standard errors in parentheses * p<0.1 ** p<0.5 *** p<0.01
Source: SPSS regression outputs, 2023.

4.3. Results of Stage 3

As mentioned above, in the third stage of the model, the transformation of inputs into outputs is analyzed. So here it will be analyzed how much the independent variables shown in the table below affect the increase in sales of these enterprises. Financial subsidies, either from the EU or from the national government, do not have a positive impact at this stage. Similar results are reached by Hashi and Stojcic (2013) who find that innovation subsidies do not efficiently translate into higher-quality product innovation. Tassey (2007), Jusufi and Gashi-Sadiku (2020); Jusufi et al. (2021) assert that tax-related incentives are more useful at this stage than financial support (innovation subsidies) for innovative activities.

Table 5. Results of Stage 3

Variables of stage 3	Results
Enterprise innovation subsidies:	
1-The enterprises have received financial support for innovations from the EU, 0- otherwise	-0.209** (0.074)
1-The enterprises have received financial support for innovations from the national government, 0- otherwise	-0.601*** (0.065)
Internal capacity of the enterprise:	
1-Lack of qualified personnel was highly important in hampering their innovation activities, 0- otherwise	-0.0058 (0.032)
1-Entreprises use only their internal capacities to develop new products or processes, 0- otherwise	0.138*** (0.0243)
Open innovation:	
1- Entreprises have had any cooperation on innovation activities with universities, 0- otherwise	0.0136 (0.0427)
1- Entreprises have had any cooperation on innovation activities with consumers, 0- otherwise	-0.157*** (0.0324)
1- Entreprises have had any cooperation on innovation activities with research laboratories, 0- otherwise	0.235*** (0.0426)
Sources of information:	
1-Information from competitors, suppliers, and customers are highly important factor in developing their innovation activities, 0- otherwise	0.144*** (0.0478)
1-Information sources from industrial and professional associations are highly important in developing their innovation activities, 0- otherwise	0.218* (0.123)
constant	0.564***
Wald Test (rho=0) p value	0.03***

Robust standard errors in parentheses * p<0.1 ** p<0.5 *** p<0.01
Source: SPSS regression outputs, 2023.

The lack of qualified personnel presents a negative relationship with the dependent variable, thus hindering innovative activities, while enterprises that use only their internal capacities to develop new products or even new processes present significance in the model. The use of the enterprises' internal resources increases the capacity to develop innovations and increase the enterprises' sales. Enterprises, that cooperate with universities and research laboratories, positively affect innovative activities. Even cooperation with research laboratories is significant in this model. Whereas cooperation with consumers presents a negative relationship and is significant. According to Reçica (2016), the multiplication of cooperation is more important than the individual types of cooperation. This is most important for the market success of innovative products. The sources of information are very important for the development of innovative activities and with this also for increasing the level of sales of enterprises. Both categories of this variable present significance in this model of this phase.

4.4. Results of Stage 4

The fourth stage is about the results of the enterprise performance equation. The percentage of sales growth is an indicator of the enterprise performance. Authors like Folkeringa, et al. (2005); Mahmutaj and Krasniqi (2020); Ramaj et al. (2022); Elezaj and Livoreka (2022) in their research on innovations have taken the increase in the level of sales as an indicator of

the good performance of the enterprise. Therefore, in this research, the percentage of sales growth during the three-year period was taken as an indicator of the company's performance. Therefore, all the variables and the impact they have on the performance of enterprises that are engaged in innovative activities, both in product innovations and in process innovations, will be elaborated below.

The financial support from the EU does not positively affect the increase in the level of sales and is insignificant, while the financial support from the national government has a positive effect and is significant in the fourth phase. According to Jusufi et al. (2020), very few Kosovar enterprises have received funds from the EU, while the number of enterprises that have received funds from the national government is greater. Kosovar enterprises lack the absorption capacities for the benefit of funds from the EU, in particular IPA funds. In particular, according to Ajdarpašić and Qorraj (2020), Kosovar enterprises lack adequate and competent human resources to benefit from IPA I and II funds.

Table 6. Results of Stage 4

Variables of Stage 4	Results
Enterprise innovation subsidies:	
1-The firm has received financial support for innovations from the EU, 0- otherwise	-0.0177 (0.0319)
1-The firm has received financial support for innovations from the national government, 0- otherwise	0.0518** (0.0124)
Sources of information:	
1-Information from competitors, suppliers, and customers are highly important factor in developing their innovation activities, 0- otherwise	0.0007 (0.0110)
1-Information sources from industrial and professional associations are highly important in developing their innovation activities, 0- otherwise	0.0271* (0.0163)
Factor hampering innovations:	
1-If enterprises think that cost innovation is a big obstacle, 0- otherwise	-0.0785*** (0.0108)
1-If enterprises think that the lack of knowledge about the market and technology is a big obstacle, 0- otherwise	-0.0157 (0.0139)
1-If enterprises consider that lack of market demand for innovation is a big obstacle for innovation activities, 0- otherwise	-0.0213 (0.0055)
constant	0.676**
Wald Test (rho=0) p-value	0.09**

Robust standard errors in parentheses * p<0.1 ** p<0.5 *** p<0.01
Source: SPSS regression outputs, 2023.

Information sources have a positive impact on increasing the level of sales of these enterprises, but only the second category Information sources from industrial and professional associations are highly important in developing their innovation activities is significant. So only information sources from industrial and professional associations have a significant impact on the performance of Kosovar enterprises that carry out innovative activities. All categories of this variable have a negative impact on the performance of the researched enterprises. Even the first category or the cost of innovations is significant. So taking the cost of innovations, the percentage of sales growth decreases.

5. Conclusion

The study concludes that enterprises that export to the EU and the Western Balkans region have a significant relationship, so this positively affects the tendencies of these enterprises for innovative activities, whereas enterprises that are oriented only to the local market, do not present significance and even have a negative relationship with the enterprises' tendencies for innovations. A large part of the enterprises think that innovations have high costs and are even unaffordable therefore this represents a big obstacle for the development of innovations.

The lack of knowledge about markets and technology represents a big obstacle to the development of innovations, and it even negatively affects the decisions of these enterprises about innovations. The lack of qualified personnel presents a negative relationship with the dependent variable, thus hindering innovative activities, while enterprises that use only their internal capacities to develop new products or even new processes present significance in the model. The use of the enterprises' internal resources increases the capacity to develop innovations and increase the enterprises' sales. Even cooperation with research laboratories is significant in this model.

Therefore, based on our findings, we conclude that enterprises that are more into innovation are better linked to the international market. So, local enterprises need to invest more in innovation in order to increase their market and profit. The lack of qualified personnel presents a negative impact and enterprises need to invest more in research and development, and this can be solved by cooperating with universities and research laboratories, that positively affect innovative activities. A large part of enterprises think that innovations have high costs and are even unaffordable therefore this represents a big obstacle to the development of innovations and the Government of Kosovo needs to support enterprises to overcome this obstacle.

The main contribution of this paper is the research of such a topic through the CDM econometric model. In order to increase the level of their exports, Kosovar enterprises must develop innovations, in particular product/service innovations as well as process innovations. Exports can only be increased through innovative products. Kosovar enterprises cannot benefit from the trade preferences offered by the EU through the Stabilization Association Agreement (SAA) as long as they do not have innovative and competitive products. Due to many restrictions of various natures, Kosovar enterprises have not managed to develop enough innovative activities, therefore Kosovar products cannot compete with the products of regional countries in the international market.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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Khairul Amri[1]
Raja Masbar[2]
B. S. Nazamuddin[3]
Hasdi Aimon[4]

DOES UNEMPLOYMENT MODERATE THE EFFECT OF GOVERNMENT EXPENDITURE ON POVERTY? A CROSS-PROVINCES DATA EVIDENCE FROM INDONESIA[5]

Our study aims to investigate the effect of government expenditure on the poverty rate and detect the moderating role of the unemployment rate in the functional relationship between the two variables. Using a panel data set of 24 provinces in Indonesia during 2005-2018, we use the dynamic model of the Generalized Methods of Moment to estimate the functional relationships. Our findings discovered that government expenditure on goods, services, and capital significantly reduces poverty. Conversely, grant and social aid expenditures have a positive and significant effect. The unemployment rate substantially increases the poverty rate and moderates the impact of the three types of public spending on the poverty rate. The higher the unemployment rate, the smaller the poverty reduction effect of government expenditure. These findings imply that the government budgetary allocation for a particular spending component should consider the unemployment rate as the primary consideration. It is due to the effectiveness of each expenditure group in reducing poverty differing at the various levels of the unemployment rate.
Keywords: Poverty rate; government expenditure; unemployment rate; moderating effect; GMM-Estimation
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1. Introduction

Poverty is a complex incident that has been substantially becoming a challenge for sustainable development (Garcia et al., 2019; Wang et al., 2021). High poverty rates reflect

[1] *Khairul Amri, Assistant Professor, Faculty of Islamic Economics and Business, Universitas Islam Negeri Ar-Raniry, Indonesia, e-mail: khairul.amri@ar-raniry.ac.id.*
[2] *Raja Masbar, Professor, Faculty of Economics and Business, Universitas Syiah Kuala, Banda Aceh, Indonesia, e-mail: raja.masbar@unsyiah.ac.id.*
[3] *B. S. Nazamuddin, Associate Professor, Faculty of Economics and Business, Universitas Syiah Kuala, Banda Aceh, Indonesia, e-mail: nazamuddin@unsyiah.ac.id.*
[4] *Hasdi Aimon, Professor, Faculty of Economics and Business, Universitas Negeri Padang, Indonesia, e-mail: s3dkpl@gmail.com.*
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lower welfare and potentially cause social and economic problems for a community (Tian et al., 2018; Li et al., 2020). Several non-beneficial circumstances of socio-economics, such as higher crime rates, lower education, and poor quality of health, get into reality due to high poverty. In empirics, the facts reflect that poverty harms social life (Mood, Jonsson, 2016). Therefore, poverty alleviation has become the government's main priority in improving people's welfare. And the government's success in reducing poverty rates has become a successful indicator of the economic development program (Ikhsan, Amri, 2022; Mansi et al., 2020).

For carrying out economic development programs, the government has generally become public spending to be the main policy instrument. Public expenditure is part of the government's fiscal policies to finance a development program for increasing economic activities (Wright, 1977; Tanninen, 1999; Beyer, Milivojevic, 2020; Albassam, 2020), improve people's incomes (Iniguez-Montiel, 2010), create jobs opportunity (Karras, 1993; Brückner, Pappa, 2012), enhance economic growth, and in turn, reduce the poverty rate. So, government policies for reducing poverty rely on public expenditure as the primary resource. Numerous studies support the hypothesis that some components of public spending are very effective at encouraging economic growth and reducing the number of poor people (Hong, Ahmed, 2009; De Miguel-Velez, Perez-Mayo, 2010).

In the context of the local public budget in Indonesia, the government has allocated a larger share of the budget to goods and services, capital, and grant and social aid spending. In 2013, the portion of the local government budget for these three types of public spending was 24%, 20%, and 18% of the total budget, respectively. Along with the increase in regional financial capacity, the budget realization for the three expenditures has also increased. This matter aims to enhance economic activity in the regions, create job opportunities, increase incomes, and reduce poverty. However, in reality, the decline in poverty went relatively slowly. In fact, by 2015, the poverty rate in several provinces in Indonesia, such as Riau, Jambi, and Bali, for example, increased compared to the previous period (Adnan, Amri, 2021). In addition, the open unemployment rate in several regions is also high, such as West Java, East Kalimantan, North Sumatra, Papua, and West Papua. Even West Java, regionally close to the national capital, also experiences a high poverty rate (Putra et al., 2020). This fact prompted the question of what extent of the poverty-reducing impact of government spending was. Therefore, the relationship between poverty and local government expenditure in the context of the sub-national economy of Indonesia is interesting to study.

In the empirical context, studies on the impact of government expenditure on poverty have been the focus of the attention of economic researchers (Van de Walle, 1998; Asghar et al., 2012). However, the empirical findings they reveal have not provided conclusive results. Regarding public budgetary allocation for capital expenditures, for example, several researchers found that capital expenditure significantly reduces poverty (Fan, Jitsuchon, 2008; Marinho et al., 2017). The significant effect of capital expenditure on poverty reduction is because this expenditure directly affects the productivity of the private sector, the flow of goods and services, and job opportunities and increases the labour force productivity (Felice, 2016). However, in contrast to these researchers, empirical research conducted by Adegboyo (2020) reveals that raising capital expenditures does not significantly reduce poverty rates. Instead, his findings discover a positive relationship between capital spending and poverty.

Concerning the goods and services spending of public budgetary allocation, for instance, the direction of the relationship between the expenditures and poverty details has not been disclosed by economic researchers. However, as an overview of the relationship between the two variables, Mahdavi's (2004) research suggests that the allocation of the public budget to current expenditures such as goods and services, for example, directly impacts people's welfare. His findings implicitly suggest a close relationship between increased spending on goods and services on the one hand and poverty reduction on the other. Previously, a research study conducted by Devarajan et al. (1996) using data from 43 developing countries also found that current expenditure positively influences people's welfare. Contrary to the two researchers above, studies by Gregoriou & Ghosh (2009) and Combes et al. (2020) conclude that spending on goods and services is the less productive spending-categorized government expenditure. The increase in spending is closely related to the low prospect of economic growth and consequently reduces the effectiveness of government expenditure in reducing poverty.

Furthermore, the effect of social spending on poverty also has not yet provided a fixed conclusion. Studies conducted by Mieziene & Krutuliene (2019) used a panel data set of European countries to conclude that social spending could reduce poverty levels. Similarly, the empirical research undertaken by Kiendrebeogo et al. (2017) also revealed that the effect of social spending on poverty is negative and significant. The greater the social spending the government realizes in an economy, the lower the poverty rate. Slightly different from these researchers, the results of other empirical studies have found that the effect of social spending on poverty can be positive or negative (Abell, Abell, 2004; Satumba et al., 2017).

As described above, the controversial findings related to the direction and significance of the relationship between poverty and government spending provide a strong argument that this relationship is notable for further investigation. Therefore, this study re-examines the effect of government expenditure on poverty in the context of the regional economy in Indonesia. In contrast to previous studies, our research places the unemployment rate as a moderating variable between poverty and government spending. We suspect that the effectiveness of government spending in reducing poverty is related to many economic factors, mainly the unemployment rate. Such as Anderson et al. (2018) revealed that the impact of public expenditure on the poverty rate is related to various factors, either economic or non-economic, as well as the type of government spending. The poverty rate of a given area depends on the creation of job opportunities and the ability of individuals to carry out economic activities. Job opportunities are essential for economic growth because being without a job means less income (Popirlan et al., 2021). The negative consequences of unemployment are not only individual welfare but also adverse impacts on the community, such as poverty in society (Amri, 2018; Ruesga-Benito et al., 2018; Bejaković, Mrnjavac, 2018). This respect indicates that unemployment is one of the obstacles for the government in reducing poverty rates.

Based on the aforementioned empirical arguments, unemployment has the potential to moderate the effect of government expenditures on poverty. In the context of the Indonesian economy, we hypothesize that variations in unemployment rates cause differences in the effect of government spending on poverty reduction. In other words, the impact of government spending on poverty can differ at various levels of the unemployment rate.

Therefore, studies related to the direction and significance of the moderating effect of unemployment in the relationship between poverty and government expenditures are essential. In detail, we also calculate and analyze the threshold effect of the unemployment rate in the functional relationship between the poverty level and each type of expenditure, capital expenditure, goods and services expenditure, and social expenditure. Finally, our study provides empirical evidence on the moderating effect of unemployment on the poverty impact of government spending and contributes to the development of related literature.

Systematically, this paper consists of five parts. After the introduction, the second part is a literature review that provides a theoretical and empirical basis for the relationship between poverty, government expenditures, and the unemployment rate. The third part describes the data and methodology, and the fourth part states the research results and discussion. Finally, the fifth part is conclusions and recommendations.

2. Data, Variables, and Econometric Model

Our research uses a panel data set of 24 provinces in Indonesia from 2005 to 2018. The operationalized variables in this research consist of the poverty rate (as a dependent variable) and government spending (as an independent variable). The poverty rate is a proxy of the poor to the total population ratio (as a percentage of the population). Government spending is limited to goods and services, grants and social aid, and capital expenditures. The three components of government expenditures are measured in IDR000 per capita. We also use the unemployment rate as a control variable. This macroeconomic variable is proxied from the percentage of unemployed to the total labour force (Mansi et al., 2020). The conceptual reasoning behind the unemployment rate as a control variable refers to both a theoretical and empirical basis. Being of no work causes unemployed people to lose income and sources of livelihood, which in turn causes individuals to have a high risk of poverty (Meidani, Zabihi, 2011; Bruckmeier, Rhein, 2018). In summary, the description and measurement of research variables as in Table 1.

Table 1. Description and measurement of research variables

Variables group	Variable name	Variable description	Measurement
Dependent variable	Poverty rate (Pov)	the ratio of the poor to the total population (% of the population)	Percent
Independent variables	Goods and services expenditure (GSEs)	Realization of local government budgets on goods and services spending.	Per capita IDR000
	Social expenditures (SEs)	Realization of local government budgets on grant and social aid spending.	Per capita IDR000
	Capital expenditure (CEs)	Realization of local government budgets on capital spending.	Per capita IDR000
Control variables	Unemployment rate (Unem)	The ratio of unemployed workers to the total labour force.	Percent

Sources: Author's conceptual point of view.

In analyzing the relationship between macroeconomic variables by setting down the poverty rate as a dependent variable, there is the potential that the poverty rate in a certain period is

strongly related to its lagged values. Many studies have proven that the poverty rate in a certain period is associated with the poverty rate in the previous year (Wang et al., 2021; Alao, Alola, 2022). The dynamic model that places the lagged value as a predictor for endogenous variables is the generalized methods of moments (GMM) (Romilio, Torrecillas, 2018; Laverde-Rojas, Correa, 2019). Therefore, our research applies the generalized methods of moments (GMM) to data analysis.

However, the appliance of GMM has a weakness related to the potential for endogeneity problems (Ullah et al., 2018). Therefore, the instrumental variable approach is essential for overcoming of endogeneity problem (Wooldridge, 2002). Arellano & Bond (1991) and Blundell & Bond (1998) suggest that lag values of the dependent variable are better instrumental variables than the external instrumental variables. The lag values satisfy the relevance and homogeneity conditions and therefore are valid instrumental variables (Li et al., 2021). Hence, the GMM model in this study uses the lag value of the poverty rate as an instrumental variable.

As explained earlier, we also position the unemployment rate as a moderating variable between government spending and the poverty rate. The setting down of the unemployment rate as a moderator variable between public expenditure and the poverty rate implies that the analytical model used not only focuses on efforts to determine the poverty impacts of government expenditure and unemployment. But it also detects the interaction effect of both on the poverty rate. Therefore, the dynamic model of GMM comprises two models: a basic model and an interaction model.

The basic model aimed to determine the main effect of government expenditure on the poverty rate by including the unemployment rate as both the control and predictor variables. In econometrics, the basic model is as in Equation 1.

$$lnPov_{it} = \alpha lnPov_{i(t-1)} + \beta_1 lnGSE_{it} + \beta_2 lnSE_{it} + \beta_3 lnCE_{it} + \beta_4 lnUnem_{it} + \mu_1 \quad (1)$$

Where $lnPov_{it}$ is the logarithmic value of the poverty rate for the i^{th} province at the t^{th} period. $lnPov_{i(t-1)}$ is the lagged value of $lnPov_{it}$, $lnGSEs_{it}$ represents the logarithmic value of goods and services expenditure of the i^{th} province for the t^{th} period, $lnSEs_{it}$ denotes the logarithmic value of social expenditure of the i^{th} province at the t^{th} period, $lnCEs_{it}$ denotes the logarithmic value of capital expenditure at the i^{th} province at the t^{th} period, and $lnUnem_{it}$ represents the logarithmic value of unemployment rate of the i^{th} province at the t^{th} period. In terms, the unemployment rate roles as a control variable. Furthermore, α is the estimated coefficient of $lnPov_{i(t-1)}$, and β_1, β_2, β_3, and β_4 are the estimated coefficient of $lnGSEs_{it}$, $lnSEs_{it}$, $lnCEs_{it}$, and $lnUnem_{it}$, respectively. Lastly, μ_1 is the error term.

In Equation 1, the estimated coefficients represent the main effect of the respective variable on the poverty rate. Testing the influence of a variable on the poverty rate refers to the significance of the estimated coefficient of the variables. For example, when $\beta_1 \neq 0$ (p-value < 0.05) statistically means that goods and services spending affect the poverty rate. The opposite interpretation will go on when $\beta_1 = 0$ (p-value > 0.05).

Furthermore, the interaction model is a modified form of the basic model due to the existing independent variable as a moderator in the relationship between variables (Afshartous &

Preston, 2011). As previously explained, this study places the unemployment rate as a moderating variable in the functional relationship between the poverty rate and government expenditure. Therefore, the basic model is modified by including the government expenditure-unemployment rate interaction as a predictor for the poverty rate. Because government expenditure consists of three types of spending, namely goods and services, grant and social aid, and capital spending, the interaction model of applied GMM consists of three models, Equations 2a, 2b, and 2c.

$$lnPov_{it} = \alpha lnPov_{i(t-1)} + \beta_1 lnGSEs_{it} + \beta_2 lnSEs_{it} + \beta_3 lnCEs_{it} + \beta_4 lnUnem_{it} + \lambda_1 lnGSEs_{it} * lnUnem_{it} + \mu_2 \quad (2a)$$

$$lnPov_{it} = \alpha lnPov_{i(t-1)} + \beta_1 lnGSEs_{it} + \beta_2 lnSEs_{it} + \beta_3 lnCEs_{it} + \beta_4 lnUnem_{it} + \lambda_2 lnSEs_{it} * lnUnem_{it} + \mu_3 \quad (2b)$$

$$lnPov_{it} = \alpha lnPov_{i(t-1)} + \beta_1 lnGSEs_{it} + \beta_2 lnSEs_{it} + \beta_3 lnCEs_{it} + \beta_4 lnUnem_{it} + \lambda_3 lnCEs_{it} * lnUnem_{it} + \mu_4 \quad (2c)$$

lnGSEsit*lnUnemit is the first interaction variable, constituting the multiplication results of the logarithmic value of goods and services expenditure and unemployment rate. lnSEsit*lnUnemit represents the second interaction variable. The second interaction variable is the multiplication result of the logarithmic values of social spending and unemployment rate. lnCEsit*lnUnemit denotes the third interaction variable that constitutes the multiplication of the logarithmic values of capital expenditure and unemployment rate. Further, λ_1, λ_2, and λ_3 are the estimated coefficients of the respective interaction variables, respectively. Lastly, μ_2, μ_3, and μ_4 are error terms for the respective equations.

Evaluation of the moderating effect of the unemployment rate in the functional relationship between the poverty rate and government expenditure refers to the significance of the estimated coefficient (Kalmaz, Giritli, 2020). If the estimated coefficient of the interaction variable is significant at a 95% confidence level (p-value < 0.05), it indicates that the unemployment rate moderates the effect of government expenditure on the poverty rate. The moderating effect of the moderator variable consists of three possibilities, strengthening, weakening, or changing the direction of the functional relationship between variables (Gardner et al., 2017). On the other hand, if the estimated coefficient is insignificant, there is no moderating effect (Amri et al., 2022).

When we find a moderating effect of the unemployment rate on the functional relationship between the poverty rate and government expenditure, the next step is to evaluate the marginal effect at the various levels of the unemployment rate. Through the derivating process of Equations 2a, 2b, and 2c, the marginal effects of the respective kinds of government expenditure on the poverty rate -at the various levels of the unemployment rate as a moderating variable- as in Equation 3a, 3b, and 3c (Huynh, Tran, 2021; Akcay, Karabulutoglu, 2021).

$$\frac{\Delta \ln(\mathrm{Pov}_{i,t})}{\Delta \ln(\mathrm{GSEs}_{i,t})} = \beta_1 + \lambda_1 \ln(\mathrm{Unem}_{i,t}) \quad (3a)$$

$$\frac{\Delta \ln(\mathrm{Pov}_{i,t})}{\Delta \ln(\mathrm{SEs}_{i,t})} = \beta_2 + \lambda_2 \ln(\mathrm{Unem}_{i,t}) \quad (3b)$$

$$\frac{\Delta \ln(\mathrm{Pov}_{i,t})}{\Delta \ln(\mathrm{CEs}_{i,t})} = \beta_3 + \lambda_3 \ln(\mathrm{Unem}_{i,t}) \quad (3c)$$

From Equation (3), if β_1, $\lambda_1 > 0$, a higher unemployment rate and more goods and service expenditure would increase poverty rates. On the other hand, if β_1 and λ_1 have different signs, there is a threshold effect, suggesting that the impact of goods and service expenditure on the poverty rate differs at the various levels of the unemployment rate. For instance, if $\beta_1 > 0$ and $\lambda_1 < 0$, the marginal impact of goods and services expenditure would be positive at the lowest value and negative at the highest value of the unemployment rate. Hence, it is essential to calculate the marginal effects to verify this. The marginal effect verification refers to the various levels of unemployment rates, mainly mean, maximum, and minimum values.

3. Empirical Results and Discussion

3.1. The results of descriptive statistics

This study revealed that the poverty rate in each region is different between one province and another. On the one hand, there is a province with a high poverty rate, and on the other hand, with a low poverty rate. As in Table 2, the maximum value of the poverty rate is 28.44%, and the minimum is 4.01%. Furthermore, the mean poverty rate is 12.57%. Along with differences in poverty levels in each region, the unemployment rate is also different. The highest unemployment area is 18.91%, and the lowest is 1.37%. On average, the unemployment rate of 6.62%. These statistical figures indicate that, on one side, several regions experienced high unemployment rates, while on the other hand, several other areas experienced low unemployment. In summary, the result of descriptive statistics and the correlation matrix between the poverty rate, unemployment rate, and the three kinds of local public expenditure are such as in Table 2.

In connection with government expenditure, the realization of the local government budget for each type of expenditure is relatively different between regions. Of the three groups of government expenditure mentioned above, spending on goods and services constitutes the largest portion compared to the two other spending groups. On average, spending on goods and services amounts to IDR164,335.5 per capita. Furthermore, capital expenditure is in second with an average realization of spending of IDR148,931.4 per capita. Conversely, government spending on grants and social aid is a minor portion, with an average of IDR105,678.6 per capita. These statistical numbers inform that the public budgetary allocation for goods and services is the most dominant compared to capital, grant, and social aid expenditure.

Table 2. The result of the descriptive statistics and correlation matrix

Descriptive statistics					
	Poverty rate (%)	Unemployment rate (%)	Goods & services expenditure (IDR per capita)	Grant & social aid expenditures (IDR per capita)	Capital expenditure (IDR per capita)
Mean	12.573	6.615	164335.5	105678.6	148931.4
Median	11.525	6.055	115886.1	111056.7	104236.1
Maximum	28.440	18.910	1167923.	406041.1	943249.9
Minimum	4.010	1.370	16821.30	316.9476	8510.805
Std. Dev.	5.710	2.936	161045.7	85071.14	142183.6
Skewness	0.632	0.996	2.704885	0.565921	2.060692
Kurtosis	2.575	4.017	12.57107	2.620439	8.461994
Observations	336	336	336	336	336
Correlation matrix					
	lnPov	lnUnem	lnGSEs	lnSEs	lnCEs
lnPov	1.000				
lnUnem	0.031	1.000			
lnGSEs	-0.188	-0.114	1.000		
lnSEs	-0.330	-0.320	0.357	1.000	
lnCEs	-0.265	0.011	0.374	0.257	1.000

Sources: Author's computation by using E-views 10.

The correlation matrix, as in Table 2 above, shows the correlation coefficient between each type of government expenditure with poverty and unemployment rates. In summary, the three types of spending are negatively correlated with poverty, indicating a relationship in the opposite direction. The greater the expenditure on goods and services, grants and social aid, and capital spending, the lower the poverty rate, and vice versa. Likewise, the relationship between the unemployment rate and government spending is also negative, except for capital expenditure with a weakly positive association with a correlation coefficient of 0.011.

Table 2 above also shows the correlation coefficient between the groups of government expenditure. In general, the respective groups have a positive relationship with one another. For example, the increase in spending on goods and services was followed by an increase in grant expenditure, social aid, and capital expenditure. Likewise, the rise in capital expenditure was also followed by the increase in two other spending. Even so, this positive relationship is not strong enough, so we believe this relationship does not affect the accuracy and validity of our estimation.

3.2 The result of panel estimation

As explained earlier, to estimate the effect of government expenditure on the poverty rate, we apply a dynamic model of generalized methods of moments (GMM). The justification that the GMM is the best model has been based on statistical results showing that this model is free from autocorrelation symptoms and is statistically proven to meet the requirements of the validity and reliability of the measurement model. Thus, this model is declared to have good validity and produce accurate estimates. As explained in the methods section, the application of GMM in this study pertains to two models. The first model is called a "basic model," representing the dynamic relationship between the poverty rate and independent and

control variables (Model 1). The second constitutes "an interaction model" comprising three econometrical equations of GMM (Model 2a, 2b, and 2c).

Table 3 summarizes the results of GMM estimation for both the basic model and interaction models. The dynamic model of GMM resulted in a Hansen p-value greater than 0.05. This statistical value indicates that GMM is reliable for predicting the relationship between variables (Pham et al., 2022). The Wald X^2 p-value is smaller than 0.05. This matter shows that the resulting estimate has high accuracy (Ullah et al., 2021). Furthermore, the AR1 p-value and AR2 p-value generated by GMM of <0.05 and >0.05, respectively, mean that a first-order correlation exists but that there is no second-order correlation (Arellano & Bond, 1991). These results satisfy the necessary conditions for ensuring the goodness of the dynamic panel model.

The estimation result of Model 1 (basic model) indicates the unidirectional causality within the poverty rate for the lag length of one-period series data with a coefficient estimate of (α = 0.656, $p<0.05$). In other words, the increase in the poverty rate for the period of t was significant because of the rise in poverty in the previous period (t-1). An increase in the poverty rate by 1% in a given period will increase the poverty rate to 0.656% in the following period. This respect means there is an internal dependence on the poverty rate variable. Poverty refers to a condition of self-inability, where the poor face a greater risk of deprivation in terms of health and income and a lower potential to live a better life. In turn, a low income and lack of assets to do productive activities increase their inability to escape poverty. This regard indicates that the way out of the poverty trap at the sub-national level in Indonesia is complicated. This finding is in line with the research results of Wang et al. (2021) used panel data from Saharan Countries in Africa, which pointed out that the poverty rate is related to the lag of its self-value. The findings strengthen empirical evidence that poverty positively and significantly affects itself. This finding supports the research results of Runtunuwua & Tanjung (2020), which also proves that the poverty rate has a positive and significant effect on itself at lag one. In other words, an increase in poverty in the period of t positively and significantly impacts poverty in the following period (t+1).

Goods and services expenditure significantly reduce poverty rates (β_1 = -0.091, $p < 0.05$). One percent increase in spending reduces the poverty rate by 0.091%. From the perspective of local government expenditure in Indonesia, public expenditure on goods and services usually focuses on the purchase/procurement of goods and services with a practical value of less than one year, and if that use of services in implementing local government programs and activities. This increase in spending reflects an increase in government demand for goods and services, which consequently affects business development and community income in the region and reduces the poverty rate. In other words, the local government budgetary allocation for the goods and services spending supports local government activity programs and impacts reducing poverty levels (Nazamuddin, Amri, 2020). This finding confirms the results of research by Wieser (2011) using panel data from developing countries, which pointed out that government spending significantly influences poverty reduction. Also, this finding is implicitly in line with the study of Maulid et al. (2021) on the relationship between central government spending and income and community welfare, proving that government spending on the procurement of goods and services significantly increases economic growth and community welfare.

Table 3. The result of GMM Estimation

Constant & preditors	Dependent variable: lnPov			
	Main effect	Interaction effect		
	Model 1	Model 2a	Model 2b	Model 2c
lnPov(-1) (α)	0.656*** [24.219] (0.000)	0.549*** [14.308] (0.000)	0.637*** [27.092] (0.000)	0.593*** [18.885] (0.000)
lnGSEs (β_1)	-0.091*** [-4.629] (0.000)	0.083*** [2.392] (0.017)	-0.078*** [-5.534] (0.000)	-0.089*** [-5.913 (0.000)
lnSEs (β_2)	0.022*** [4.239] (0.000)	0.012*** [3.136] (0.002)	0.050*** [4.457] (0.000)	0.016*** [6.381] (0.000)
lnCEs (β_3)	-0.014 [-0.835] (0.404)	-0.025* [-1.666] (0.097)	-0.015 [-1.066] (0.287)	0.105*** [4.898] (0.000)
Control variable				
lnUnem (β_4)	0.095*** [3.915] (0.000)	1.138*** [5.449] (0.000)	0.306*** [7.148] (0.000)	0.873*** [5.676] (0.000)
Interaction variables				
lnGSEs*lnUnem (λ_1)		-0.086*** [-4.673] (0.000)		
lnSEs*lnUnem (λ_2)			-0.019*** [-3.012] (0.003)	
lnCEs*lnUnem (λ_3)				-0.066*** [-4.678] (0.000
Effects Specification: Cross-section fixed (dummy variables)				
Mean depend. Var	-0.044	-0.044	-0.044	-0.044
S.E. of regression	0.059	0.055	0.057	0.056
Hansen test				
J-statistic	22.298	20.549	21.428	20.829
Prob(J-statistic)	(0.383)	(0.303)	(0.258)	(0.288)
Arilano and bond test				
AR(1)	-1.989 (0.027)	-2.533 (0.013)	-3.184 (0.002)	-2.895 (0.004)
AR(2)	0.003 (0.998)	0.044 (0.965)	-0.386 (0.699)	-0.289 (0.773)

Note: Numbers in [ ] are t-statistics, *, **, and *** indicate a significance at the confidence level of 90%, 95%, and 99%, respectively.

Sources: Author's computation by using E-views 10.

In contrast to the poverty impacts of goods and services expenditure, the government budgetary allocation on grants and social aid expenditure positively affects poverty with an estimated coefficient of 0.022 (p-value < 0.05). This increase in spending is positively correlated with an increase in the poverty rate, indicating that grant and social aid expenditure cannot improve the living standards of the poor in the long term. Even this increase in spending is parallel with an increase in the poverty rate. Grants and social aid expenditures are local government spending aims to assist community organizations, political parties, and

other social aid in improving community welfare. Thus, social aid expenditure is government spending with short-term goals, such as cash transfers, direct financial assistance, humanitarian assistance for people affected by disasters, and other community social assistance programs. Therefore, the impact of this spending on the beneficiaries is only temporary and cannot get them out of the poverty trap. This finding is in line with the results of the research by Zaman & Khilji (2013) for the case of the Pakistani economy, which found that the allocation of social spending in the country is intrinsically not pro-poor. Although the government's budget allocation for social spending increased, it did not impact reducing the poverty level. It indicates that the economic impact received by the beneficiaries of this spending cannot get them out of the poverty trap.

Capital expenditure also significantly affects poverty reduction, as shown by the estimation coefficient of -0.014 (p-value < 0.05). The coefficients provide statistical information that a one percentage point increase in the realization of local government budgetary allocation on capital spending will reduce the poverty rate by 0.029 percentage points. Capital spending reflects public investment to drive economic activity in the region. In practice, capital spending helps build public infrastructure to support community activities in various sectors of the economy, such as agriculture, fisheries, trade, the manufacturing industry, and other sectors. Improving the quality of rural roads, for example, can directly boost the economic activities of rural communities, thereby contributing to the reduction of rural poverty (Tijani et al., 2015). The decline in rural poverty directly impacts aggregate poverty reduction. This empirical evidence confirms the findings of Murty & Soumya (2007) found that public investment funded by capital spending increases employment opportunities, promotes economic growth, and reduces poverty levels.

As previously explained, our research uses the unemployment rate as a control variable, and this macroeconomic variable also plays a moderating variable between government spending and the poverty rate. The interaction models (Models 2a, 2b, and 2c) in Table 3 above, the respective model show an estimated coefficient (β_4) of 1.138, 0.306, and 0.873 (p-value < 0.05). This coefficient means that for every one percent increase in unemployment, the poverty rate will increase between 0.306 to 1.138%. These statistical results imply that raising an area's poor to the total population ratio is strongly related to the rise in unemployment. The higher the unemployment rate, the higher the poverty rate. In other words, areas with high unemployment rates experience high poverty rates. Otherwise, areas with low poverty rates experience low poverty rates. So, a positive and significant relationship exists between the unemployment rate and poverty. This finding supports the results of Martinez et al.'s (2001) study using panel data from OECD countries, proving that unemployment significantly impacts increasing poverty rates. The higher the unemployment, the higher the poverty rate. These findings are also consistent with empirical evidence by Ayala et al. (2016) used panel data from Spanish regions and pointed out that unemployment generates severe poverty.

Model 2a shows that the interaction between spending on goods and services and the unemployment rate (lnGSEs*lnUnem) influences the poverty rate significantly and negatively (λ_1 = -0.086; p < 0.05). These statistics provide statistical information regarding the moderating role of unemployment on the effect of goods and services expenditure on the poverty rate. Meanwhile, the estimated coefficient of goods and services expenditure on

poverty is positive ($\beta_1 = 0.083$; $p < 0.05$). Since the sign of the two estimated coefficients is different, it is necessary to calculate the marginal effect of goods and services spending at various levels of the logarithm of unemployment. By deriving Model 2a into partial derivation, the marginal effect of goods and services expenditure on the poverty rate is as follows.

$$\frac{\Delta \ln \mathrm{Pov}_{it}}{\Delta \ln \mathrm{GSEs}_{it}} = 0.083 - 0.086 \ln \mathrm{Unem}_{it}$$

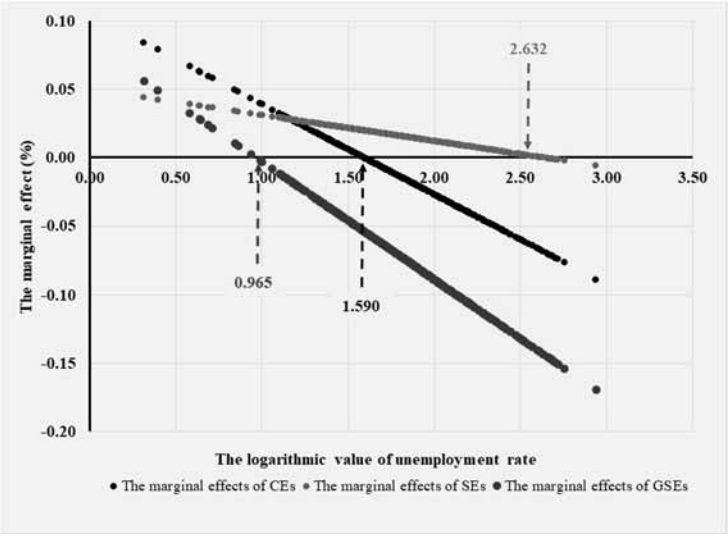
The marginal effect of spending on goods and services on poverty is evaluated at the mean, maximum, and minimum value of the logarithm of unemployment rates of 1.794, 2.940, and 0.315, respectively (see Appendix 1). By substituting the three values into the above equation, we get statistical figures of -0.071, -0.170, and 0.056 (see Appendix 2a). An increase of one percent in spending on goods and services reduces the poverty rate by 0.071% at the mean value and by 0.170% at the maximum value of the unemployment rate. On the other hand, at the minimum value of the unemployment rate, the increase in spending on goods and services cannot reduce the poverty rate. An important question is what percentage of the unemployment threshold effect allows goods and services expenditure to positively or negatively impact the poverty rate. Therefore, it is necessary to calculate where the marginal impacts are equal to zero. The calculation process is as follows. (detailed calculation process, see Appendix 2a).

0.083 – 0.086(lnUnem) = 0, This equation can be rewritten as

0.083 = 0.086(lnUnem), so;

lnUnem = 0.083/0.086 = 0.965.

Figure 1. The marginal effect of government expenditure on the poverty rate at various levels of the logarithmic value of the unemployment rate

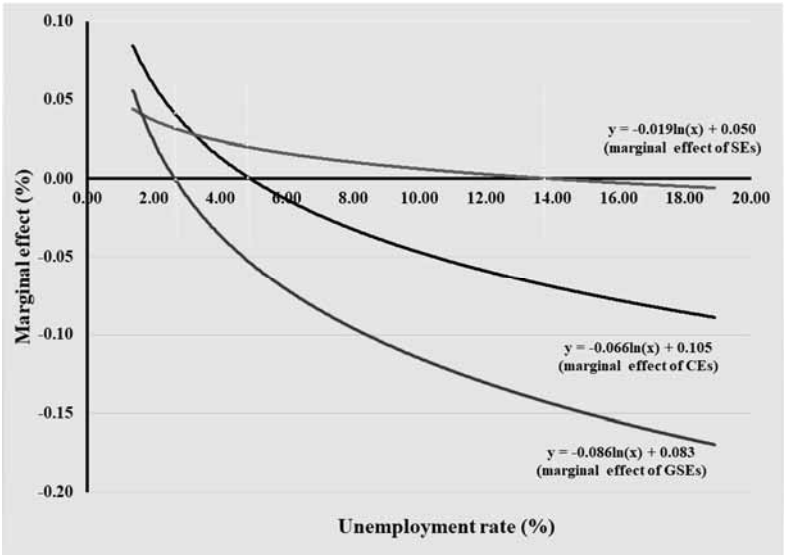


Source: The author's design refers to the result of statistical calculation.

Figure 1 displays the graphical representation of the marginal effects of goods and services expenditure at the various levels of the logarithmic value of the unemployment rate. The downward-sloping graph suggests that the marginal impact of government expenditure on poverty reduction tends to decrease along with an increase in the unemployment rates.

Through the anti-log process, we return to the original scale of the unemployment rate so that the unemployment rate for the marginal effect equal to zero is 2.625% (Appendix 2a). As shown in Table 2, the descriptive statistics of the unemployment rate show the mean, maximum, and minimum values of 6.615, 18.910, and 1.370%, respectively. The marginal effect of goods and services expenditure on the poverty rate shows that this component expenditure negatively affects poverty at the mean and maximum value of the unemployment rate. Conversely, at the minimum value, the marginal effects are positive. The statistics score of 2.625 above is the threshold effect of the poverty impact of goods and services expenditure. Therefore, this expenditure can reduce poverty when the unemployment rate is only above 2.625%. Conversely, when unemployment is below the rates, this public expenditure cannot reduce the poverty rate. In the graphic, the marginal effect of goods and services expenditure on the poverty rate at various levels of the unemployment rate, as is seen in Figure 2.

Figure 2. The marginal effect of government expenditure on the poverty rate at various levels of the unemployment rate



Source: The author's design refers to the result of statistical calculation.

As shown in Figure 2 above, the vertical axis represents the marginal effects of government expenditure on the poverty rate. The horizontal axis represents the unemployment rate. The goods and services expenditure impact the poverty reduction when the unemployment rate is above 2.625% (the intersection point between the marginal effect graph and the horizontal axis). The higher the unemployment rate, the more significant the negative impacts of goods

and services expenditure on the poverty level. Conversely, when unemployment is below 2.625%, a rise in this public spending does not impact poverty reduction.

The interaction between the grant and social aid expenditure and the unemployment rate (lnSEs*lnUnem) also influences on poverty rate (λ_2 = -0.019, $p < 0.05$). The estimate coefficients are negative and significant at the confidence level of 95%, providing statistical information that unemployment has a negative moderating role on the functional relationship between the poverty rate and government expenditure. An increase in the unemployment rate causes a decrease in the poverty impact of grants and social aid expenditures. Through the first derivation of Model 2b, the marginal effect of grant and social aid expenditure on poverty is as in the equation below.

$$\frac{\Delta \ln \mathrm{Pov}_{it}}{\Delta \ln \mathrm{SEs}_{it}} = 0.050 - 0.019 \ln \mathrm{Unem}_{it}$$

As in Figure 1, the graph of the marginal effect of grant spending and social aid expenditure on the poverty rate also decreases from the top left to the bottom right. The graph suggests that the marginal impact of these government expenditures decreases with an increase in the unemployment rate. Evaluation of the marginal effect also refers to the mean, maximum, and minimum logarithmic values of unemployment rates of 1.794, 2.940, and 0.315, respectively (see Appendix 1). The statistical calculation points out that the poverty reduction impact of the grant and social aid expenditure is different at the various levels of the unemployment rate. By substituting the three logarithmic values into the above equation, we get the marginal effects of 0.016, -0.006, and 0.044, respectively (see Appendix 2b). One percent increase in grants and social aid expenditure reduces the poverty rate by 0.006% at the maximum unemployment rate. On the other hand, at the mean and minimum value of the unemployment rates, the raises in grants and social aid expenditures do not impact poverty reduction. Thus, our hypothesis suggesting that the effect of government spending on poverty is different based on the unemployment rate is statistically confirmed.

The existence of different impacts of social spending on poverty confirms the results of research by Lustig et al. (2013) used sample data from several countries, which proves that social spending significantly reduces poverty rates in Argentina, Brazil, and Uruguay, but not for Bolivia, Mexico, and Peru. This finding confirms the results of a study by Zwiers & Koster (2014) using data from the Eurostat and European Social Survey, which discovered that social spending has different effects within a country. Differences in some macroeconomic variables, such as job opportunities and income inequality, influence the impact of social expenditure in reducing poverty levels.

The results of statistical calculations show that the threshold effect of the unemployment rate on the poverty impact of grant and social aid expenditure is 13.898% (see Appendix 2b). As in Figure 2 above, the marginal effect of social spending has a negative sign when the unemployment rate is above and a positive sign below 13.898%. This statistical result indicates that the negative impact of the expenditure on poverty only occurs when the unemployment rate is above 13.898%. On the other hand, when the unemployment rate is less than 13.898%, the increase in social and services aid expenditure does not reduce the poverty rate. This public spending component has even a positive and significant effect on poverty. This finding is shocking; the social spending allocation on the local government

budget in Indonesia cannot encourage poverty reduction, especially when the unemployment rate is low.

Furthermore, the interaction between capital expenditure and the unemployment rate (lnCEs*lnUnem) also influences on poverty rate (λ_3 = -0.066, $p < 0.05$). The estimate coefficients are significant at the confidence level of 95%. It means that the effect of capital expenditure on the poverty rate is different at the various unemployment rates. In other words, it statistically indicates that the negative moderating effects of the unemployment rate exist in the functional relationship between the poverty rate and capital expenditure. An increase in the unemployment rate causes a decrease in the poverty impact of capital expenditure. Through the first derivation of Model 2c, the marginal effect of capital expenditure on poverty is as in the equation below.

$$\frac{\Delta \ln \mathrm{Pov}_{it}}{\Delta \ln \mathrm{CEs}_{it}} = 0.105 - 0.066 \ln \mathrm{Unem}_{it}$$

The downward-sloping graph in Figure 1 above suggests that the marginal effect of capital expenditure on the poverty rate also tends to decrease along with an increase in the unemployment rate.

As in Table 2, the mean unemployment rate is 6.615, with a maximum value of 18.910 and a minimum value of 1.370. Meanwhile, the threshold effect for the unemployment rate is 4.322% (see Appendix 2c). It means that the marginal impact of capital expenditure on poverty has a negative sign at the mean and maximum value of the unemployment rate and a positive one at the minimum value. In other words, capital spending can reduce poverty when the unemployment rate is above 4.322%. Graphically, the relationship between the unemployment rate and the marginal effect of capital expenditure on poverty, such as in Figure 2 above. The impact of capital expenditure on poverty depends on the unemployment rate. This spending can lead to a reduction in poverty when the unemployment rate is above 4.322%. Conversely, when the unemployment rate lies below this point, the increase in capital spending has no impact on reducing poverty. Referring to the quantitative results, suspecting that the effect of government spending on poverty is to be different based on the unemployment rate is statistically proven.

Figure 2 above provides information implying that social spending is ineffective in reducing poverty rates, except when the unemployment rate is high, above 13.898%. On the other hand, when unemployment is below this threshold, an increase in social spending is positively related to the level of poverty. Second, when the unemployment rate ranges from 2.625 to 4.322%, efforts to reduce poverty become a reality through increased spending on goods and services. On the other hand, capital expenditure is not effective in reducing poverty. Third, when the unemployment rate ranges from 4.322-13.898%, capital expenditure and expenditure on goods and services reduce poverty effectively. Still, the marginal effect of spending on goods and services on poverty reduction is greater than the marginal effect of capital expenditure. The difference in the poverty impact of government expenditure at the various levels of the unemployment rate is in line with the findings of Anderson et al. (2018). Their empirical findings pointed out that the poverty impact of government expenditure is closely related to regional and socio-economic factors, including the poverty rate, job opportunities, and the unemployment rate.

4. Conclusions and Implications

Studies on the effect of government spending on poverty have been carried out by several economic researchers, using national and cross-border data. However, the empirical findings they publish are still controversial and do not provide a fixed conclusion, so the direction and significance of the poverty impacts of government expenditure is still an open question and very relevant for further research. In addition, in predicting the functional relationship between poverty and government spending, there are still very few researchers who consider other macroeconomic variables as determinants of the relationship between the two variables. Economic variables, such as unemployment, for example, can potentially affect the impact of poverty reduction from public budget allocations.

In the context of provincial panel data in Indonesia, we suppose that differences in unemployment rates between regions potentially impact the relationship between poverty and government spending. Based on a logical framework, the unemployment experienced by an area complicates the community to get out of poverty. Therefore, in contrast to several previous researchers, our study re-examines the poverty impact of public spending by placing the unemployment rate as a moderating variable. Using panel data from 24 provinces in Indonesia from 2005-2018, the analytical model applied to analyze this relationship is the Generalized Methods of Moment (GMM).

Our study found a one-way causality relationship in the poverty rate, where the poverty rate of a given period positively and significantly depends on the poverty rate in one period before. And the poverty rate of a region at a certain period drives an increase in poverty in the next period. Of the three groups of government expenditures operationalized in predicting poverty levels, spending on goods and services and capital expenditures significantly reduce poverty. Conversely, spending on grants and social aid could not impact poverty reduction.

The unemployment rate has a positive effect on the poverty rate. Regions with higher unemployment rates have higher poverty rates. Vice versa, a decrease in the unemployment rate impacts reducing poverty significantly. It confirms that the variation in the poverty rate between regions in Indonesia is highly dependent on changes in the unemployment rate. Apart from having a positive effect on poverty, the unemployment rate also plays a detrimental role in the impact of government spending on poverty. The moderating effect of the unemployment rate on the impact of expenditure on poverty is negative and significant. The higher the unemployment rate, the smaller the poverty-reducing impact of government expenditure. In other words, in areas with high unemployment, the impact of government spending on the poverty rate is smaller than in areas with low unemployment. On the other hand, in areas with low unemployment, the influence of the expenditure on poverty reduction is more significant than in areas with high unemployment. Thus, a high unemployment rate reduces the effectiveness of government expenditure for poverty reduction.

From the conclusions above, the policy implications for local governments in Indonesia are as follows: (1) policymakers should design regional expenditure allocations oriented toward reducing unemployment rates to alleviate poverty. Increasing the portion of capital expenditure in regional budgeting should be a main priority. (2) Given the empirical fact that most portions of the poor live in rural areas, government capital expenditure should be

allocated to improve rural economic infrastructure. It aims to increase rural economic activities to reduce rural poverty. (3) In addition, in realizing spending on grants and social assistance, local governments must ensure that the beneficiaries of these expenditures are the poor group.

While our findings have provided statistical evidence of a link between government spending and poverty levels, this research has several limitations. First, our study only places the unemployment rate as a control variable in examining the relationship between poverty and government spending. Even though many other variables have the potential to determine the effectiveness of government spending in reducing poverty, such as economic growth, investment, inflation, and other macroeconomic variables. Therefore, forthcoming researchers can conduct a more in-depth study of the effect of government spending on poverty using a number of these macro variables as control variables. Second, this study only focuses on the functional relationship between the poverty rate and government spending. In fact, the regional government's policy in determining regional spending allocations also considers the poverty rate. Therefore, future researchers can re-examine the relationship between these variables using an analytical model that allows revealing the direction of causality between variables.

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Appendix 1

Logarithmic value of research variables

	Poverty rate (lnPov)	Unemployment rate (lnUnem)	Goods and services expenditure (lnGSEs)	Grants and social aid expenditure (lnSEs)	Capital expenditure (lnCEs)
Mean	2.426008	1.793542	11.65974	11.01918	11.51285
Median	2.444518	1.800881	11.66036	11.61779	11.55441
Maximum	3.347797	2.939691	13.97074	12.91421	13.75709
Minimum	1.388791	0.314811	9.730401	5.758737	9.049092
Std. Dev.	0.468378	0.444828	0.829403	1.263771	0.921555
Skewness	-0.132074	-0.202037	0.142234	-0.844779	-0.109580
Kurtosis	2.158208	3.099515	2.686735	3.121540	2.583110
Jarque-Bera	10.89742	2.424510	2.506798	40.17126	3.105590
Probability	0.004302	0.297526	0.285533	0.000000	0.211656
Sum	815.1387	602.6302	3917.673	3702.445	3868.319
Sum Sq. Dev.	73.49165	66.28708	230.4497	535.0343	284.5034
Observations	336	336	336	336	336

Appendix 2

Model 2a

$lnPov_{it} = 0.549lnPov_{i(t-1)} + 0.083lnGSEs_{it} + 0.012lnSEs_{it} - 0.025lnCEs_{it} + 1.138lnUnem_{it} - 0.086lnUnem_{it}*logGSEs_{it} + \mu_2$

The marginal effect of goods and services expenditure

$$\frac{\Delta \ln Poverty_{it}}{\Delta \ln GSE_{it}} = 0.083 - 0.086 \ln Unem_{it}$$

At the mean value of the logarithm of the unemployment rate

$$\frac{\Delta \ln Poverty_{it}}{\Delta \ln GSEs_{it}} = 0.083 - 0.086(1.793) = -0.071$$

At the maximum value of the logarithm of the unemployment rate

$$\frac{\Delta \ln Poverty_{it}}{\Delta \ln GSEs_{it}} = 0.083 - 0.086(2.939) = -0.170$$

At the minimum value of the logarithm of the unemployment rate

$$\frac{\Delta \ln Poverty_{it}}{\Delta \ln GSEs_{it}} = 0.083 - 0.086(0.315) = 0.056$$

Threshold effect, where the marginal effect is equal to zero

$$\frac{\Delta \ln Poverty_{it}}{\Delta \ln GSEs_{it}} = 0.083 - 0.086 \ln Unem_{it} = 0$$

$$0.083 - 0.086(\ln Unem_{it}) = 0$$

$$\ln Unem_{it} = \frac{0.083}{0.086}$$

$$\ln Unem_{it} = 0.965116279$$

Then, return to the original scales of the unemployment rate, so

$$Unem_{it} = 2.718^{0.965116279}$$

$$Unem_{it} = 2.625 \text{ percent}$$

Appendix 2b

Model 2b

$lnPov_{it} = 0.637lnPov_{i(t-1)} - 0.078lnGSEs_{it} + 0.050lnSEs_{it} - 0.015lnCEs_{it} + 0.306lnUnem_{it} - 0.019lnUnem_{it}*logSEs_{it} + \mu_2$

The marginal effect of grant and social aid expenditure

$$\frac{\Delta \ln Poverty_{it}}{\Delta \ln SEs_{it}} = 0.050 - 0.019 \ln Unem_{it}$$

At the mean value of the logarithm of the unemployment rate

$$\frac{\Delta \ln Poverty_{it}}{\Delta \ln SEs_{it}} = 0.050 - 0.019(1.793) = 0.016$$

At the maximum value of the logarithm of the unemployment rate

$$\frac{\Delta \ln Poverty_{it}}{\Delta \ln SEs_{it}} = 0.050 - 0.019(2.939) = -0.006$$

At the minimum value of the logarithm of the unemployment rate

$$\frac{\Delta \ln \text{Poverty}_{it}}{\Delta \ln \text{SEs}_{it}} = 0.050 - 0.019(0.315) = 0.044$$

Threshold effect, where the marginal effect is equal to zero

$$\frac{\Delta \ln \text{Poverty}_{it}}{\Delta \ln \text{SEs}_{it}} = 0.050 - 0.019 \ln \text{Unem}_{it} = 0$$

$$0.050 - 0.019(\ln \text{Unem}_{it}) = 0$$

$$\ln \text{Unem}_{it} = \frac{0.050}{0.019}$$

$$\ln \text{Unem}_{it} = 2.631578947$$

Then, return to the original scales of the unemployment rate, so

$$\text{Unem}_{it} = 2.718^{2.631578947}$$

$$\text{Unem}_{it} = 13.898 \text{ percent}$$

Appendix 2c

Model 2c

$\ln Pov_{it} = 0.593 \ln Pov_{i(t-1)} - 0.089 \ln GSEs_{it} + 0.016 \ln SEs_{it} + 0.105 \ln CEs_{it} + 0.873 \ln Unem_{it} - 0.066 \ln Unem_{it} * \log CEs_{it} + \mu_2$

The marginal effect of capital expenditure

$$\frac{\Delta \ln \text{Poverty}_{it}}{\Delta \ln \text{CEs}_{it}} = 0.105 - 0.066 \ln \text{Unem}_{it}$$

At the mean value of the logarithm of the unemployment rate

$$\frac{\Delta \ln \text{Poverty}_{it}}{\Delta \ln \text{CEs}_{it}} = 0.105 - 0.066(1.793) = -0.013$$

At the maximum value of the logarithm of the unemployment rate

$$\frac{\Delta \ln \text{Poverty}_{it}}{\Delta \ln \text{CEs}_{it}} = 0.105 - 0.066(2.939) = -0.089$$

At the minimum value of the logarithm of the unemployment rate

$$\frac{\Delta \ln \text{Poverty}_{it}}{\Delta \ln \text{CEs}_{it}} = 0.105 - 0.066(0.315) = 0.084$$

Threshold effect, where the marginal effect is equal to zero

$$\frac{\Delta \ln \text{Poverty}_{it}}{\Delta \ln \text{CEs}_{it}} = 0.105 - 0.066 \ln \text{Unem}_{it} = 0$$

$$0.105 - 0.066(\log \text{Unem}_{it}) = 0$$

$$\ln \text{Unem}_{it} = \frac{0.105}{0.066}$$

$$\ln \text{Unem}_{it} = 1.590909$$

Then, return to the original scales of the unemployment rate, so

$$\text{Unem}_{it} = 2.718^{1.590909}$$

$$\text{Unem}_{it} = 4.322 \text{ percent}$$

ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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Mihaela Angelova[1]

CHANGES IN DETERMINANTS OF LIFE SATISFACTION OF PEOPLE AGED 50 AND OVER BEFORE AND AFTER THE OUTBREAK OF COVID-19[2]

The goal of this longitudinal study is to analyse the changes in determinants of life satisfaction of older people in Europe and highlight risk predictors of frustration before and after the outbreak of Covid-19. Parallel analyses of Wave 7 and Wave 8 data of the Survey of Health, Ageing and Retirement in Europe (SHARE) are performed to examine the relationship between different determinants and life satisfaction in the basic model and post-COVID model. Logistic regression models are evaluated for both scenarios to explore the dependence between life satisfaction and various demographic, economic, health and behavioural factors. Transformation of the main model on Wave 8 data is applied to assess whether friends net, use of internet, vigorous sports activities and health care factors affect life satisfaction. The research provides an up-to-date picture of the changes in the behaviour of older people in Europe with a focus on specific challenges related to the global pandemic. Results suggest directions for interventions that will improve the life satisfaction of older people in ordinary scenarios and in severe times, as well as directions for a better fit between academic research and the needs of policymakers and practitioners in the sphere of design and implementation of social policies, focused on increasing the life satisfaction and ultimately aiming to foster economic growth.

Keywords: SHARE; Europe; older people; life satisfaction; pandemic; social policies
JEL: I3

[1] *Mihaela Angelova, PhD student in Data Science, Sofia University "St. Kliment Ohridski", Faculty of Economics and Business Administration, 0887569962, e-mail: mihaela.urb@gmail.com.*

[2] This paper uses data from SHARE Waves 7 and 8 (DOIs: 10.6103/SHARE.w7.800, 10.6103/SHARE.w8.800) see Börsch-Supan et al. (2013) for methodological details.(1) The SHARE data collection has been funded by the European Commission, DG RTD through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812), FP7 (SHARE-PREP: GA N211909, SHARE-LEAP: GA N227822, SHARE M4: GA N261982, DASISH: GA N°283646) and Horizon 2020 (SHARE-DEV3: GA N676536, SHARE-COHESION: GA N°870628, SERISS: GA N654221, SSHOC: GA N823782, SHARE-COVID19: GA N101015924) and by DG Employment, Social Affairs & Inclusion through VS 2015/0195, VS 2016/0135, VS 2018/0285, VS 2019/0332, and VS 2020/0313. Additional funding from the German Ministry of Education and Research, the Max Planck Society for the Advancement of Science, the U.S. National Institute on Aging (U01_AG09740-13S2, P01_AG005842, P01_AG08291, P30_AG12815, R21_AG025169, Y1-AG-4553-01, IAG_BSR06-11, OGHA_04-064, HHSN271201300071C, RAG052527A) and from various national funding sources is gratefully acknowledged (see www.share-project.org).
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1. Introduction

The global pandemic of COVID-19 caused multiple limitations, lockdowns and healthcare measures that destroyed thousands of lives globally causing increased depressive symptoms, anxiety and psychological distress that affect life satisfaction. Knowing that in European elections since 1970 life satisfaction of people is the best predictor of whether governments get re-elected – much more important than economic growth, unemployment or inflation, public policy needs a new focus: not "wealth creation" but "well-being creation" (Clark, Fletch, Layard et al., 2016). According to previous theories (Campbell A. et al., 1976), subjective well-being depends to the greatest extent on the objective circumstances of their lives. Numerous studies examine the effects of the pandemic on behaviour and mental health (Yap et al., 2014; Gawrych et al., 2021; Araki, 2022; López et al., 2020; etc.). However, its consequences for well-being are still not deeply investigated and it will be a hot topic for the next years to explore the changes in the factors affecting life satisfaction, especially of older people, being the most vulnerable group in terms of higher risk of mortality and modern challenges facing society: climate change, unknown diseases, war conflicts, the development of digitalization and artificial intelligence.

While policymakers focus their efforts on the development of the healthcare sector, which is important in short-term plan, it is also necessary to pay attention to improving the well-being and resilience of older people and to limit the economic and social problems in a long-term aspect. In this light, understanding the drivers behind well-being creation is a research question with growing importance. Moreover, the occurrence of pandemics followed by its measures amplifies the importance of this topic. Therefore, the research aims to investigate the changes in determinants of life satisfaction of people aged 50 and over in Europe since the outbreak and highlight risk factors for frustration before and during the pandemic. In accordance with the goal and the research issues, three working hypotheses are tested. In the first place, the research verifies the hypothesis that life satisfaction depends on different factors. The second hypothesis tested in the study is that life satisfaction varies across the investigated countries. Finally, the research argues in favour of the hypothesis that determinants of life satisfaction have changed since the outbreak of the global pandemic. Along with the research goal, the following tasks are formulated, including analyses of the socio-economic trends and observed changes across the investigated countries before and during the pandemic, analyses of the main drivers for life satisfaction in ordinary working scenarios and in severe times, investigation on the reasons for changes and formulation of social policies directed to each factor.

Unlike most of the papers, in the current research dimension reduction is used to combine strongly correlated characteristics in latent factors used for follow-up analysis of the determinants of life satisfaction before and during the pandemic. Apart from that, an additional post-Covid model is estimated, including factors, crucial for older people's well-being during times of restrictions. For the analyses answers of respondents from 24 European countries included in both Wave 7 (conducted before the pandemic) and Wave 8 (conducted during the pandemic) of the SHARE data are used for comparison and understanding of the most significant predictors of life satisfaction in both scenarios. The applied methodological framework could be used in authorities' monitoring as an algorithm for classification and risk identification of the key aspects of older people's well-being and satisfaction.

Among the limitations of the study are the missing or not enough data about some features that literature shows are predictors of life satisfaction like early life experiences, state and mood of the participants, number of children, quality of the environment, living standards, fear of COVID-19, etc. Moreover, the sample used for the estimated models in both waves is unbalanced with respect to both classes: satisfied and dissatisfied. Besides that, the data reveals only the self-perception of older people, which in the case of mental health problems could cause biased results (Angelini et al., 2012). Another limitation is that the analysis is not performed on a country-by-country basis because of small sample sizes on a country level, which could reveal insights into how the factors differ between countries. Despite the presented limitations, the study enriches the literature by exploring the relevant factors for the life satisfaction of older people in Europe, especially during severe times.

The rest of the paper is organized as follows: the next section provides a literature review. Section 3 reveals the research methodology. Section 4 presents the data and the main results, followed by a discussion. Section 5 concludes the research.

2. Literature Review

2.1. Definitions of life satisfaction

In Cambridge Advanced Learner's Dictionary (Walter, 2003), satisfaction is defined as "pleasant feeling you get when you receive something you wanted, or when you have done something you wanted to do; a way of dealing with a complaint or problem that makes the person who complained feel happy; the act of fulfilling (achieving) a need or wish". According to Hall (2014), the concept of life satisfaction is associated with the idea of happiness and well-being, it is often used as a synonym of happiness and a major component of well-being. According to Heady et al. (1991), there are two main types of theories about life satisfaction: „bottom-up", examining life satisfaction as a result of satisfaction in various areas of life, and „top-down" according to which the overall life satisfaction influences the satisfaction in the different spheres of life. In the research, the first approach is followed.

In the literature appear different definitions of life satisfaction:

Def. 1 Life satisfaction is the extent to which one cherishes his life (Veenhoven, 1996).

Def. 2 Life satisfaction is an overall evaluation of one's emotions and mindset about life at a particular moment (Diener, 1984).

Def. 3 Life satisfaction is the rate at which one considers life wealthy, sane, full, or of high quality (VandenBos, 2007).

Def. 4 Life satisfaction is a reasonable evaluation of one's life, usually affected by social factors (Ellison et al., 1989).

Each of the definitions has its pluses and minuses. While Def. 1 assesses the overall perception of one's life, Def. 2 splits the concept into two different aspects: emotions and mindset. On the other hand, Def. 3 is also appropriate because it looks at life satisfaction in 4 different aspects and Def. 4 adds the social factors in the picture. However, in none of these

definitions, so many drivers are considered together for the evaluation of life satisfaction as the ones investigated in the research.

Each definition contributes to the achievement of the research goal and the research tasks. Def. 1 is used for the fulfilment of the first research task where analysis of the trends in the overall level of satisfaction since the outbreak is performed. Def. 2. is used for the achievement of the second research task where analysis of the main drivers for life satisfaction in two particular moments (before and during the pandemic) is done. Def. 3. is used for the achievement of the second research task where drivers for life satisfaction in different spheres of life are deeply investigated in both scenarios. Def. 4. is used for the achievement of the second research task where additional factors for life satisfaction during the pandemic, including social factors, are assessed. All four definitions are used for the fulfilment of the last research tasks related to the investigation of the reasons for changes and formulation of social policies directed to each determinant of life satisfaction.

The next section provides a discussion on how life satisfaction is measured.

2.2. Measurement of life satisfaction

According to Mannell & Dupuis (2007), satisfaction with life is one of the most ancient investigative questions in the examination of obsolescence, directed originally to pathology and handling, afterwards transforming into a problem about the sensation of goodness of life. Several approaches are presented in the literature in terms of the measurement of life satisfaction. The most frequently used metrics in the literature include:

Metric 1: Life Satisfaction Index (Neugarten, Havighurst, and Tobin, 1961) consists of a 20-item questionnaire (11-item short form version) forming an overall measure of quality of life for adults over 50.

Metric 2: Satisfaction with Life Scale (SWLS), presented by Diener et al. (1985), is the most popular and widely used measure of life satisfaction. It consists of five statements that respondents rate on a scale from 1 (strongly disagree) to 7 (strongly agree).

Metric 3: The OECD[3] Better Life Index (OECD, 2016) measures the overall life satisfaction by the participating components and by counties on a scale from 0 to 10, where 0 means not at all satisfied and 10 is completely satisfied.

Metric 4: Riverside Life Satisfaction Scale (Margolis et al., 2018) is a measure combining 6 items rated on a scale from 1 (strongly disagree) to 7 (strongly agree), that aims to improve the previously measured life scale by increasing the scope of the measure and reducing the bias.

In the data used for the research, a measurement approach based on the third metric is applied, since in the chosen target characteristic respondents rate their satisfaction with life on a scale from 0 to 10.

[3] The Organisation for Economic Co-operation and Development.

2.3. Factors affecting life satisfaction

The research on the topic highlights a complex of factors that affect the feeling of satisfaction with life.

A study by Angelini et al. (2012) proves major determinants of life satisfaction are deteriorating health, physical limitations, and age. The research shows being female, married, having a job, high level of education and socioeconomic status, determine a higher level of satisfaction. In another study (Lu et al., 2019) low evaluation of the goodness of life is found to be related to lower education and higher stress at work, low income, inactivity, illness, mobility limitations or depression. According to Bruno & Faggini (2017), among the public expenses, education is significant both because of its share in total costs and its input to the various dimensions of well-being.

Arpino, Gumà, and Julià (2018) find happenings in the early stages of life affect the afterwards life paths, health and well-being. According to the authors, retirement from employment is generally associated with declining health, whereas when the initial status is unemployment or inactivity, the effect of retirement appears to be null or even positive. This conclusion is also supported by Dingemans and Henkens (2019). Another research by Solé-Auró et al. (2018), shows higher degrees of life gratification and felicity are linked to more prolonged and wholesome lives. Bjelajac et al. (2019) examine the relationship between employment and mental health showing jobless declare indications of loneliness more frequently than occupied, and besides that in rural regions, unemployment is linked to depression. Puvill et al. (2019) show wealthier countries report higher life satisfaction. The authors state differences in responses may be due to subjective factors such as the state and mood of the participants.

Regarding socio-economic factors, household size has a significant positive effect on satisfaction (Ferreira et al., 2013). On the other hand, Angeles (2010) finds a strong positive effect of the children. Besides that, Arsenijevic and Groot (2018) conclude loneliness rises with age and can negatively influence physical and mental health, it is connected to life-reshaping events such as the loss of a partner, retirement, or diminished mobility. Solé-Auró and Cortina (2019) find a protective effect of partnership at a later age is a much more significant predictor of gratification than the children.

Arezzo and Giudici (2017) reveal social interactions have a positive impact on health by protecting people from affliction from misconceptions of their well-being. Tomini et al. (2016) also reveal social assistance and social net size are related to overall or spiritual health. Maniscalco et al. (2020) show the quality of life is based on one's necessities, mental state, and anticipation. According to Börsch-Supan et al. (2019), individuals who are more outgoing, socially confident and emotionally steady feel greater gratification.

According to Ozdamar and Giovanis (2018) good environment is a predictor of prosperity, and it is important for policymakers to ameliorate the air purity and prevent the overall health. Numerous studies show significant associations between air pollution, depression, and suicide (Szyszkowicz et al., 2010; Lim et al., 2012; Mehta et al., 2015). Several studies point out country of residence is one of the most important factors for life satisfaction, health and well-being (Angelini et al., 2012; Börsch-Supan et al., 2019; Puvill et al., 2019).

The results of the research are a milestone for social policies focused on increasing life satisfaction, that could indirectly foster economic growth. While most of the literature investigates the effects of economic growth on life satisfaction, several studies explore the dependence from another perspective, namely the indirect effect of life satisfaction on economic development. Oswald et al. (2015) prove there is the existence of a causal link between well-being and human performance, revealing lower happiness is associated with lower productivity. Korkmaz & Korkmaz (2017) conclude an increase in productivity enables higher levels of output in the economy. According to Patel (1986) the term 'productivity' is almost synonymous with economic growth. Other studies on the topic (Adejumo et al., 2013; Affandi et al., 2019) reveal human capital has a direct or indirect impact on economic growth. According to Chiappero-Martinetti et al. (2015), human development and economic growth are two rather different paradigms that imply different objectives, measurement techniques, and policies for a common goal, namely socio-economic progress. These findings support the idea of the research, aiming at the identification of the main drivers of life satisfaction, that could be used by policymakers' implementation of social policies, on one hand, focused on people's happiness and on the other hand indirectly fostering economic growth.

2.4. Does life satisfaction change

According to Yap et al. (2014), many studies prove considerable change in subjective well-being can occur when people experience important life events. Several new studies show global pandemic, being the biggest health crisis in more than a century (Helliwell et al., 2021) affects well-being and life satisfaction. According to Gawrych et al. (2021), there is a significant medium decrease in the level of happiness and life satisfaction during the pandemic.

Zhang et al. (2020) investigate the relationship between health, distress, and life satisfaction and highlight more proactive individuals are more affected by restrictions. Araki (2022) shows there is a significant increase in older people's life satisfaction during the pandemic and older people in better socio-economic status are more satisfied in critical times. Another longitudinal study (Kwong et al., 2021), investigates two generations in England, finding evidence more people experience low life satisfaction after the outbreak. According to Dymecka et al. (2021), the increase in anxiety and stress during the pandemic has a negative impact on well-being. In another research, Dymecka, Gerymski and Machnik-Czerwik (2021) show people experiencing a strong fear of COVID-19 are more satisfied with life than people experiencing strong stress but weak fear of COVID-19. Moreover, loss of job, isolation, absence of social contacts or big change in life could be more dangerous for well-being than the risk of infection, which many people don't consider as a threat.

Another research (López et al., 2020) shows personal sensations of health, family, resistance, gratefulness and approval influence older people's well-being. According to Brandtstädter and Renner (1990), older people use strategies to adapt and cope with new challenges.

The literature presents various factors that influence the life satisfaction of older people in Europe. Nevertheless, most authors investigate the effect of a single factor or explore the

situation using a significantly smaller sample of people in one or several countries, or compare two generations of people (not limiting the research only to older people), or use data from older waves of SHARE data or research the changes in longitude data in ordinary working scenarios. None of the available studies suggests a standardized approach for identifying the changes in the determinants of life satisfaction of older people since the outbreak of the global pandemic, that could be used as an algorithm for better authority policies aiming to improve life satisfaction, that could indirectly influence the economic development in positive direction. Moreover, little attention has been paid to the post-Covid period and there is a wide research gap in terms of the effect of additional factors like hospitalisation, vaccinations, digital networks, alcohol consumption, active life and sports, that are not included in all SHARE waves but are crucial for the well-being of older people especially in severe times. Furthermore, the global pandemic is highlighting new inequalities, especially among older people whose consequences need deep investigation.

3. Methodology

3.1. Data

This study uses SHARE data, available on the official internet page of the project.

3.2. Study design and participants

In this research, comparative analyses of Wave 7(Börsch-Supan, 2022) and Wave 8 (Börsch-Supan, 2022) of SHARE data are used to assess the relationship between different factors and life satisfaction at basic and post-covid models. The target population is represented by 30615 adults aged ≥50 years including both waves.

3.3. Data extraction and data preparation

For the purposes of the study, six modules of wave 7 and seven modules of wave 8 data are used, including questions about activities, physical and mental health, personal and behavioural characteristics, housing conditions, etc. The unique number of the respondents ‘merged’ is used to merge the different modules. Digital encoding is applied to numerical variables. Qualitative variables with several levels are converted into factor characteristics. For some socio-demographic features binning is performed at several levels. Respondents younger than 50 are removed from the data. Factor analysis is used to generate four factors that are then dichotomized into two categories. Since Wave 7 was conducted in 2017 and Wave 8 in 2020-2021, for all the respondents there is a correction in the age with 2-3 years, so a dummy variable ‘ageing’ is created for Wave 8 data to show the effect of ageing, which takes the value of 1 if the respondent changes the age group and the value of 0 otherwise.

3.4. Life satisfaction

In the chosen target characteristic 'ac012_' respondents rate their satisfaction with life on a scale from 0 to 10. The average value of the answers in the sample is 7.73 in wave 7 data, and 7.88 in wave 8 data, or around 8 both before and during the pandemic. Based on this limit the target variable is converted into a dichotomous variable with two classes: class 1 /respondents dissatisfied with their lives/ and class 0 /respondents satisfied with their lives/. The choice of cut-off value is also based on the literature review. According to Ponocny et al. (2015), only strongly positive ratings (8+) can be taken as a clear dominance of positive over the negative aspects of people's feelings.

3.5. Statistical analysis

Chi-squared statistics are performed to analyze the differences in the distribution of the categorical variables with reference to life satisfaction for both datasets. P-values<0.05 are considered statistically significant. Decision trees and subset selection methods are applied in order to find the best predictors of life satisfaction of older people in different scenarios. Binary logistic regression models are estimated for both waves to examine the association between life satisfaction and different factors. Modification of the initial model for Wave 8 is used to show whether friends net, use of internet, sport and health care factors affect the life satisfaction of older people in Europe.

The following notations are used in the logistic regression equations: LS_i-Life Satisfaction, O_i-Optimism, I_i-Illness, A_i-Age, S_i-Single, J_i-Job situation, C_i-Country, T_i-type of building, AG_i-Agreeableness, EX_i-Extraversion, N_i-Neuroticism, OP_i-Openness, AC_i-Active Life, D_i-Depression, IN_i-Income, M_i-Marital status, CO_i-conscientiousness, E_i-Education, VS_i-Vigorous sport, H_i-Hospitalisation, IT_i-Internet, AL_i-Alcohol consumption, V_i-Flu vaccination, $S2_i$-Synergy2:No partnership & age>70, $S3_i$-synergy3:low extroversion/ conscientiousness/openness or high neuroticism, $S4_i$-synergy4:high level of neuroticism and single, where i = 1, …, N and N = number of respondents in both Wave 7 and Wave 8 data.

Equation (1) is used to analyze determinants of life satisfaction before the outbreak. Equation (2) is used as a baseline model during the pandemic. Equation (3) is used as a modified post-Covid model where additional factors like VS_i, IT_i, AL_i ,H_i, V_i are included.

$$LS_i = \beta_0 + \beta_1 O_i + \beta_2 I_i + \beta_3 A_i + \beta_4 S_i + \beta_5 J_i + \beta_6 T_i + \beta_7 C_i + \beta_8 AG_i + \beta_9 EX_i + \beta_{10} N_i + \beta_{11} OP_i + \beta_{11} AC_i + \beta_{12} D_i + \beta_{13} IN_i + \beta_{14} M_i + \beta_{15} S2_i + \beta_{16} S3_i + \beta_{17} S4_i + \varepsilon_i \quad (1)$$

$$LS_i = \beta_0 + \beta_1 O_i + \beta_2 I_i + \beta_3 A_i + \beta_4 S_i + \beta_5 J_i + \beta_6 T_i + \beta_7 C_i + \beta_8 AG_i + \beta_9 EX_i + \beta_{10} N_i + \beta_{11} CO_i + \beta_{12} E_i + \beta_{13} AC_i + \beta_{14} D_i + \beta_{15} IN_i + \beta_{16} S2_i + \varepsilon_i \quad (2)$$

$$LS_i = \beta_0 + \beta_1 O_i + \beta_2 I_i + \beta_3 A_i + \beta_4 S_i + \beta_5 J_i + \beta_6 T_i + \beta_7 C_i + \beta_8 AG_i + \beta_9 EX_i + \beta_{10} N_i + \beta_{11} CO_i + \beta_{12} E_i + \beta_{13} AC_i + \beta_{14} D_i + \beta_{15} IN_i + \beta_{16} S2_i + \beta_{17} VS_i + \beta_{18} H_i + \beta_{19} IT_i + \beta_{20} AL_i + \beta_{21} V_i + \varepsilon_i \quad (3)$$

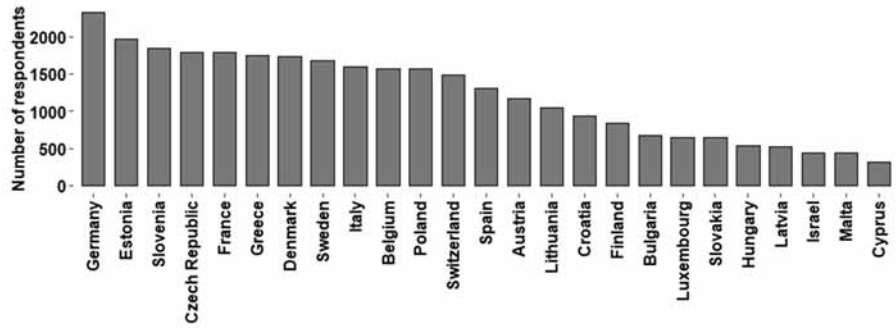
The response variable LS_i indicates whether the respondent is satisfied with life or not. Synergy variables are interaction terms between two or more conditions. The β_i coefficients show the effect which each predictor has on an individual's life satisfaction.

4. Results

4.1. Sample overview and demographics

In this study, 30615 respondents from 24 European countries and Israel are included. Figure 1 displays the distribution of the respondents in the sample per countries.

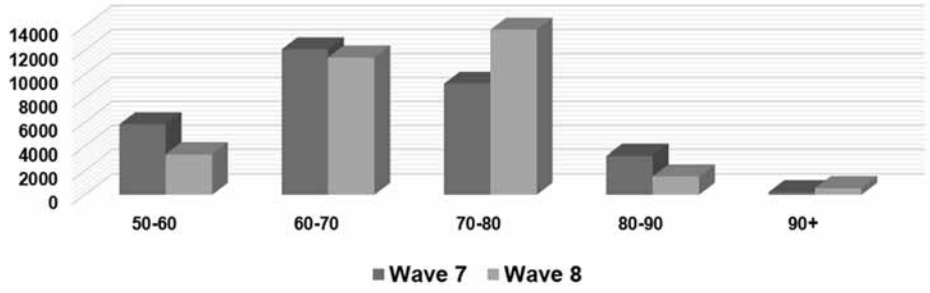
Figure 1. Distribution of respondents per countries



Source: Author's graph.

Figure 2 shows there is an uneven distribution of the respondents by age groups in both scenarios. Since all the respondents were older during the pandemic, some important changes are observed in Wave 8 data, namely an increase in the numbers in age groups 70-80 and 90+.

Figure 2. Distribution of respondents per age groups in Wave 7 and Wave 8 data

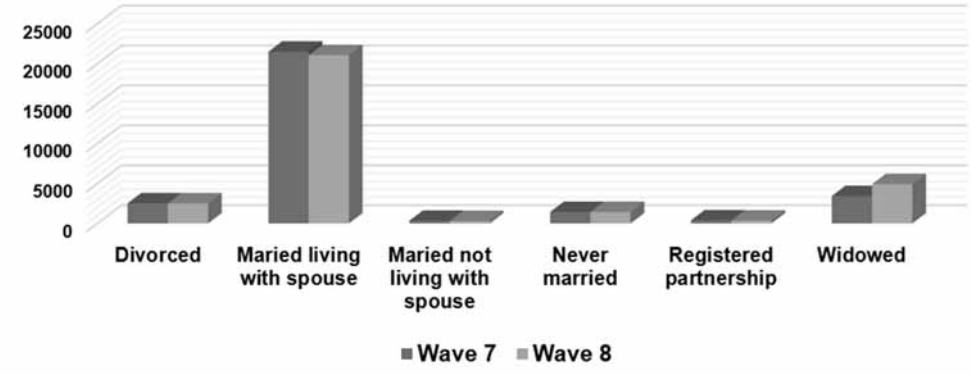


Source: Author's graph.

Regarding marital status, there is an increase of widowed older people at the expense of a decrease in the number of married and those with registered partnerships (Figure 3) due to older age and a lot of deaths during the pandemic.

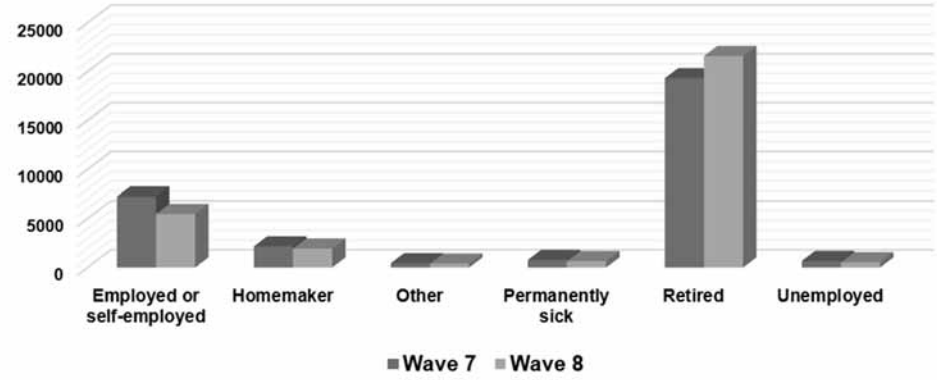
Concerning the job situation, the most important change is the transition from employment to retirement (Figure 4) due to the older age and job losses related to closed businesses during the pandemic.

Figure 3. Distribution of respondents per marital status in Wave 7 and Wave 8 data



Source: Author's graph

Figure 4. Distribution of respondents per job situation in Wave 7 and Wave 8 data



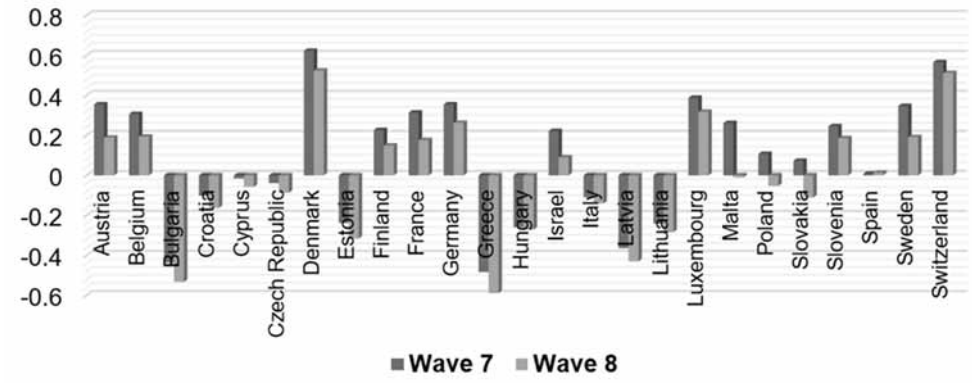
Source: Author's graph.

4.2. Factor analysis of the variables

Three factors (Optimism, Active life and Depression) are generated in data from both waves based on the analyses of Angelova (2021) and another factor Illness is generated from module gv_health: synthetic characteristics related to the general health status of the respondents.

Comparison between the levels of the four factors per countries shows similar results for most countries. The level of optimism decreased in all countries except for Hungary (Figure 5). It is visible that older people in Bulgaria are one of the biggest pessimists in Europe in both scenarios.

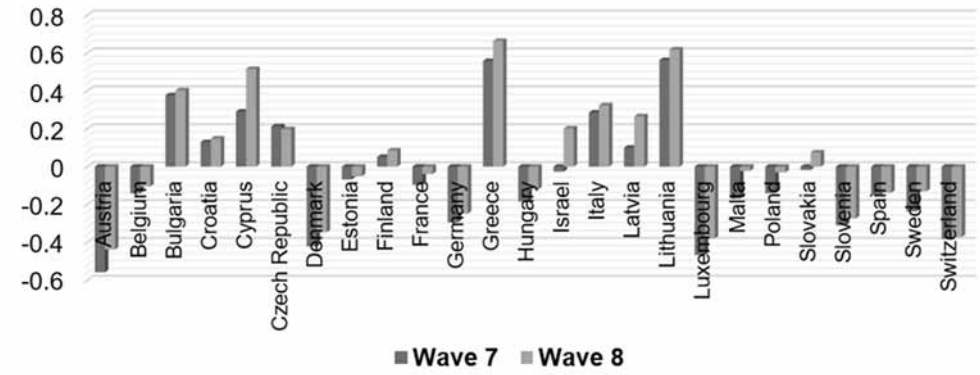
Figure 5. Factor Optimism before and during the pandemic



Source: Author's graph.

On the other hand, levels of depression increased in all countries except for Switzerland (Figure 6) due to higher level of stress during the pandemic. It is visible that older people in Bulgaria are one of the most depressed in Europe in both scenarios.

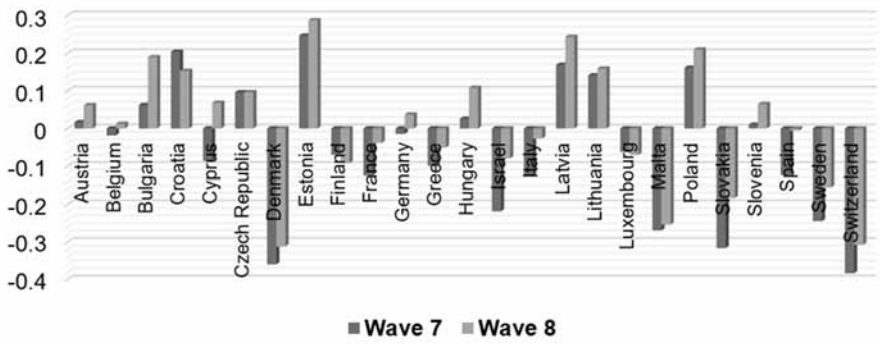
Figure 6. Factor Depression before and during the pandemic



Source: Author's graph.

Levels of illness, due to the severity and the fast spread of the virus, increased in all countries except for the Czech Republic where it stays at the same level and Croatia and Luxemburg where a decrease is observed (Figure 7). It is visible in Bulgaria both before and during the pandemic the levels of illness are one of the highest. However, during the pandemic, the levels of illness in Bulgaria increased drastically while in most countries the increase is much slighter.

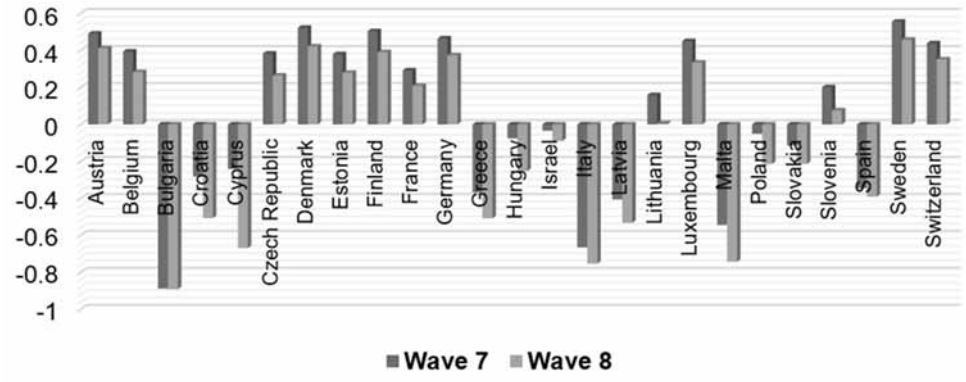
Figure 7. Factor Illness before and during the pandemic



Source: Author's graph.

In all countries, except in Bulgaria, the active live of older people decreased drastically (Figure 8) which is due to the restrictions of activities during lockdowns. The only country where levels of active life haven't changed since the outbreak is Bulgaria. However, the levels of active life in Bulgaria are also the lowest in Europe, so older people in Bulgaria are not active in general.

Figure 8. Factor Active life before and during the pandemic



Source: Author's graph.

4.3. Determinants of life satisfaction before and during the pandemic – testing of hypotheses

H1: Life satisfaction depends on different factors

For the analyses, 23 independent features in Wave 7 and 28 independent features in Wave 8 are used. Results of the Chi-squared test reveal the variety of factors that contribute to life satisfaction in both scenarios. Before the pandemic the dissatisfied people are more often women, without partners, low educated, unemployed or permanently sick, living in bigger cities and big buildings, with low levels of extraversion, openness, conscientiousness and

agreeableness, with high levels of neuroticism, with low income, inactive, pessimists, ill and depressed.

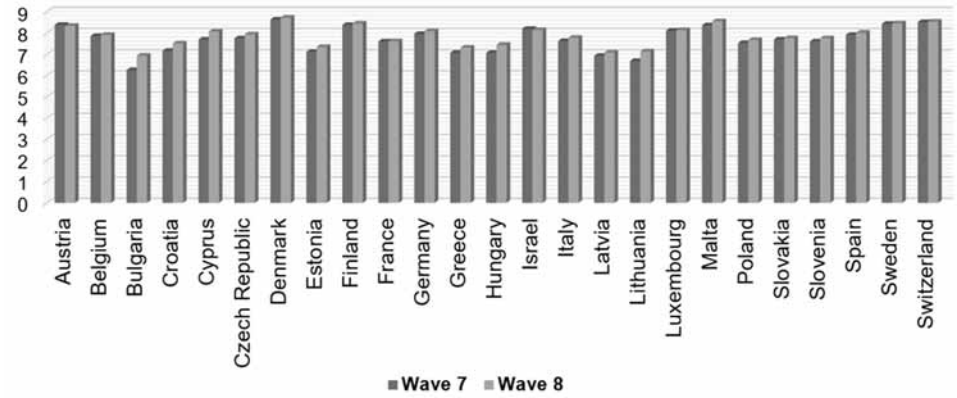
After the outbreak, the independent factors for life satisfaction are country, age, partnership, education, job situation, type of building, personality traits, income, active life, optimism, depression, illness, type of household, frequency of sports activities, alcohol consumption, friends net, hospitalization, flu vaccination, health insurance and usage of internet.

H2: Life satisfaction varies across the investigated countries

In most countries, the average level of life satisfaction increased during the pandemic (Figure 9) proving the results from other researches about the resilience of older people in critical situations.

In Bulgaria, we see before the pandemic the level of life satisfaction is the lowest in Europe, while during the pandemic the level is very close to that in several other countries. Moreover, Bulgaria is the country where during the pandemic the most drastic increase in the level of satisfaction is observed.

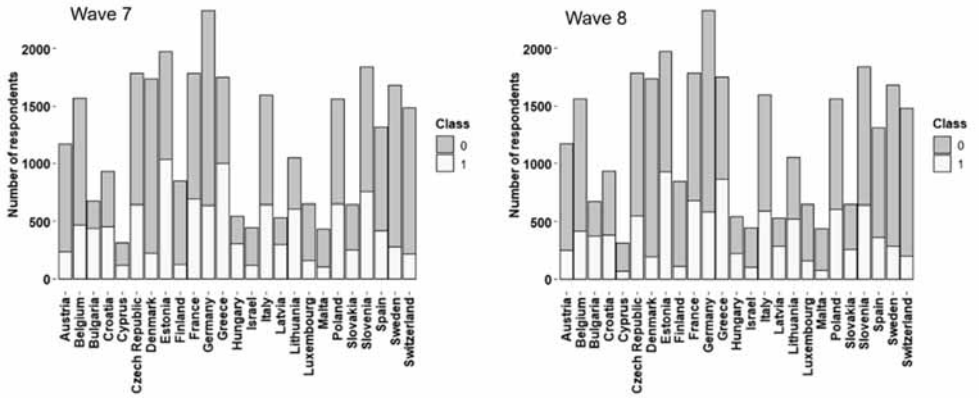
Figure 9. Changes in the average level of life satisfaction per countries before and during the pandemic



Source: Author's graph.

The baseline ratio of dissatisfied to satisfied people is 35.46%: 64.54% before and 31.66%: 68.34% after the outbreak of the global pandemic (Figure 10).

Figure 10. Distribution of satisfied (class 0) and dissatisfied people (class 1) before and during the pandemic



Source: Author's graph.

H3: Determinants of life satisfaction change since the outbreak of global pandemic

Table 1 shows the result of the logistic regression model for Wave 7 data. Results reveal factors increasing the probability of being dissatisfied before the outbreak are: aged 50-70; ill; single; depressed; no partnership, divorced, widowed or never married; unemployed or permanently sick; with low level of agreeableness, extraversion, openness; low or medium income, being at the same time single and with high level of neuroticism /anxiety/; being resident of Belgium, Bulgaria, Croatia, Check Republic, Estonia, France, Germany, Greece, Italy, Latvia, Lithuania, Hungary, Poland, Slovakia, Slovenia, Spain. At the same time factors that decrease the probability of being dissatisfied are: optimism; living in a house or housing complex; low level of neuroticism; lack of activities; being in no partnership, divorced, widowed or never married and at the same time aged over 70; being in one or more of the following personality states: high extroversion, high level of creativity and imagination, high level of agreeableness or low level of anxiety; being resident of Denmark or Finland.

Testing the baseline model with Wave 8 data with the same variables, results show factors that increase the probability of being dissatisfied during the pandemic are: being ill, aged 50-70, single, unemployed or permanently sick, low level of agreeableness, extraversion, conscientiousness, low education, lack of activities, depression, low income, being resident of Belgium, Bulgaria, Croatia, Estonia, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Poland, Luxemburg, Slovakia, Slovenia. At the same time, factors that decrease the probability of older people to be dissatisfied during the pandemic, using the baseline model, are optimism, living in a house of housing complex for the elderly, low level of neuroticism, having no partner and at the same time aged over 70, being resident of Cyprus, Finland, Denmark, Malta, Sweden, Switzerland. The variable that represents the effect of ageing shows no statistical significance, so it is dropped from the final model.

Table 1. Determinants of life satisfaction before the pandemic – logistic regression output (Wave 7 model)

Variables	Estimate	Std. Error	z value	Pr(>|z|)	Signif.
(Intercept)	-1.064	0.136	-7.819	5.33E-15	***
Optimism: Yes	-1.251	0.035	-35.521	< 2e-16	***
Illness: Yes	0.364	0.036	10.222	< 2e-16	***
Age: 50-70	0.162	0.042	3.851	0.000118	***
Single: Yes	0.270	0.085	3.188	0.001432	**
Marital status: No partner, divorced, widowed or never married	0.168	0.079	2.125	0.033576	*
Job situation: Unemployed or permanently sick	0.423	0.067	6.334	2.39E-10	***
Type of building: House of housing complex for elderly	-0.114	0.035	-3.263	0.001102	**
Belgium	0.361	0.118	3.047	0.00231	**
Bulgaria	1.508	0.143	10.523	< 2e-16	***
Croatia	0.963	0.128	7.540	4.69E-14	***
Cyprus	0.213	0.187	1.141	0.253924	
Czech Republic	0.254	0.113	2.244	0.024852	*
Denmark	-0.285	0.131	-2.177	0.029468	*
Estonia	1.160	0.110	10.541	< 2e-16	***
Finland	-0.752	0.152	-4.943	7.71E-07	***
France	0.822	0.113	7.249	4.21E-13	***
Germany	0.401	0.111	3.606	0.000311	***
Greece	0.730	0.115	6.355	2.08E-10	***
Hungary	1.345	0.147	9.157	< 2e-16	***
Israel	0.219	0.167	1.313	0.18916	
Italy	0.523	0.118	4.445	8.78E-06	***
Latvia	1.014	0.149	6.829	8.53E-12	***
Lithuania	1.009	0.125	8.085	6.20E-16	***
Luxembourg	0.290	0.149	1.942	0.052094	.
Malta	0.093	0.175	0.532	0.594388	
Poland	0.665	0.117	5.693	1.25E-08	**
Slovakia	0.631	0.145	4.342	1.41E-05	***
Slovenia	1.105	0.112	9.855	< 2e-16	***
Spain	0.338	0.122	2.759	0.005793	**
Sweden	-0.150	0.123	-1.214	0.224619	
Switzerland	-0.184	0.131	-1.408	0.159231	
Agreeableness: low	0.093	0.034	2.735	0.006244	**
Extroversion: low	0.231	0.037	6.231	4.62E-10	***
Neuroticism: low	-0.294	0.041	-7.203	5.88E-13	***
Openness: low	0.121	0.039	3.119	0.001814	**
Active life: No	-0.082	0.048	-1.718	0.085773	.
Depression: Yes	0.709	0.036	19.680	< 2e-16	***
Income: low	0.341	0.040	8.509	< 2e-16	***
Income: medium	0.116	0.052	2.239	0.025127	*
Synergy2: no partner & aged>70	-0.331	0.072	-4.607	4.08E-06	***
Synergy3: high extroversion/ high openness / high agreeableness / low neuroticism	-0.255	0.076	-3.342	0.000832	***
Synergy4: single with high neuroticism	0.303	0.072	4.190	2.79E-05	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Source: Author's calculations.

Table 2. Determinants of active life during the pandemic – logistic regression output (Wave 8 –post-Covid model)

Variables	Post Covid model Wave 8				
	β	Std. Error	z	Pr(>|z|)	Signif.
(Intercept)	-1.290	0.121	-10.67	< 2e-16	***
Optimism: Yes	-1.290	0.041	-35.47	< 2e-16	***
Illness: Yes	0.329	0.040	8.31	< 2e-16	***
Age: 50-70	0.245	0.043	5.72	1.10E-08	***
Single: Yes	0.467	0.050	9.25	< 2e-16	***
Job situation: Unemployed or permanently sick	0.470	0.072	6.54	6.10E-11	***
Type of building: House of housing complex for elderly	-0.083	0.035	-2.36	0.0183	*
Belgium	0.290	0.120	2.41	0.0158	*
Bulgaria	1.053	0.140	7.50	6.26E-14	***
Croatia	0.635	0.129	4.93	8.41E-07	***
Cyprus	-0.514	0.201	-2.56	0.010	*
Czech Republic	0.132	0.114	1.16	0.246	
Denmark	-0.404	0.136	-2.978	0.0029	**
Estonia	0.940	0.110	8.513	< 2e-16	***
Finland	-0.807	0.159	-5.080	3.78E-07	***
France	0.835	0.115	7.291	3.09E-13	***
Germany	0.283	0.113	2.507	0.0122	*
Greece	0.395	0.116	3.411	0.0006	***
Hungary	0.727	0.148	4.917	8.79E-07	***
Israel	-0.017	0.173	-0.097	0.9226	
Italy	0.429	0.118	3.627	0.0003	***
Latvia	0.965	0.148	6.517	7.17E-11	***
Lithuania	0.690	0.124	5.551	2.84E-08	***
Luxembourg	0.405	0.149	2.722	0.0065	**
Malta	-0.498	0.190	-2.625	0.0087	**
Poland	0.426	0.117	3.625	0.0003	***
Slovakia	0.585	0.144	4.067	4.75E-05	***
Slovenia	0.794	0.113	7.021	2.20E-12	***
Spain	0.188	0.124	1.514	0.1301	
Sweden	-0.227	0.125	-1.821	0.0687	.
Switzerland	-0.243	0.133	-1.830	0.0672	.
Agreeableness: low	0.110	0.034	3.203	0.0014	**
Extroversion: low	0.151	0.036	4.219	2.45E-05	***
Neuroticism: low	-0.291	0.035	-8.387	< 2e-16	***
Conscientiousness: low	0.137	0.037	3.681	0.0002	***
Education: low	0.082	0.038	2.147	0.0318	*
Active life: No	0.123	0.041	2.980	0.0029	**
Depression: Yes	0.676	0.037	18.370	2.28E-75	***
Income: low	0.245	0.041	5.930	3.03E-09	***
Income: medium	0.000	0.052	0.006	0.9949	
Synergy2: no partner & aged>70	-0.155	0.064	-2.432	0.0150	*
Vigorous sports: Weekly	-0.074	0.036	-2.071	0.0384	*
Hospitalisation last 12 months: Yes	0.160	0.045	3.534	0.0004	***
Flu vaccination: Yes	-0.072	0.038	-1.891	0.0586	.
Use of internet in past 7 days: Yes	-0.103	0.040	-2.559	0.0105	*
Alcohol consumption the last 7 days: Yes	0.071	0.036	1.966	0.0493	*

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Source: Author's calculations

In the post-Covid model some additional variables, significant independent factors for life satisfaction, are added. The results show being hospitalised in the last 12 months and drinking alcohol regularly increases the probability of being dissatisfied. On the other hand, doing vigorous sports, having flu vaccination and using the Internet regularly are factors that decrease the probability of being dissatisfied (Table 2).

Interesting is that factors like household type, friends net and health insurance are strong independent predictors of life satisfaction, but they don't show explanatory power in the multivariate logistic regression.

The estimated models don't have very high explanatory power due to the determinants that are not included in the research, but the literature review shows they also affect life satisfaction.

5. Discussion

The analyses prove there are significant changes in older people's attitudes towards well-being and life satisfaction. Estimated models show life satisfaction depends on a mixture of drivers. The results reveal one of the most important factors in both scenarios is the country of residence, which is in line with the finding of Angelova (2021) that the country is the most significant predictor of the behaviour of older people absorbing the effect of various factors. In another research, Yordanov et al. (2022) show that each country has its strengths and weaknesses in terms of its economic development, natural resources and social benefits.

Moreover, living in a house is also proved to be a factor that decreases the probability of being dissatisfied in both scenarios. One possible explanation is that houses allow more privacy, safety, silence and comfort. According to Gifford (2007), high-rises are less satisfactory than houses, because they are not optimal for children, social relations are more impersonal, helping behaviour is less, and crime and fear of crime are greater. Another explanation is that houses are usually surrounded by green spaces that help release stress, while tall buildings are typical for big cities with a lot of traffic and pollution. Moreover, during the pandemic, when 'stay-home' measures are imposed, it is not surprising that people feel more satisfied in a private house, where they can go out and do some gardening or other activities that make them feel happier (Sunga, Advincula, 2021).

Concerning the demographic factors, the research shows that younger respondents (aged 50-70) are more likely to be dissatisfied in both scenarios. One possible explanation consistent with other authors (Solé-Auró et al., 2018; Dingemans, Henkens, 2019) could be that people feel happier around retirement age. Another explanation is that people at a later age get used to difficulties more easily (Kwong et al., 2021; Brandtstädter, Renner, 1990; Araki, 2022; López et al., 2020). Another result is that the lack of a partner is a very important factor for being dissatisfied. This may be due to the fact that older people need more support and help, and usually, their children have their own living places and their partner is the most important person in their everyday life (Solé-Auró, Cortina,2019). Another factor that increases the probability of being dissatisfied in both scenarios is being unemployed or permanently sick. Possible explanations are that good health and activities are very important for older people's

well-being and self-care independence, older adults who are working, can meet and exchange ideas with other people and being busy makes them not think about their problems and have better mental health (Bjelajac et al., 2019; Arpino, Gumà, Julià, 2018; Angelini et al., 2012).

On the other hand, the baseline model in both scenarios reveals two very important factors that decrease the probability of being dissatisfied. The first one, being an optimist, is also proven to be a strong predictor of life satisfaction by other researchers (Leung et al., 2005). The second one, having a low level of neuroticism, is also consistent with previous studies (Hufer, Riemann, 2021). On the other hand, low level of agreeableness and extraversion are among the predictors that increase the probability of being dissatisfied which is also in line with other studies (Fors Connolly, Johansson, 2021). Moreover, Schimmack (2004) also proves the 'Big Five' are among the strongest predictors of life satisfaction.

One interesting finding in the post-COVID model is that while before the pandemic openness was one of the factors that determined life satisfaction, since the outbreak it is substituted by conscientiousness. One possible explanation is that personality changes with facing difficulties and new challenges in life like social isolation, traumatic experiences and environmental factors (Harris et al., 2016; Rubeena, 2020). Meanwhile, concerning socio-economic factors, before the pandemic low or medium income are among the factors that increase the probability of being dissatisfied, while during the pandemic medium income is no longer a factor. One possible reason is that because of restrictions on activities and closed restaurants and shops, people spend less and save more money (Yordanov et al., 2022). It is interesting, that since the outbreak low education appears to be one of the factors that increase the probability of being dissatisfied, while before the pandemic education is not among the significant factors. One possible explanation is that people with higher education have better jobs, they are better informed and make better decisions, which is very important for mental health and well-being during the pandemic (Ilies et al., 2019).

The biggest change since the pandemic concerns the effect of active life on life satisfaction. Results show that before the pandemic, inactive people were more satisfied with life than the active, while since the outbreak the situation has been the opposite. Moreover, the statistical significance of this factor since the outbreak has increased a lot. One possible explanation is that in ordinary scenarios most older people are enjoying their lives with passive activities like reading, watching TV, listening to the radio and spending time with family (Cho et al., 2018). Thus, before the pandemic older people are not thinking much about their active life, because there are no barriers. Moreover, according to Wicker and Frick (2015), the time spent on intensive physical activity is negatively related to subjective well-being. Another explanation is that before the pandemic lonely older people dissatisfied with life were searching for activities that would make life more interesting, like meeting people, going out, travelling, etc. This could be the reason since the outbreak's lack of activities increases the probability of being dissatisfied (Zhang et al., 2020). The pandemic causes more stress and depression, and the limitation of activities deepens mental health problems. According to Yordanov (2021), social distancing causes increased stress levels, depression and sleep disorders. According to Beall et al. (2022) participation in outdoor activities and exposure to nature improve mental well-being.

Regarding the additional factors in the post-Covid model it is found being hospitalised in the last year increases the probability of being dissatisfied. A possible explanation is that

hospitalization causes strong anxiety and depression (Vlake et al., 2021). Another factor that increases the probability of being dissatisfied during the pandemic is regular alcohol consumption. The possible reason is that people who drink alcohol regularly either feel lonely or have mental health problems, or try to cope with stress, or search for pleasure or are socially influenced (Mäkelä et al., 2015; Abbey, 1993). Thus, there is a positive relationship between dissatisfaction and alcohol consumption in both directions.

On the other hand, an additional factor in the post-Covid model that decreases the probability of being dissatisfied is doing vigorous sports. One possible explanation is that sport helps release stress and be in good health (Kaur et al., 2020). Moreover, it is a good way to distract from everyday bad news about the victims of the pandemic. Another factor that decreases the probability of being dissatisfied is having a flu vaccination. This may be due to the increased campaigns about the benefits of vaccinations in the media, that make older people feel safer if they have one. According to Conlon et al. (2021), influenza vaccination is associated with decreased positive COVID-19 testing and improved clinical outcomes. One can assume older people who are afraid of infections will prefer to have the vaccine as protection, which will make them feel more satisfied (Dymecka, Gerymski, Machnik-Czerwik, 2021).

The last additional factor positively correlated to life satisfaction is regular Internet usage. One reason is that the Internet allows people to stay connected with their family and friends during the restrictions. Moreover, the Internet gives the opportunity to work or study from home (Mochón, 2021). According to Karakose et al. (2022), there is a positive relationship between COVID-19-related quality of life and loneliness, and that loneliness positively predicts Internet addiction. Moreover, Venuleo et al. (2020) detected three motives for Internet use being leisure and social interaction, knowledge and learning/working.

6. Conclusion

The results show the feeling of satisfaction is a subjective process that depends on multiple predictors, thus confirming the first hypothesis of the research. The research provides an up-to-date picture of the changes in the behaviour of older people in Europe with a focus on the specific challenges related to the pandemic.

Findings emphasize the need to invest in mental health interventions, prevention and coping strategies focusing on improving the life satisfaction of older people. Knowing the main drivers for life satisfaction, policymakers could design specific social policies directed to each factor that could lead to an increase in the level of satisfaction, which will in turn indirectly foster economic growth.

Talking about the factors of age and partnership, policymakers should focus on the development of programmes aiming at reducing loneliness and social isolation (Fakoya et al., 2020) like social bonding, social skills training, support groups and educational programs (Andersson, 1998), creating age-friendly communities, including housing and technology (Van Hoof et al., 2019).

As for the factors of income, education and job situation, appropriate action is social policy focused on the bottom of the income distribution, as well as implementing educational policy

aiming to afford more efficient education and skills (Swagel, Boruchowicz, 2017). According to Affandi et al. (2019), high-quality educational infrastructure and a curriculum that focuses on enhancing cognitive skills are key to ensuring higher economic growth.

Possible solutions focused on factors of optimism, depression and changes in personality traits could be an integration of mental health policy into public health policy and general social policy (Jenkins, 2003).

As for the factors of illness and hospitalisation, policymakers should focus on improving the quality of health care services, enhanced training to manage common medical conditions, home-based services and development of information technology and caregiver support (Kripalani et al., 2014), which will lead to improved patient experience and saved costs (Walsh et al., 2016).

In order to promote the factors of sport and active life, the necessary measures are setting- and target-group-specific policies, as well as policies that make changes to the environment and transport infrastructures (Gelius et al., 2020), that encourage people to participate in more physical activities.

As for factor Internet usage, policymakers should focus on the improvement of digital skills in collaboration with private and public stakeholders, self-training promotion strategies and local training initiatives (Fuller, 2020), better Internet usage opportunities or benefits, as well as mitigating the digital divide via increase of social programs adapted to disadvantaged groups in their communities (Van Dijk, 2020).

Regarding the factor of regular alcohol consumption, policymakers should support community programs for high-risk social groups, develop non-alcoholic environments, socio-professional reintegration, and relapse prevention (Nistor, 2019), that are relevant to improvement of the mental health.

To support factor flu vaccination, the needed policies are publicity promoting vaccines, better access to vaccination via services such as workplaces and pharmacies, as well as increased knowledge about the importance of vaccination for disease prevention, and medical office staff trained to assess the vaccination needs of patients (Anderson, 2014).

Regarding factor country, policymakers should focus on the development of infrastructure, supportive environments and spaces taking into account different aspects of design, dimensions and colours (Sungur, Polatoglu, 2010) and special planning aiming at more green spaces associated with better health of the residents (Maas et al., 2006), as well as implementation of regulatory policy, insuring political and bureaucratic transparency and anticorruption measures (Dimant, Tosato, 2018). On one hand, changing the living environment design will increase the physical activity of people (Giles-Corti et al., 2015), which is one of the drivers of life satisfaction. On the other hand, these policies will have a positive effect on the country's image and indirectly affect foreign direct investments, which in turn will foster economic growth.

Focusing on Bulgaria, the results show older people there are the biggest pessimists and the most depressed in Europe. Moreover, during the pandemic extreme increase in the levels of illness is observed while the very low level of activeness stays at the same level. Thus,

specific social policies could be implemented on a national level in response to these issues. Knowing that optimism and depression are proven to be one of the strongest predictors of life satisfaction, policymakers in Bulgaria should focus their efforts on social policies for reducing loneliness and improving the mental health of older people, including training programs for physical exercises like yoga, yoga laughter, tai-chi, dances; for relaxation exercises like breathing, meditation, music therapy, drawing, etc.; organising tourism activities and voluntary work; developing measures like social assistants and private assistants that support older people in their daily life. These policies would positively affect the high levels of illness and the low level of activeness in Bulgaria.

The research generates several findings. First, the results prove in both scenarios life satisfaction depends on the mixture of drivers. Moreover, to the best of the author's knowledge, in no other research, so many drivers are considered together and so deeply investigated. Second, it adds new knowledge about the significant changes in older people's mindset as well as providing the possible reasons for the changes. On one hand, changes in the personality traits are observed. On the other hand, in comparison with the times before the pandemic where low and medium income are significant predictors of life satisfaction, in the post-Covid period only low income is crucial for being satisfied. Furthermore, during the pandemic low education is one of the factors that increase the probability of being dissatisfied, while before that it wasn't the case. Besides that, before the pandemic, inactive people were more satisfied with their lives than the active, while since the outbreak the situation has been the opposite. Moreover, the post-Covid model reveals additional factors that affect life satisfaction. On one hand, hospitalization and regular alcohol consumption increase the probability of being dissatisfied. On the other hand, additional factors that decrease the probability of being dissatisfied during the pandemic are doing vigorous sports, flu vaccination and regular Internet usage. The results are important to the design and implementation of social policies ultimately aiming to foster economic growth. The final contribution of the research reveals detailed recommendations for such social policies, based on the results and supported by an extensive literature review, as well as recommendations for policies with emphasis on Bulgaria.

The results could be implied in European, national, and local policies, directed towards care of human life and happiness, improving the mental health and quality of life of older people as well as keeping this group involved in the social and economic life. Implementation of such social policies could lead to better performance of the labour force and higher productivity (Oswald et al., 2015) which could positively affect economic growth (Korkmaz, Korkmaz, 2017; Patel, 1986; Adejumo et al., 2013).

The results suggest a direction for a better fit between academic research and the needs of policymakers and practitioners aiming at an increase in life satisfaction and economic development.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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Ainel Abuova[1]
Mukhit Assanbayev[2]
Talgat Basmurzin[3]
Talgat B. Kilybayev[4]
Alua Assanbayeva[5]

A COMPARATIVE ANALYSIS OF MARKETING RESEARCH IN UNIVERSITY WEBSITES: INSIGHTS FROM KAZAKHSTAN[6]

This study utilized a multi-faceted approach to explore marketing research strategies employed by Kazakhstani higher education institutions and their corresponding websites. The research highlighted gaps in current theory amid contemporary global crises and identified opportunities for enhancing the efficacy of marketing research. Utilizing official data from both Kazakhstani and foreign sources, the study conducted a comparative analysis of the 2016 and 2021 international Webometrics ratings of the top 10 university websites in Kazakhstan, observing a generally positive trend. The results generated actionable recommendations for improving marketing research, promoting educational services, and augmenting the effectiveness of university websites as primary marketing tools. These findings are expected to guide higher education institutions and policymakers in enhancing national educational competitiveness and efficiency amidst socioeconomic instability.
Keywords: Marketing of educational services; digital technologies in education; tools for promoting educational services; higher educational institutions
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1. Introduction

Higher education institutions are the sphere of training highly qualified personnel for the national economy. The significance of such training is enormous since highly trained

[1] *Ainel Abuova, title, Almaty Management University, Republic of Kazakhstan, e-mail: abuovaainel@gmail.com.*
[2] *Mukhit Assanbayev, Abai Kazakh National Pedagogical University, Republic of Kazakhstan, e-mail: mukhit.assanbayev@gmail.com.*
[3] *Talgat Basmurzin, Varna Free University, Varna, Bulgaria, e-mail: talgat.basmurzin@yahoo.com.*
[4] *Talgat B. Kilybayev, Abai Kazakh National Pedagogical University, Republic of Kazakhstan, e-mail: talgat.kilybayev@gmail.com.*
[5] *Alua Assanbayeva, Al-Farabi Kazakh National University, Republic of Kazakhstan, e-mail: aassanbayeva@aol.com.*
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professionals are the future of the country, its development and progress. New socio-economic challenges are making adjustments and creating the need to change many areas. For example, with the beginning of a period of socio-economic instability in 2020 (the emergence of global challenges, the COVID-19 pandemic, etc.) around the world, completely new approaches and socio-economic tools have become in demand (Dzhulai, 2022).

For the first time, the education sector was compelled to swiftly adapt and introduce new teaching strategies. The focus here is on distance learning, which was practised before, but never at the current scale. The ongoing pandemic thrust both educators and students into an unprecedented situation. Many faced challenges due to the lack of necessary technical resources, as curriculums and software were not initially intended for this modality (Fomina, Kolomiiets, 2022). Furthermore, extended hours in front of a screen, an unavoidable component of distance learning, pose health concerns. The world has quickly transformed, and society is necessitated to adjust to these shifts. It's a common understanding that the world, as we knew it, has forever changed. This crisis has significantly accelerated the progress of distance education. This development is not without its merits – specific groups of students exhibit a preference for consistent online learning at the university level. Typically, these are students from rural areas or distant cities who would benefit from being able to continue living at home while attending, for instance, an urban university (Dolhikh, 2023). This mode of education differs considerably from part-time learning and even surpasses it in some respects. When compared to traditional, full-time (in-person) education, the learning process in this new format is arguably less rigorous. The potential of this new educational form is bolstered by the technical resources now available to educators and students alike. The current demand is for the creation of specialized curriculums tailored to this mode of learning. Information about this type of education should be easily accessible on university websites. However, most higher education institution websites in Kazakhstan have yet to include such specific sections. These sections should provide comprehensive details about the necessary equipment, software for learning, course selection guidance, and so forth.

The purpose of the study is to identify new methodological approaches to conducting marketing research on the websites of universities of the Republic of Kazakhstan in conditions of socio-economic instability. The disclosure of the goal involves solving a number of tasks in the study:

- to investigate the theoretical approaches of Kazakh and foreign marketing in the field of educational services;
- to analyse modern global experience, to identify successful practices and effective tools for promoting educational services using the website in the face of global challenges and risks;
- to identify the strengths and weaknesses of the websites of the main universities in the Republic of Kazakhstan;
- to determine the main criteria for increasing the competitiveness of universities, including through the refinement and improvement of websites;
- to develop methodological recommendations for evaluating the university website;

- to develop recommendations for improving the effectiveness and improvement of university websites to improve the promotion of educational services in conditions of socio-economic instability.

The object of study is the university website as the main tool for promotional marketing of educational services. The originality of the study is conditioned by the fact that the object of the study was considered in modern conditions of socio-economic instability in the world and the Republic of Kazakhstan. Difficult socio-economic conditions were formed with a significant degree of influence of the COVID-19 pandemic. These conditions caused significant systemic changes in the entire global economy in 2020, the education sector was also subjected to the strongest impacts and underwent changes requiring regulation (Silagadze et al., 2022).

Therefore, there is a need for new research and scientific refinement of the mechanisms and tools of marketing research in the field of higher education, the studies by other authors on a similar object and problems have a certain gap in research. This is conditioned by the emergence of crisis phenomena and problems that are completely new for society and economic institutions in 2020 and continue to this day (Makaliuk et al., 2022). Marketing in the field of higher education has become much more widespread in foreign countries than in Kazakhstan (Leonow et al., 2019). Most universities in developed Western countries have been using marketing for a long time to improve the efficiency of their activities. For example, in the USA the idea of marketing in the field of education began to be implemented in the second half of the 20th century, and in Germany, the first comprehensive concept was formulated in 1980 by W. Sarges and F. Haeberlin (1980).

The issues of the general theory of marketing and marketing research were dealt with by world-famous researchers: F. Kotler, W. Wong, D. Saunders (1990; 2007; 2019), J.R. Evans, B. Berman (1990), J.-J. Lambin (2019), Ch. Shiv, A. Hyam (2017). Theoretical and practical problems of marketing in higher education have been addressed in the studies by reputable authors: M.Zh. Serikbayev (2016a; 2016b; 2016c; 2017), R.Ya. Vakulenko, A.A. Bulgachev, E.A. Ryzhova (2017), A.N. Sergeev (2016), N.I. Zelenskaya, Yu.V. Lavnikova (2013), I.I. Topilina (2010), I.L. Khizamutdinova (2015), O.B. Istomin (2019).

This manuscript has significant socio-economic implications, especially in the context of higher education and digital transformation in the face of unprecedented challenges such as the COVID-19 pandemic. From a social perspective, the manuscript underlines the necessity for educational institutions to adapt and evolve their methods of instruction and communication to accommodate the changing dynamics of the learning environment.

2. Literature Review

The effectiveness of university websites as marketing tools has been explored extensively in the literature. Abuova et al. (2021) conducted a case study in Kazakhstan, highlighting the increasing role of the Internet in marketing strategies. Concurrently, Mogaji (2016) discussed the international student recruitment process and the impact of website design on the decisions made by potential students. These studies underscore the importance of website

design and content in attracting prospective students, affirming the significance of the current research on the marketing research of university websites in Kazakhstan.

The issue of content is a critical one. Kasemsarn et al. (2023) identified the types of information that students sought from a postgraduate design course website, pointing out the necessity of a user-centred design. In the same vein, Ashraf and Thongpapanl (2015) investigated the impact of website interface features on sales performance, emphasizing that more information content is not always beneficial. These insights are crucial for the current study as they shed light on the importance of strategic content selection and presentation. Digital marketing strategies extend beyond the university websites themselves. Omar et al. (2021) demonstrated the impact of viral marketing strategies on social network sites on students' image. Such findings highlight the need for higher education institutions to adopt a comprehensive online marketing approach that encompasses both their own websites and social media platforms.

The role of marketing in enhancing the world ranking of universities is another important area of focus. Salahaldin and Atua's (2022) exploratory study in Iraqi private universities and colleges emphasized the potential benefits of effective marketing in higher education. Such a concept is pertinent for Kazakhstan universities that aspire to improve their global standing. Considering the broader perspective, Britz et al. (2006) provided a moral reflection from the perspective of the developing world on the fair distribution of information in the marketplace in the context of global capitalism. This view allows for a comprehensive understanding of the overarching dynamics that can influence the marketing strategies of universities, especially in developing countries like Kazakhstan.

Utepbergenov et al. (2019) study on the statistical research of problems of information support for innovative activity of enterprises in Kazakhstan provides valuable insights into the specific context of the current study. It may help identify the unique challenges faced in the local digital marketing landscape (Idrysheva et al., 2019). It is also important to note the role of digital tools in student interaction and perception. Alqudah et al. (2019) conducted an experimental study revealing the impact of educational infographics on students' interaction and perception in higher education. This study could offer valuable insights on how to optimize digital tools for improved user engagement.

Moreover, the quality of web information is an essential factor to consider. Macedo-Rouet et al. (2019) studied the benefits and limits of prompting on adolescents' evaluation of web information quality. Similarly, Firdaus et al. (2019) examined the openness of government website content using a text analysis method. Both studies may provide guidelines on how to present and structure information on university websites effectively.

In conclusion, the reviewed literature provides a comprehensive view of the various aspects of digital marketing in higher education. It underlines the importance of effective website design, strategic content selection, integrated marketing approaches, and the quality of web information. The current study will contribute to this body of knowledge by examining the marketing strategies of university websites in Kazakhstan, thus filling the gap in context-specific research in this field.

3. Materials and Methods

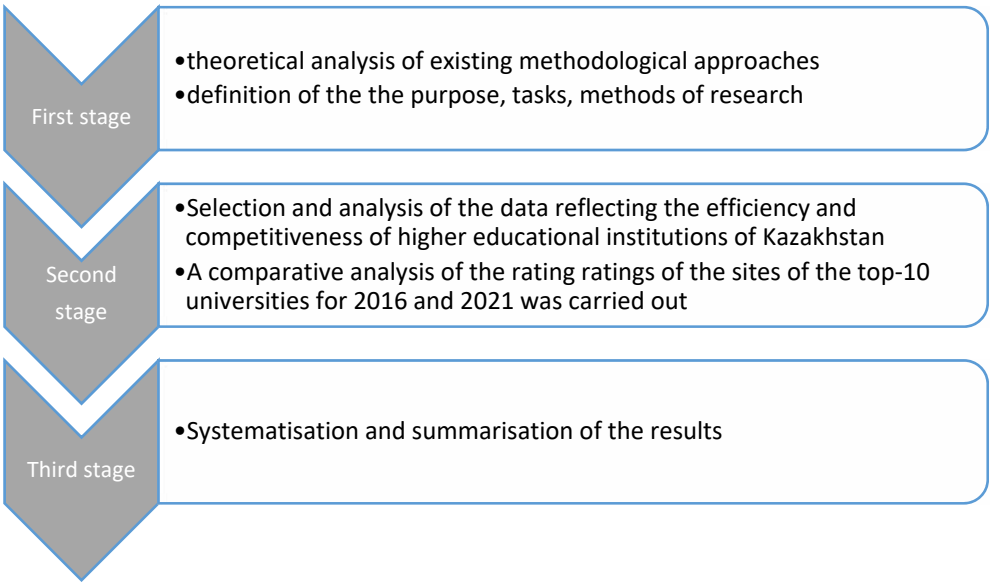
The study used a number of modern approaches to investigate the problem of marketing research. Theoretical methods and approaches, analysis and synthesis were used: analysis of Kazakh and foreign theoretical positions on marketing research and promotion of educational services, increasing competitiveness. The study pays attention to the identification of gaps in the theory, in connection with the acute crisis conditions that have arisen in the world today. Using the method of concretization and generalization, problems and gaps in research and theory were identified. The shortcomings and opportunities to improve the effectiveness of marketing research on websites of higher education institutions were investigated. The data were selected and a comparative analysis of the 2016 and 2021 rankings of the websites of the top-10 universities in the Republic of Kazakhstan in the international Webometrics rating was carried out. The use of Webometrics in this research is based on its broad scope, encompassing not just academic output but also other online activities pertinent to the university's mission. Given the study's focus on evaluating the marketing effectiveness of university websites in Kazakhstan, Webometrics offers a relevant and robust methodology. It allows us to quantitatively analyze and compare the digital marketing strategies of these institutions, as reflected in their web presence and visibility.

The results of the analysis indicated, in general, a positive trend. Over the past five years, the websites of higher educational institutions have been actively improved and filled up, and some of them have advanced to higher positions in the world ranking, which is very important in conditions of socio-economic instability. The degree of validity and reliability of the research of scientific statements and conclusions is provided by the analysis of a large array of official data from authoritative Kazakh and foreign sources. The following materials were considered: The Message of the Head of State Kassym-Jomart Tokayev (The President of Kazakhstan announced…, 2021); The State Program "Digital Kazakhstan" (State program "Digital Kazakhstan", 2017) and the Rating of universities in Kazakhstan according to the criteria of Webometrics, 2021 (Rating of universities ..., 2021).

The study was carried out in several stages. These stages are illustrated in Figure 1.

The study results can be used by specialists of higher educational institutions and public authorities in developing a strategy for the development of higher education in the country, improving its competitiveness and efficiency. Methodological recommendations can be used for a universal assessment of the website of a higher educational institution and the definition of targets for its further improvement. The wider use of qualitative research would allow the forming of a marketing strategy to increase the effectiveness of the promotion of educational services in difficult conditions of socio-economic instability.

Figure 1. Stages, on which the study was provided



4. Results and Discussion

Websites of universities of the Republic of Kazakhstan form the opinion of the international community about the entire system of higher education in the country. They are a kind of showcase by which they judge the university and where they find all the necessary information. The importance of developing and raising the level of the site has increased so much in recent years that the study of this aspect is included in the category of beyond relevant. And this relevance in the conditions of socio-economic instability continues to grow. The development of a marketing strategy by universities is necessary to increase their competitiveness and sustainability. The basic component of such sustainability, in addition to increasing state funding for the development of universities, is to increase the level of intensification of digital technologies (including the university website and social networks).

In the theory of modern marketing of educational services of higher educational institutions, it is the website that is the main marketing tool for promotion. However, not all universities in Kazakhstan realize the importance of the role of the official website in the establishment of the scientific and educational image in the Kazakh and foreign space.

The authoritative international rating, which is held twice a year by Webometrics testifies to the insufficient effectiveness of the websites of higher educational institutions in the Republic of Kazakhstan. The main criteria for ranking are occupancy, degree of support, and popularity of university websites (Rating of Universities…, 2021).

According to the international Webometrics rating (July 2021), the highest in the rating of Kazakh universities is Nazarbayev University. It ranks 915th out of 15.843 universities in the world. The top 10 universities of the Republic of Kazakhstan are presented in Table 1.

Table 1. Top-10 universities of the Republic of Kazakhstan in the international Webometrics ranking in 2021 and 2016

Name of the university	Rating in 2021 among universities of the Republic of Kazakhstan / among world universities		Name of the university	Ranking in 2016 among universities of the Republic of Kazakhstan / among world universities	
Nazarbayev University	1	915	Al-Farabi Kazakh National University	1	2011
Al-Farabi Kazakh National University	2	1782	K. Satbayev Kazakh National Technical University	2	2253
L.N. Gumilov Eurasian National University	3	2000	L.N. Gumilov Eurasian National University	3	2721
K. Satbayev Kazakh National Technical University	4	3792	S.D. Asfendiyarov Kazakh National Medical University	4	3110
S.D. Asfendiyarov Kazakh National Medical University	5	3792	S. Toraighyrov Pavlodar State University	5	3822
Akhmet Yesavi International Kazakh-Turkish University	6	3867	Karaganda State Technical University	6	4706
D. Serikbayev East Kazakhstan Technical University	7	4110	Shakarim Semipalatinsk State University	7	5573
Kazakh National Agrarian University	8	4505	E.A. Buketov Karaganda State University	8	5773
Karaganda State Technical University	9	4805	Auezov South Kazakhstan State University	9	6017
Abay Kazakh National Pedagogical University	10	4881	D. Serikbayev East Kazakhstan Technical University	10	6351

The study of the Webometrics rating data in comparison for 2016 and 2021 showed the characteristic dynamics of changes in the ratings of the websites of leading universities over the past five years. Nazarbayev University came out on top in 2021, although in 2016 it was not even among the top 10 leaders. It is a young (founded in 2010 on the initiative of N. Nazarbayev), a progressive university with a full, well-structured website. The university has a fairly high world ranking – 915th place (out of 12.000 participants). Abay Kazakh National Pedagogical University and Akhmet Yesavi International Kazakh-Turkish University, Kazakh National Agrarian University entered the top 10 in 2021 for the first time. Some universities left the top 10 in 2021 (compared to 2016). These include Toraighyrov Pavlodar State University, Shakarim Semipalatinsk State University, E. A. Buketov Karaganda State University, and Auezov South Kazakhstan State University. The indicators of many university websites have grown in the world ranking over the past five years, which indicates

the positive dynamics of development. But, nevertheless, it is necessary to further develop and improve such a basic promotion tool as a website.

As for the Webometrics rating methodology, for all its authority, it operates with a limited list of criteria: the fullness and popularity of sites. But very important criteria are not considered – the location (capital or peripheral city), the number of specialities, faculties, teaching staff, and students. It is necessary to use general marketing criteria considering the needs of applicants, since they are the target audience of higher education services. In this regard, the results of the survey of a focus group with first-year students (in the number of 30 people) are of interest (Serikbayev, 2016a). The survey determined that the sections that attract the most attention on university websites are the following: admission rules, tuition fees, virtual tours, links to social networks and mobile version of the site.

A study of the websites of higher educational institutions included in the top 10 showed that the standard rules for admission of applicants are posted on all these sites in the "admission information" sections. The standard admission rules were approved by the Decree of the Government of the Republic of Kazakhstan dated 12.05.2016 N 288. Not all sites have posted information about important dates and contacts of the admissions committee, this information appears immediately before the start of the admissions committee. This procedure is not convenient for applicants and their parents, who are starting to search for a higher educational institution in advance. Students who choose paid education would like to see the cost of tuition and the payment procedure on the website. However, only some universities post this information on their websites. The exact information about this is shown in Table 2.

Table 2. The fullness of information on the websites of the eop-10 universities of the Republic of Kazakhstan

Tools	Number of Universities Performing		
	Well	Moderately	Poorly
Admission Rules Posted	8	2	0
Virtual Tours	2	3	5
Important Dates	6	3	1
Contact Information	8	2	0
Tuition Information	4	4	2
Feedback Availability	3	3	4
Social Media Presence	3	5	2
Mobile Website Version	3	4	3

The placement of a virtual tour of an educational institution on the university website, as evidenced by foreign experience, greatly motivates applicants to enrol in this educational institution. On the websites of foreign educational institutions, it is almost always possible to find such a tour and see everything from the inside (classrooms, equipment, dining room, dormitory, etc.). In Kazakhstan, virtual tours have just begun to be published on websites. Currently, not even all websites of top-10 universities have a section with such a tour. It is necessary to focus on this in terms of improving websites, as this is a very effective modern promotion tool and Kazakh universities have something to show: modern equipped classrooms, scientific laboratories, libraries, etc. All these are strong points that are still poorly communicated to the target audience – applicants (Zaki et al., 2023).

An additional contemporary marketing tool that bolsters the efficacy of university websites is an online consultant capable of providing prompt information on all queries made by potential students. Only about 10% of all universities in Kazakhstan have adopted this marketing tool by integrating online consultants into their websites. Over 50% of higher education institutions still lack mobile versions of their websites. In 2016, 30% of universities did not have social media accounts. However, the situation has improved and the majority now have active social media accounts. In 2016, social media was regarded with considerable skepticism, but recent years have witnessed a dramatic shift, with social media accounts becoming a valid marketing tool for promoting educational services (Zaitsev, 2016). While website feedback is usually minimal, given it primarily serves an informational role, extensive feedback is characteristic of social media platforms. The abundance of reactions, reviews, comments, likes, and questions enables the collection of a continuous flow of valuable primary marketing data. Along with this, the capability to conduct polls provides a quick method of gathering essential information. Consequently, potential students, upon connecting to the university's main social media accounts, can quickly acquire a wealth of information about their university of interest, ranging from faculty reviews and their competencies to the conditions of learning.

Targets in the promotion of educational services are associated with the development of social networks of higher educational institutions, professional ability to form content for them, competent positioning, and emphasizing the strengths of an educational institution. Research of the target audience, identification of demand, and transformation of preferences of applicants and students is also associated with the active involvement of social networks for marketing research and surveys (Boiko, 2023). But the website today is the official representative of a higher educational institution on the Internet. The website forms the image and increases the competitiveness and rating of the university. The analysis of the structure and content of the websites of the leading universities of the Republic of Kazakhstan (included in the top 10) allowed the identification of a number of criteria characterizing the effectiveness of the site. First, it is the availability of high-quality content – texts, images, audio, video (how modern, logical, high-quality, relevant, and whether it is new). Second, the context is how attractive the design is, whether the text is readable, whether there is congestion on the page and how easy it is to work with the site (convenient navigation, fast loading of the website and subsections). Third, are there any guarantees of transparency of educational and scientific activities on the website? Fourth, good visibility of the website in the main search engines. Fifth, the presence of cross-links on the website to go to other sites (a very important function for obtaining additional information). Sixth, interactivity and feedback (Kotler, Keller, 2019). In general, there is extensive globalization of the higher education system, characterized by: the instability of the preferences of the target audience, the contradiction between the professional training of graduates of higher education institutions and the expectations of the labour market (in specialists of certain specializations and their qualifications), the rapid development of digital-Internet technologies, the aggravation of internal competition in higher education, the socio-demographic situation (Istomin, 2019)

Amid the current socio-economic instability in Kazakhstan and globally, the competition among universities for prospective students has intensified. Consequently, the utilization of marketing tools has become increasingly important. Marketing is the linchpin of efficient

operations and successful growth in the realm of educational services. However, as F. Kotler noted, "Modern marketing requires more than just developing a high-quality product, setting an appealing price, and making it accessible to target consumers. Companies must still engage in communication with their customers" (Kotler, 1990). Now, during these challenging and volatile times, the ability to foster effective communication plays a pivotal role. It's this interaction with future students (even before they enrol in higher education), during their studies, and post-graduation that offers competitive edges.

When Kotler (2007) updated this line of action, digital technologies were not in the picture, and the focus was primarily on personal communications. However, at this stage, with the advent of digital technologies, there is an array of methods to facilitate communication. A responsive website stands as a principal tool for interaction. The importance of communications as a tool for marketing promotion has grown exponentially. Given the escalating competition among educational institutions, it's prudent to formulate an effective communication policy. Therefore, the marketing elements that facilitate achieving the set objectives are delineated. This means selecting tailored marketing strategies that transmit the necessary information and incentives to applicants and students. These include public relations, advertising, promotional marketing at mass events, open days, and so on.

The main feature of marketing communications of a higher educational institution is the focus on two groups – external: schoolchildren and their parents, graduates of colleges and universities, entrepreneurs, employers, public organizations and government agencies; and internal: university students, parents of students, staff, and teachers. The split orientation of marketing communications is based on the fact that internal consumers (teachers and students) influence external ones (through the media, acquaintances and in person), thus forming this or that attitude toward the university even before admission and personal acquaintance with the educational institution.

In the context of increasing competition among educational institutions and the importance of marketing in attracting students, effective communication becomes crucial. As noted by Utepbergenov et al. (2019), modern marketing goes beyond creating a quality product and requires implementing communication with customers. In the current era of digital technologies, the main communication tool is the website, which has become instrumental in conveying information and incentives to applicants and students.

Promoting a higher educational institution through the website involves utilizing various communication channels and tools, such as personal pages of teachers, video materials, and the placement of conference and scientific event materials. Furthermore, qualitative research plays a significant role in marketing research for higher educational institutions. Qualitative research provides insights into consumer behaviour, opinions, and preferences. It is particularly relevant in the current context of socio-economic instability, where there is a need for new educational services, including distance learning. Qualitative research methods like focus groups, in-depth interviews, and protocol analysis can help understand the decision-making factors of potential groups suitable for distance education.

The author has developed methodological recommendations for the marketing evaluation of the university website. The evaluation of the site is carried out in accordance with the blocks in which the criteria are thematically combined. Rating scale in each block: high level,

medium, and low. This approach allows for quickly, universally and reliably conducting site research. The methodological approach is universal. When using it, it is necessary to conduct a marketing analysis of the users of the university website and more accurately determine the main segments of the target audience of the site.

1. The first block. Website design – evaluation is carried out according to the following criteria: design style, font readability, compatibility with the design of subsites, cross-browser compatibility and the convenience of viewing photos and videos.
2. The second block. Site navigation – site map, warning when switching to third-party resources, navigation menu, search engine performance, ease of navigation in general.
3. The third block. Content – information about contacts, documentation and basic information, educational process, extracurricular activities, open days, Olympiads, and admission committee.
4. The fourth block. Interactivity – the presence of feedback, links to social networks, the ability to register on the site, regular updating of the site (at least 1 month) and the presence of an internal information system with access via login and password.
5. The fifth block. Visibility – Yandex CY, Google PageRank (PR), Webometrics Word Rank, Alexa Rank.

The methodology proposed by the author offers a comprehensive and detailed evaluation of university websites from a marketing perspective, which is distinguished by the following blocks: website design, site navigation, content, interactivity, and visibility. Existing methodologies often neglect some of these important dimensions, emphasizing a single aspect such as design or visibility, but rarely all together.

Existing evaluations often focus on measuring quantitative aspects, such as website traffic, without considering qualitative factors like the site's design or interactivity level. Similarly, many existing methodologies concentrate on the site's academic content and overlook the marketing dimension, which involves creating a compelling and attractive online presence for potential students, staff, and other stakeholders.

Moreover, current methods may overlook regional specifics, treating all university websites alike, regardless of their local context. In contrast, the author's approach offers a universal framework but recommends conducting a marketing analysis of the specific users of the university website, allowing for more accurate segmentation of the target audience.

The author's approach also appears more thorough and systematic, providing a clear structure for the evaluation process with set criteria for each thematic block. This way, it enables the user to conduct the site research quickly, universally, and reliably. It also allows the method to be adapted to various contexts, ensuring its versatility and broad applicability.

The promotion of a higher educational institution using the website is based on the use of channels and tools of the communication environment: personal pages (blogs) of teachers, video materials (lectures, additional research), placement of materials of conferences and scientific events, placement of materials of university publications.

5. Conclusions

In conclusion, the analysis of Webometrics rating data comparing 2016 and 2021 revealed significant changes in the rankings of leading university websites. Nazarbayev University emerged as the top-ranked university in 2021, showing remarkable growth. Several universities entered the top 10 for the first time. While many university websites have improved in their world rankings, there is a need to further enhance and optimize these websites as a fundamental promotional tool. The Webometrics rating methodology has limitations, as it focuses on completeness and popularity while overlooking factors like location, specialities, and faculty. Incorporating general marketing criteria that consider the needs of applicants is essential. A survey of first-year students highlighted the website sections that attract the most attention, including admission rules, tuition fees, virtual tours, links to social networks, and mobile versions of the site.

Examining the websites of the top 10 universities revealed that standard admission rules were present, but information about important dates and contacts of the admissions committee was not always readily available. Universities should provide transparent information about tuition costs and payment procedures. Virtual tours, commonly used by foreign institutions, significantly motivate applicants and should be implemented more widely to showcase modern facilities. Online consultants play a crucial role in providing prompt information to applicants, yet their presence on university websites is still limited. Additionally, many universities lack mobile versions of their websites. Social media accounts have become important marketing tools, offering valuable feedback and engagement. It is necessary to develop social networks of higher educational institutions and create tailored content to highlight strengths and conduct marketing research.

Overall, the effectiveness of university websites lies in high-quality content, attractive design, transparency, search engine visibility, cross-linking capabilities, and interactivity. To promote educational services successfully, it is essential to focus on the website as the official representative of the institution, shaping its image, competitiveness, and ranking. Despite the global nature of higher education, universities must adapt marketing methods to effectively communicate with their target audiences, both internal and external. Incorporating qualitative and quantitative research methods can provide valuable insights into consumer behaviour and preferences, particularly in emerging areas such as distance learning. In an era of increasing competition and socio-economic instability, effective marketing communication plays a decisive role in the success of higher educational institutions.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
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Ivanka Nikolova[1]

ASSESSING THE SIGNIFICANCE OF INTELLECTUAL CAPITAL IN RETAIL TRADE THROUGH CONJOINT ANALYSIS[2]

In the conditions of widespread application of information and communication technologies, intellectual resources as a result of human intelligence, knowledge and experience are the leading source of development and growth. Intellectual capital, encompassing all the intellectual resources from which businesses derive growth in various forms, is emerging as the leading form of capital today.
The aim of this publication is to assess the significance of joint impact and the extent to which elements of intellectual capital contribute to value creation and the establishment of conditions for manifestations of competitive advantages in retail trade.
The study was carried out using conjoint analysis. After a brief historical overview of the development of the conjoint analysis methodology, its relationship with the hierarchical process analysis developed by Thomas Saaty is shown and a full profile conjoint analysis is conducted. The necessary data were obtained by carrying out surveys with managers from consumer goods retail chains. Based on the obtained ratings – partial, average, and overall – of the 'utility' and 'importance' categories, conclusions have been drawn regarding the joint impact and the extent to which the elements of intellectual capital contribute to value creation in retail trade.
Keywords: intellectual resources; intellectual capital; conjoint analysis; retail trade, retail chains.
JEL: M21; O34

1. Introduction

The rapid development of information and communication technologies causes an increase in the speed rate of knowledge dissemination as well as of possibilities for its implementation in the form of innovations, know-how, image, trade mark and other tangible and intangible assets. Modern business practice shows that the growth and success of market entities and the difference between market values and balance sheet company values are increasingly dependent on the knowledge applied as a kind of intellectual resource. According to Sveiby, knowledge management is the art of generating value from the company's intangible assets (Sveiby, 1997). The increasing competition in the retail market stimulates research on the

[1] *Ivanka Nikolova, Associate Professor, Ph.D., University of National and World Economy, 0889652771, e-mail: ivnik@abv.bg.*
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role of intellectual capital in creating competitive advantages. Further theoretical development of the market requires more empirical applications of existing and new methods and methodologies to better assess the utility and significance of the different elements of intellectual capital.

The aim of this publication is to assess the significance of joint impact and the extent to which elements of intellectual capital contribute to value creation and the establishment of conditions for manifestations of competitive advantages in retail trade.

The goal is achieved by solving the following tasks:

- Review of the literature on the origin and development of conjoint analysis and its application to empirical research;
- Identifying the significant combinations of intellectual resources that jointly impact value creation in retail;
- Assessment of the importance of intellectual resources through the main characteristics of the conjoint analysis "utility" and "importance";
- Assessment of the extent of the joint impact of the elements of intellectual capital – human, organizational and relational – on value creation in retail trade.

Intellectual capital is seen as a collection of intellectual resources or knowledge, whose use in economic and social life increases worth, value and wealth in a variety of its forms (Pozharevska, 2017). Intellectual capital has three components according to the agent where the capital lies: human capital lies in people, structural capital lies within the organisation and relational capital lies in the relations between the organisation and environment (Sveiby, 2001). Most researchers accept the view that intellectual capital comprises three main elements – human capital, structural or organizational capital, and relational capital, but there is still no consensus on which term is more appropriate – structural or organizational capital (Galabova, 2022).

Three stages can be distinguished in the development of the economic theory and practice focused on intellectual capital research (Dumay, Garanina, 2012). The first one includes the last two decades of the XX c. and is devoted to the clarification of the nature and scope of intellectual capital, the second one focuses on its measurement while the third stage is related to intellectual capital management and encompasses large-scale empirical research.

Over the last few years, numerous methods for the assessment of intellectual capital have been suggested in specialised literature. D. Luthy (1998) and M. Williams (2001) systematize scientific research by dividing these methods into four main groups:

- Direct Intellectual Capital Methods (DICM);
- Market Capitalisation Methods (MCM);
- Return on Assets Methods (ROA);
- Scorecard Methods (SC).

Based on a long-standing research experience in intellectual capital management, G. Roos, S. Pike and L. Fernstroem add a fifth group of assessment methods – the so-called Proper Measurement Systems (PMS), one of which is conjoint analysis (Roos, et al., 2005).

Generally, the implementation of most of these methods is realized at a company level and often requires confidential information and the presence of developed financial markets in the given country, which results in a number of limitations.

The present study was conducted using conjoint analysis, the idea of which originated in the economic theory a century ago. A study of the emergence of conjoint analysis helps reveal the meaning and significance of the complex and ever-changing method used today with the help of specialised software. A full profile conjoint analysis was conducted after a brief historical overview of the development of conjoint analysis methodology, showing its connection with the hierarchical process analysis proposed by Thomas Saaty. The data needed were collected through surveys of retail chain managers and members of the Association for Modern Trade in Bulgaria, offering consumer goods. The data reveal the views of the managerial teams.

As a result of the applied conjoint analysis in retail trade, based on the obtained ratings – partial, average, and overall – an assessment has been made of the joint impact and the extent to which the elements of intellectual capital contribute to value creation in retail trade.

2. Literature Review on the Origins of Conjoint Analysis

Conjoint Analysis (CA) is a term used to refer to the methods of eliciting individuals' preferences about alternatives and with regard to the study context they are related to the choice of goods, services, resources or course of action. It is an unconscious multi-attribute system for the joint measurement of the impact of the studied features (attributes) on a particular choice. Conjoint analysis is based on mathematical representations of rank orderings of datasets. It is aimed at determining the combination of a limited number of features (attributes) with the greatest joint impact on the respondents' choice or decision-making.

The idea of conjoint analysis, which is also popular in economic literature as joint analysis (formed from the word combination CONsidered JOINTly), can be found in the economic theory of a century ago. As Kevin Gray notes, the foundations of conjoint analysis can be seen in the analysis of variance – ANOVA (Gray, 2017). In 1921, Ronald Fisher was the first to apply the analysis of variance. Through this method, an answer is sought to the question of whether a factor whose values are presented on a nominal scale (they represent some categories) has an impact on a variable whose values are presented on a numerical scale – an interval scale. The idea of controlling the impact of side factors in the analysis of variance (ANOVA) is used in conjoint analysis as well.

In fact, the idea of conjoint analysis can also be sought in other statistical methods – starting from the chi-square method and moving on to regression analysis. The reason for this statement is the very way conjoint analysis works. It is aimed at establishing the most significant combination of features (attributes) for a given consumer aggregate by applying

statistical methods, most often variance or regression analysis. Factor variables in statistical analysis and conjoint analysis are in their nature a kind of technology and are considered as a whole and not in terms of their individual elements. In conjoint analysis, the various combinations of elements are observed as a whole and although respondents are given the opportunity to see these elements, the assessment and the ranking of the combinations are made as a whole. Thus conjoint analysis makes it possible to find latent, invisible factors that affect respondents' choices.

Economic literature shows that the analysis of variance is applied in experimental psychology as well, and this is a field where the roots of conjoint analysis are also to be found, especially in psychometrics. Carol and Green point out that "at the moment, conjoint analysis and the related technique of experimental analysis are the most commonly applied methodologies of measurement and analysis of consumer preferences" (Carroll, Green, 1995, p. 385). As a method, conjoint analysis was developed by the American psychologist and mathematician Duncan Luce and the statistician John Tukey in 1964 (Luce, Tukey, 1964).

Since the 1980s, conjoint analysis has been widely used in a lot of sectors. Paul Green notes that "the development of conjoint analysis and its application in marketing and business studies is remarkable both with its eclectic roots (psychometrics, statistics, operations research, economics) and with the fact that it reflects the efforts of a multitude of experts – academia, marketing specialists, practitioners from the industry, software experts." (Gustafsson, Herrmann, Hubert, 2007).

Hauser and Rao describe the later developments and application of conjoint analysis, after Paul Green, and pay attention to its relation to multidimensional scaling. "The strength of multidimensional scaling (MDS) include the ability to present the multidimensional consumer perceptions and preferences with regard to a certain set of products. Multidimensional scaling decomposes based on holistic judgements in order to reveal these perceptions and preferences" (Hauser, Rao, 2002).

It is known that as a form of non-linear dimensionality reduction, multidimensional scaling is a means of visualisation of the degree of similarity. One of the tasks of conjoint analysis in psychology as well, is "to reveal the structure of the examined set of stimuli…The procedure of structure building is based on the analysis of objective or subjective information about the similarity between the stimuli or the information about the preferences for a set of stimuli. In the case of subjective data analysis, two problems are solved simultaneously. On the one hand, the objective side of subjective data is shown and, on the other, the factors affecting the decision-making process are defined" (Koschachek, 2021).

Paul Green tries to increase the power of multidimensional scaling. "He sought a means to decompose consumer preferences to part-worth contribution of product features. Thus researchers can not only explain the preferences for existing products, but also simulate preferences for completely new products, determined by feature combinations… Some authors such as Luce and Tukey (1964), and Krantz, Luce, Suppes and Tversky (1971) investigate behavioural axioms that would allow the decomposition of overall judgement… Conjoint analysis is of psychometric origin as a theory of decomposition of an ordinal scale of overall judgement into interval scales for each component" (Hauser, Rao 2002).

Paul Green takes advantage of this joint theory of measurement and adapts it to the solving of marketing and product problems and in 1971 Green and Rao pioneered the application of conjoint analysis in the field of marketing (Green, Rao, 1971). Later on, G. Roos, S. Pike and L. Fernstroem apply conjoint analysis to the management of intellectual capital by decomposing managerial preferences to part-worth contribution with regard to the elements of intellectual capital so as to stimulate various ideas for its management.

According to Kevin Grey, the term conjoint is used quite loosely by marketing researchers and, actually, most of the time it refers to the discrete modelling method which builds on earlier studies and is often associated with the pioneering work of the economist Daniel MacFadden. At the beginning of the 1970s, MacFadden provided the basis for the choice of modelling among a number of alternatives (Grey, 2017).

The historic review of the development of conjoint analysis methodology showed that there are a lot of similarities between conjoint analysis and the Analytic Hierarchy Process theory developed and popularised by Thomas Saaty in 1980. The similarities between the two methods are of crucial importance to understand the way conjoint analysis functions, especially given its application by using software products today. These similarities are found with regard to several directions:

First, when defining the nature and purpose of the methods, Thomas Saaty explains the essence of the method of the analytic hierarchy process – "The Analytic Hierarchy Process (AHP) is a theory of measurement through pairwise comparisons and relies on the judgements of experts to derive priority scales. It is these scales that measure intangibles in relative terms. The comparisons are made using a scale of absolute judgements that represents, how much more, one element dominates another with respect to a given attribute" (Saaty, 2008).

In conjoint analysis, the importance of the attributes for each surveyed expert is measured through pairwise comparisons the way that Saaty introduced in the 1980s. The aim of conjoint analysis is to find out what combination of a limited number of features has the greatest joint impact on the respondents' choice when making decisions. In marketing, conjoint analysis is used to establish the optimal set of features of a given product that would ensure a maximum result in the market by combining the interests of producers, merchants and consumers. In the present publication, conjoint analysis is aimed at defining what combinations of limited intellectual resources have the greatest joint impact on the choice the surveyed managers make to create value and prerequisites for the manifestation of competitive advantages in trade chains.

Second, Thomas Saaty considers hierarchy on a macro scale and, in the broadest sense, presents the philosophy of the optimal relationship between the elements of a structure or system, which is a universal methodology and is largely embedded in conjoint analysis. According to him, "The Analytic Hierarchy Process (AHP) is a closed logical structure that provides for analysing complex problems in all their varied forms using simple rules and leading to the best answer. In addition, the application of the method allows the inclusion in the hierarchy of everything that a researcher has on the problem under consideration, such as knowledge and imagination. This, in my view, is a balanced way of solving a difficult problem: leave mathematics behind and let the richness of the structures carry the weight of

the complexity. No mathematics can replace the human mind and experience in interpreting the real world“ (Saaty, 2008). In conjoint analysis, respondents, in their capacity as experts or potential users of a given product, determine their preferences by comparing the various combinations of features and on the basis of certain relevant compromises. Whether it will be in establishing price levels, in the development of new products, in the management of intellectual resources, or in conjoint analysis judgment is made based on experience, preferences, knowledge and competencies. There seems to be no better way to express the basic principle of conducting research in conjoint analysis, which is ultimately reduced to prioritising qualitative over quantitative analysis.

Third, according to Saaty, “In addition, our method allows a group of people to interact based on the problem they are interested in, to modify their judgements and, as a result, to combine their group judgements in accordance with the main criterion: when performing a pairwise comparison of objects with respect to some feature or features in relation to a higher purpose, feedback provides the key to reconciling group judgements in a rational way”. As can be seen, this is an interactive approach implemented in all spheres where an acceptable decision must be made either by consensus or by accepting the decision of the majority of the respondents. Applying conjoint analysis in this particular study and based on the obtained assessments – partial, average and general, for the categories of utility and importance, conclusions were made with regard to the place and role of the individual elements of intellectual capital in terms of the creation of value in retail trade.

Fourth, Saaty reveals the nature of the concept of hierarchy and concludes: “When the mind is faced with a lot of controlling and non-controlling elements related to a difficult situation, it combines them into groups according to the distribution of some attributes among these elements... These elements, in turn, can be grouped according to a different set of properties, creating elements of another, higher level, and so until the single element is reached – the peak that can often be identified with the purpose of decision-making. What has just been described is usually called hierarchy, i.e. a system of multi-layered levels, each of which comprising a lot of elements or factors“. In this respect, it should be noted that the methodology, developed and repeatedly tested in different economic sectors by Goeran Roos, Stephan Pike and Lisa Fernstroem, for the management of intellectual capital requires the preparation of a hierarchical tree of intellectual resources as a necessary prerequisite and an entry to the realisation of conjoint analysis. With regard to the given study, “the different economic behaviour of resources allows their grouping as traditional and intellectual at the first research level. At the second research level, traditional resources, in turn, decompose into financial and tangible ones, while intellectual resources decompose into human, structural and relational ones. According to Goeran Roos, Stephan Pike and Lisa Fernstroem, the constituent elements of each subgroup form the mandatory minimum third level of detail in the investigation. Resources are subdivided until the fifth or even seventh level depending on the research objectives and these branches are visualised in the form of a hierarchical resource tree“ (Nikolova, 2018).

Fifth, according to Saaty “the main question in the language of hierarchy is how strongly the individual factors at the lowest level of the hierarchy affect the top – the common goal. The unevenness of the impact for all factors leads to the need to determine the intensity of the impact or, as we prefer to say, the priorities of the factors. The prioritisation of the lowest-

level factors relative to the objective can be reduced to a sequence of prioritisation tasks for each level, and each such task to a sequence of pairwise comparisons. Comparisons remain the basic building blocks of our theory even if the original problem is complicated by feedback conditions between different levels or factors" (Saaty, 2008). There is no more accurate description of the essence of conjoint analysis than the one Saaty gives on a completely different occasion, but generally valid, for solving tasks and problems of a very different nature in theory and practice. With the application of the Analytic Hierarchy Process theory, developed and popularised by Thomas L. Saaty, basically, two main goals are achieved: "The first one is to achieve a relatively objective ordering of the elements of each hierarchical level on some scale depending on their importance to the elements of the higher hierarchical level. The second objective is to find out whether and to what extent there is consistency in the individual assessments and opinions of the experts on the studied problem" (Iliychovksi, 2018). In addition, the fulfilment of these goals is found in the interpretation of the concepts of utility and importance in terms of conjoint analysis.

Sixth, with regard to the basic principle of conducting research in conjoint analysis – "We will show that the old proverb that apples and oranges cannot be compared is wrong… You may prefer an orange for some characteristics and an apple for others… We may be indifferent to size and colour, but the degree of our preference for taste may vary depending on the time of day. Our thesis that complex comparisons of this kind often occur in reality requires the development of a certain mathematical approach. The method will split for similar comparisons in dynamics. The practice of decision-making is concerned with weighing alternatives, each of which satisfies a particular set of desired goals. The challenge is to select the alternative that best meets the entire set of objectives" (Saaty, 1993). Those familiar with the conjoint analysis method are aware that it presents various variants (combinations) of features and the relevant persons must, based on their experience, knowledge, perceptions and competencies, determine the combination that satisfies them to the greatest extent in order to achieve the specific purpose.

Fifty years ago, Paul Green and Vithala Rao introduced the idea of conjoint analysis: "Conjoint measurement is a new development in mathematical psychology that can be used to measure the joint effects of a set of independent variables on an ordered dependent variable… This procedure requires only a rank ordering of the input and yields an interval scale score as the output" (Green, Rao, 1971). In addition, areas of marketing research are discussed in which it is possible to apply the method as well as some of the limitations to its implementation.

Bryan Orme (2010) writes that prior to Paul Green and Jerry Wind's (1975) article, namely in 1974, the vice president of Market Facts, Richard Johnson (Johnson, 1974), published an article about "a customer problem involving a durable commodity product and trade-offs between twenty-eight separate product features, each of which has about five different implementations or levels. The problem is much more complicated than the one solved by Green and his colleagues by using full-profile conjoint analysis, so Johnson invented the so-called method of double trade-offs. His article is devoted to trade-off matrices. Instead of asking respondents to assess all attributes simultaneously and in a full profile, Johnson breaks the problem down into focused trade-offs including only two attributes at a time. Respondents

are asked to rank the cells in each table in terms of their preference for joint levels" (Orme, 2010).

In 1978, Green and Srinivasan published an article that was instrumental in popularising conjoint analysis and its implementation in theory and practice. As the authors note, "since 1971 conjoint analysis has been applied to a wide variety of problems in consumer research. This paper discusses various issues involved in implementing conjoint analysis and describes some new technical developments and application areas for the methodology" (Green, Srinivasan, 1978). The importance of this article is determined by the fact that it starts by making a brief overview of the history of conjoint analysis, then moves on through the steps of the method application: choice of preferred model (vector model, ideal-point model, part-worth function model, mixed model), method of securing data, two-factor-at-a-time (trade-off analysis), full-profile (concept evaluation), stimulus construction of the full profile model – fractional factorial design, random sampling from multi-variate distribution, presentation stimuli – verbal description (multiple cue, stimulus card), paragraph description, pictorial or three-dimensional model representation, measurement scales for the dependent variable – paired comparisons, rank order, rating scales, constant-sum paired comparisons, category assignment and assessment method – MONANOVA, PREFMAP, LlNMAP, Johnson's non metric trade-off algorithm, multiple regression, LOGIT, PROBIT, a variety of tests, as well as indicating the many areas of conjoint analysis application, and ends with an overview of the method development over the years since its introduction.

The practical value of conjoint analysis is evidenced by its wide use in research work and the development of various types of it, which is evident from a number of publications by Bulgarian and foreign authors: Krastevich, T., Smokova, M. (2012); Karadzhova, Tsv. (2012); Netseva-Porcheva, T. (2012); Iliychovsky, Sv. (2018); Eggers, F., & Sattler, H. (2011); Gustafsson, A., Herrmann, A., & Huber, F. (2013); Rao, V. R. (2014); Michael Steiner and Martin Meißner, (2018), etc.

The historic overview of the emergence of conjoint analysis helps to reveal the meaning and significance of the complicated and continuously modifying method that is applied nowadays by using specialised software. The basis of the method is the comparative analysis which depending on the chosen type of conjoint analysis is realised in a different way.

3. Methodology

In conjoint analysis, two of the characteristics obtained as a result of its implementation are of primary importance:

- utility and
- importance.

Utility can be part-worth and generalised (average). Conjoint utility or part-worth utility is presented on an interval scale. What is special about this case is that this scale has an arbitrarily chosen zero point. The arbitrary origin of the scaling for each feature results from the use of dummy variables in the design matrix. It is possible to add a constant in the part-

worths for all levels or for all features being investigated and this will not change the interpretation of the results obtained. When a specific type of dummy coding is used, a coding effect is achieved where the benefits are scaled so that the sum is zero for each characteristic. The partial or part-worth utility is calculated for each level, for each feature (attribute). The set of utilities is obtained by each respondent, and each specific combination is equal to the total utility for the given profile (combination). Conjoint utility (part-worth utility) is calculated by monotonic or multiple regression analysis with dummy variables by using the analysis of variance or logistic model.

The second type of utility is generalised (average) utility – again for each factor, but it is generalised based on all respondents' opinions and presented in three variants as minimum, maximum and average utility.

Utility (both individual and average) provides insight into the impact of each intellectual resource on the value creation process for a business company. The created value, in turn, provides prerequisites for manifestations of competitive advantages in trade. The effect can be both positive and negative.

Importance: This characteristic is related to each intellectual resource at two levels – individual and average. The first option is the importance or significance of the factor, according to each respondent, and the second one is the aggregate or average rating of importance calculated on the basis of the opinion of all respondents. Importance, individual and average, shows respectively how significant the specific intellectual resource is for each of the surveyed managers (individual levels) and on average for all surveyed persons.

Importance is calculated on the basis of utility. Very often, it is necessary to determine the relative importance or significance of each feature or for each intellectual resource. This is done by calculating the difference between each feature and the total utility of the study population. This difference is the range in utility values. It is calculated as a percentage of the relative ranks obtained for the aggregate of the importance values of the individual features, adding up to 100%. Importance depends on the particular level of the feature chosen for the study. When calculating the importance of features (attributes), it is always relative to other features that are used in the study.

Researchers can compare one feature with another in terms of importance only within the particular conjoint analysis (CA), but not between different studies.

Conjoint analysis is a way of eliciting individuals' preferences about alternatives related to the context of the study and in terms of a choice of goods, services, resources or a course of action. The aim of conjoint analysis is to determine which combination of a limited number of features (attributes) has the greatest joint impact on respondents' choices or decision-making.

In retail trade, conjoint analysis is most often used to reproduce as closely as possible the situation of real choice when consumers have to make compromises about the existing alternatives of a product or service. "This technique serves to discern the hidden product features that have value for consumers" (Netseva-Porcheva, 2012). As a result, information is obtained about consumer preferences.

In the present study, conjoint analysis is used as a part of the methodology for intellectual capital management developed by Goeran Roos, Stephan Pike and Lisa Fernstroem to assess the significance of intellectual capital in retailing in creating value and prerequisites for the manifestations of competitive advantages determined by the categories "utility" and "importance" of the elements of intellectual capital – human, organizational and relational.

The basis of the method is comparative analysis which depending on the selected conjoint analysis model is implemented in a different way.

First, the scope and boundaries of the problem should be defined – the exact definition of what is measured and what is not. In practice, it is about realising the priority of qualitative over quantitative analysis. The solution to this problem requires a really good knowledge of the phenomenon to be examined.

Each product or service, in particular – each element of intellectual capital, has its features that as called attributes in conjoint analysis. Correspondingly, each attribute has its meanings or levels. Qualitative methods such as group discussions, in-depth interviews and expert evaluations are used to determine them. Determining the features of the studied phenomenon and establishing their levels is associated with the construction of the so-called measurement structure. From a practical point of view, it is recommended to limit the number of investigated attributes and their levels, since their excessive amount does not lead to more significant results, but undoubtedly complicates the process as a whole. In the case of competing products or services, each of the products or services has its own set of features with corresponding meanings, i.e. there are different combinations of elements. If a new product is developed, it is presented in several versions which are correspondingly different combinations of features. These combinations are given to the respondents who may be users or experts. In conjoint analysis, each combination is called a profile.

In the next stage, the measurement structure turns into an operational mathematical measurement system so that each stakeholder has a system. This is achieved by using a second survey in which corresponding weights are assigned by the surveyed experts to each combination selected through the conjoint analysis design procedure. By using a software product (SPSS, Exce, etc.) and corresponding processing of the obtained data, the combinations are sorted by importance. The results are analysed based on the criteria for utility (effectiveness, productivity, value) and importance – the significance of the joint influence of factors, in the case considered – of intellectual resources in the process of the creation of value and prerequisites for the formation of competitive advantages.

The requirements of the general theory of value judgements are observed when setting the objective and conducting the relevant analysis in retail trade. They basically encompass a few rules, known as Lyon's principles, that are followed in every study:

- The object, organisation or part of an organisation to be measured or evaluated must be precisely defined;
- The definition includes all stakeholder opinions and requirements;
- All participants (stakeholders) are equal, i.e. they have equal importance;
- Each participant is responsible for the truth of their position.

In the present study, the following sequence was observed in the application of conjoint analysis in retail trade:

First, the studied features and their levels are determined. The input data in the conjoint analysis are the elements of intellectual capital and its levels in the form of intellectual resources identified using a proposed and verified (with the first survey) theoretical model of the generalised hierarchical tree of resources in the investigated consumer goods trade chains (Nikolova, 2018).

Table 1. Conjoint analysis design

Observations	Human capital	Organizational capital	Relational capital
Profile 1	Motivation	Company culture	Regulators
Profile 2	Personal qualities	Business processes	Suppliers
Profile 3	Education and training	Business systems	Customers
Profile 4	Personal qualities	Intellectual property rights	Local community
Profile 5	Personal qualities	Company culture	Financial institutions
Profile 6	Motivation	Strategy and organisation	Other partners
Profile 7	Education and training	Innovations	Regulators
Profile 8	Motivation	Information infrastructure	Competitors
Profile 9	Skills and experience	Information infrastructure	Other partners
Profile 10	Personal qualities	Business systems	Owners
Profile 11	Skills and experience	Intellectual property rights	Suppliers
Profile 12	Education and training	Information infrastructure	Educational institutions
Profile 13	Skills and experience	Business processes	Educational institutions
Profile 14	Skills and experience	Strategy and organisation	Клиенти
Profile 15	Competences	Innovations	Клиенти
Profile 16	Skills and experience	Company culture	Competitors
Profile 17	Motivation	Business systems	Suppliers
Profile 18	Education and training	Business processes	Owners
Profile 19	Competences	Intellectual property rights	Regulators
Profile 20	Competences	Business systems	Local community

Source: Developed by the author.

At step two, the type of conjoint analysis is chosen as well as the so-called "conjoint analysis design" or "experiment design": a limited number of significant combinations (profiles) are found out of several hundred possible combinations of human, organizational and relational resources (elements of intellectual capital). The software used to make the "conjoint analysis design" in this case is Excel. The twenty combinations (profiles) presented in Table 1 were selected as the object of investigation and research based on an optimisation procedure.

At step three, these combinations were provided in the form of a second survey of 25 respondent managers from the management teams of retail chains for consumer goods, members of the Association for Modern Trade in Bulgaria. Each of the managers evaluated the importance of the combinations of intellectual resources to create value in retail using scores from 1 to 20. In practice, each of the surveyed managers selected and indicated the preferred influence of the combinations of intellectual resources as elements of intellectual capital creating value for the trading company and providing prerequisites for the manifestation of competitive advantages in the sector of trade.

At step four, the actual conjoint analysis is carried out after the results from the second survey have been entered. In this case, it is associated with the application of monotonic regression analysis and subsequent analysis of variance, which assess the degree of impact of combinations of intellectual resources on value. Based on the scores obtained – partial, average or total, for the categories of utility and importance, the joint impact of intellectual resources is assessed and conclusions are drawn regarding the contribution of the individual elements of intellectual capital to the creation of value in retail trade and prerequisites for manifestations of competitive advantages. The obtained results are analysed and presented in a tabular form in the following presentation.

4. Main Findings and Results

In the present study, conjoint analysis is carried out as a full-profile conjoint analysis by first applying monotonic regression analysis (regression analysis) and then analysis of variance. What is special about monotonic regression analysis is that it is applicable when the factor variables are both metered and non-metered (full profile conjoint analysis – Monotone regression and the MONANOVA model differ only in the fact that the explanatory variables are either quantitative or qualitative. They are based on linear regression in the first case, and on the ANOVA model in the second.). Conjoint analysis is used to assess the significance and joint impact of different types of intellectual resources in the creation of value in a commercial firm and the prerequisites for the formation of competitive advantages.

Table 2. Initial intellectual capital in conjoint analysis

Categories	Elements of Intellectual Capital		
	Human capital	Organizational capital	Relational capital
Cat. 1	Education and training	Strategies and organisations	Customers
Cat. 2	Skills and experience	Business processes	Suppliers
Cat. 3	Personal qualities	Business systems	Other strategic partners
Cat. 4	Motivation	Information	Competitors
Cat. 5	Competences	Company culture	Owners
Cat. 6		Innovations	Financial institutions
Cat. 7		Intellectual property rights	Local community
Cat. 8			Regulators
Cat. 9			Educational institutions

Source: Developed by the author.

The input data in the conjoint analysis are the elements of intellectual capital and its levels in the form of intellectual resources, identified using a proposed and verified (with the first survey) theoretical model of the generalised hierarchical tree of intellectual resources in the studied retail chains of consumer goods (Nikolova, 2018).

In this particular study of the importance of intellectual resources for the creation of value in retail chains, the behaviour of 21 intellectual resources is analysed with the element of human capital involved with five resources at the third research level: education and training, skills and experience, personal qualities, motivation and competences. Organizational capital is involved with seven resources: strategy and organisation, business processes, business

systems, innovations, information infrastructure, company culture and intellectual property rights. Relational capital is involved with the following resources: suppliers, other strategic partners, customers, competitors, local community, regulators, owners and educational and financial institutions (Table 2).

As stated above, there are two criteria used for the assessment of the impact of intellectual resources in creating value in consumer goods trade chains – utility and importance.

4.1. Analysis of the utility of intellectual capital in retail trade

The **utility** was analysed for intellectual resources of the second and third research levels of the generalised hierarchical tree for the surveyed trade chains. The utility provides a general idea of the impact of each resource on the process of value creation for commercial firms.

The results allow us to establish which of the 21 intellectual resources are of the greatest impact, positive or negative, on the process of creating value for the commercial firm.

It is important to specify that in the calculation of utility and the presentation of its values, an interval scale is used which is characterised by a subjectively chosen zero value. This means that from the negative value of utility, it does not follow that the relevant resource has a negative contribution to the value formation of the firm, but shows the impact of the relevant resource relative to the impact of other resources.

The second feature to note as a consequence of the interval scale, is that the sum of the positive values of utility is equal to the sum of the negative values of utility. The total of all utilities, both positive and negative, equals zero.

The maximum individual values of utility are concentrated in two groups of resources (Table 3). The first group of resources are the elements of human capital, and the second – the resources of relational capital. The view is confirmed "that human resources improve the financial performance of commercial enterprises and are seen as a major source of competitive advantage in commerce" (Ignatova, 2021). The exception is two of the respondents for whom organisational resources, and more specifically business processes as their third research level element, have the greatest impact on the value creation process for retail chains.

Personal qualities as an intellectual resource are indicated by 10 of the 25 respondent managers as the greatest contributor to the creation of utility and real prerequisites for the manifestation of competitive advantages in trade chains. The range within which the individual ratings of utility for the resource of personal qualities at the third research level is from 5.35 to 7.71.

The other 13 maximum individual ratings of utility are scattered among the following resources: motivation – 3, suppliers – 2, other strategic partners – 1, customers – 4, competitors – 2 and regulators – 1.

Table 3 presents three assessments of the utility of intellectual resources at the second and third research levels – minimum, maximum and average.

Table 3. Minimum, maximum and average value of the assessment of intellectual resources according to the criterion of utility

Source	Minimum	Maximum	Average/mean
Human – Competences	-8,30	-1,01	-5,24
Human – Personal qualities	1,25	8,63	5,28
Human – Motivation	0,78	7,51	4,23
Human – Education and training	-7,26	0,53	-3,64
Human – Skills and experience	-4,18	1,53	-0,63
Organizational – Business processes	-0,46	11,78	3,54
Organizational – Business systems	-3,99	2,34	-1,69
Organizational – Innovations	-7,61	2,86	-1,16
Organizational – Information infrastructure	-1,83	5,66	1,84
Organizational – Intellectual property rights	-5,77	-0,03	-2,85
Organizational – Strategy and organisation	-4,38	3,66	-0,05
Organizational – Company culture	-6,25	2,98	0,37
Relational – Suppliers	-4,82	5,27	1,06
Relational – Other partners	-1,58	6,19	3,58
Relational – Customers	2,23	10,08	4,78
Relational – Competitors	-5,26	7,41	2,45
Relational – Local community	-6,73	4,30	-0,32
Relational – Regulators	-0,49	9,69	2,57
Relational – Owners	-9,29	-2,37	-5,75
Relational – Educational institutions	-10,66	-0,98	-4,52
Relational – Financial institutions	-11,05	1,34	-3,86

Source: Developed by the author.

The average values of the utility for each resource were calculated based on the data from all respondents and are presented in descending order in Table 4.

Table 4. Average value of the assessment according to the criterion of utility

Intellectual resources	Grade
Human – Personal qualities	5,28
Relational – Customers	4,78
Human – Motivation	4,23
Relational – Other partners	3,58
Organizational – Business processes	3,54
Relational – Regulators	2,57
Relational – Competitors	2,45
Organizational – Information infrastructure	1,84
Relational – Suppliers	1,06
Organizational – Company culture	0,37
Organizational – Strategy and organisation	-0,05
Relational – Local community	-0,32
Human – Skills and experience	-0,63
Organizational – Innovations	-1,16
Organizational – Business systems	-1,69
Organizational – Intellectual property rights	-2,85
Human – Education and training	-3,64
Relational – Financial institutions	-3,86
Relational –Educational institutions	-4,52
Human – Competences	-5,24
Relational – Owners	-5,75
Total	0,00

Source: Developed by the author.

Table 4 presents the ratings for the average values of utility arranged in descending order and visualises the grouping of resources into two groups, which are almost the same in terms of the number of resources that fall into them, 10 and 11, respectively. The first group includes 10 out of a total of 21 observed resources that have positive utility values. The highest score for utility are personal qualities with 5.28, and the lowest is company culture with 0.37.

The idea of grouping both positive and negative values of average utility is to form subgroups of intellectual resources that, according to experts, create approximately a similar average utility for the commercial firm, which suggests that they create similar prerequisites for the manifestation of competitive advantages.

Based on the average **positive values of utility** there can be formed five subgroups.

The first subgroup includes three resources, two of which represent human capital – personal qualities with 5.28 and motivation with 4.23, and a resource representing relational capital – customers with 4.78. “Relational capital represents the organization's potential due to ex-company intangible assets which include the knowledge embodied in customers, suppliers, government, or related industry associations” (Bontis, 1999). “Part of the future lies with retail companies that personalise sounds and aromas, i.e. customise what their associates know about a user” (Petrova, 2021). The next three subgroups include two resources, each as follows: the second subgroup – other strategic partners with 3.58 and business processes with 3.54; the third subgroup includes regulators with 2.57 and competitors with 2.45. Subgroups two and three are characterised by very close average values of utility, which means that, in respondents’ opinion, their contribution to the creation of value and prerequisites for the formation of competitive advantages is almost the same. The fourth subgroup includes the resources of information infrastructure with 1.84 and suppliers with 1.06.

It can be concluded that the intellectual resources of the third research level – personal qualities (5.28), customers (4.78) and motivation (4.23) have the greatest impact on the process of value creation in the observed commercial companies. This suggests that they create, to the greatest extent, prerequisites for manifestations of competitive advantages in consumer goods trade chains.

The second group, referring to the **negative average values**, for the evaluation of utility can be divided into 4 subgroups. In the first subgroup fall "strategy and organisation" with an almost zero average value for utility – 0.05, "local society" with -0.32, which is almost a symmetrical mean of the resource "company culture" (0.37) and "skills and experience" with -0.63. The second subgroup includes the elements of organizational resources of innovation with -1.16, business systems with -1.69 and intellectual property rights with -2.85. The results raise questions as commercial practice proves that ”the brand image and reputation of a retail business are increasingly important intangible assets for building consumer loyalty, securing income and return on investment in retail trade” (Dimitrova, 2022). The penultimate subgroup includes the resources “education and training” with -3.64, “financial institutions” with -3.86 and “educational institutions” with -4.52. It was established that during the period 2008-2017 “the relative share of the employees with a degree in science and technologies in the sector of trade in Bulgaria is several points higher compared to the European Union” (Perkov, 2018). The last subgroup includes the resources with the lowest average scores for

utility and these resources are “competencies” with -5.24 and “owners” with -5.75. The obtained low average values for utility with regard to the resource of competencies are perceived as a lower degree of impact of this resource in the process of value creation at the moment and suggest the presence of potential in the application of the competence approach as a management tool. It is a well-known fact that “the investment in the development of skills and competencies generates economic benefit and allows full use of human potential” (Stoyanov, 2015).

Based on the conducted analysis of the resources which have a negative sign with regard to the creation of value for trade chains, it is concluded that the importance of the resources "owners" -5.75 and "competencies" -5.24 is the lowest. These scores should not be considered in an absolute sense, but rather relative to the remaining resource combinations (See Table 2). The evaluation is based on the position of each combination of three resources relative to all others. The negative average values of the utility evaluation of resources do not mean that these resources have a negative impact on the value creation of trade chains. They are interpreted to mean that they are evaluations presented on an interval scale with a subjectively chosen zero starting point and take into account their lower degree of impact on value creation for trade chains at the moment compared to other intellectual resources.

From the obtained results presented in Tables 4 and 5, it can be summarised that there is no group of intellectual resources that has clearly expressed only positive or only negative values of the average utility. All three types of intellectual resources at the second research level – human, organizational and relational – have elements with both positive and negative values. Therefore, there is no reason to categorically point out a leading intellectual resource in the creation of value and prerequisites for the manifestation of competitive advantages in the studied trade chains.

4.2. Analysis of the importance of intellectual capital in retail trade

In addition to utility, conjoint analysis deals with the feature of importance. Importance is related to the individual resources at two levels – individual and average. It shows how important the given resource is for each respondent manager (individual levels) as well as an average for all respondents. It is calculated based on utility and at the expert level the following steps are followed:

- The difference between the maximum and minimum value of utility for each type of third-level intellectual resource for the corresponding second-level resource is calculated. For example, for the intellectual resources of human capital in Table 3, the maximum value is 7.25 and the minimum is -8.05, and the resulting difference is 15.29 = 7.25 – (-8.05). Similarly, the differences are calculated for organizational and relational resources. Their differences are 17.09 and 16.20, respectively.
- In the second step, the three differences obtained for the intellectual resources of human, organizational and relational capital are added up – 15.29+17.09+16.20 and the sum is 48.58.

- At the third step, each of the three obtained differences is divided by the total sum of the differences and the obtained value is multiplied by 100. In this way, the relative utility of each of the intellectual resources in the total utility determined by each surveyed expert is obtained, i.e. (15.29/48.58) x 100 =31.48% for intellectual resources, elements of human capital; (17.09/48.58) x 100 =35.18% for organizational resources and (16.20/48.58) x 100 =33.34% for relational resources. This is the way in which the individual values of importance presented in Table 5 were obtained. The individual evaluations of intellectual resources according to the criterion of importance in Table 5 were obtained on the basis of the described calculation procedure applied to the individual evaluations of intellectual resources according to the criterion of utility from Table 3.

Table 5. Individual assessment of intellectual capital according to the criterion of importance

Expert number	Intellectual resources that are elements of:		
	Human capital	Organizational capital	Relational capital
1	31,48	35,18	33,34
2	33,80	23,83	42,37
3	21,49	31,26	47,25
4	28,51	32,89	38,60
5	27,47	28,88	43,65
6	35,63	22,99	41,38
7	23,71	30,67	45,61
8	40,23	26,04	33,73
9	38,68	28,47	32,85
10	39,81	27,11	33,08
11	35,52	20,94	43,53
12	43,39	16,03	40,58
13	46,57	18,33	35,10
14	44,30	21,56	34,14
15	38,43	22,92	38,65
16	39,46	22,35	38,18
17	45,31	21,65	33,04
18	36,06	24,15	39,79
19	47,04	16,83	36,13
20	36,41	15,47	48,12
21	24,50	26,89	48,61
22	30,39	29,10	40,52
23	35,68	31,29	33,03
24	32,48	19,22	48,31
25	40,42	23,18	36,40

Source: Developed by the author

The individual evaluations of the intellectual resources according to the criterion of importance in Table 5 show the relative importance of each of the intellectual resources at the second research level for individual experts in the process of value creation in trade chains. The limits within which these evaluations vary in terms of importance are presented in Table 6, in the columns for minimum and maximum value of the evaluation. For intellectual resources as elements of human capital, the minimum value is 21.49, and the maximum is 47.04. The largest difference measured by the standard deviation is found here

– 7.11. This means that with regard to intellectual resources as elements of human capital, there is the greatest difference between the assessments of individual experts regarding the contribution of these resources to the creation of value for the investigated retail chains.

Table 6. Summary assessment of intellectual capital according to the criterion of importance

Source Intellectual resources that are elements of:	Minimum	Maximum	Average	Standard deviation
Human capital	21,49	47,04	35,87	7,11
Organizational capital	15,47	35,18	24,69	5,41
Relational capital	32,85	48,61	39,44	5,37

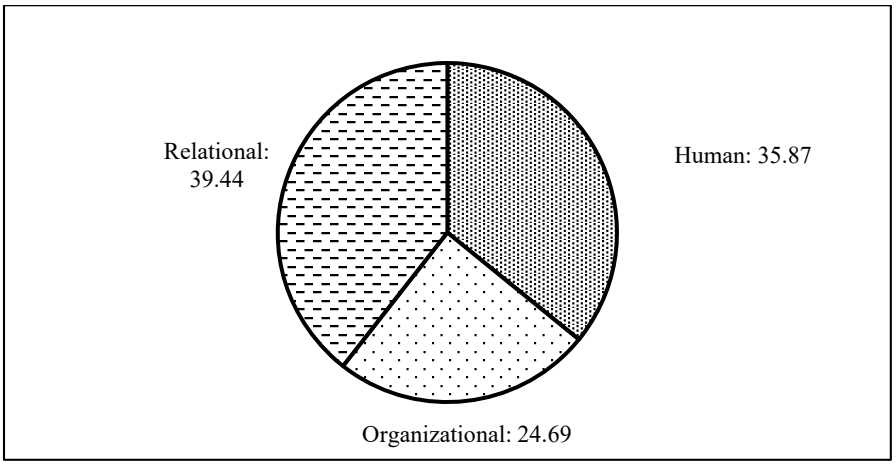
Source: Developed by the author.

Second in width of the interval are organizational resources with a lower limit of 15.47 and an upper limit of 35.18, and a standard deviation of 5.41 (Table 6). Third are relational resources with a lower limit of 32.85 and an upper limit of 48.61, and a standard deviation of 5.37, i.e. the variance is quite close to the amount of variance in organizational resources.

Two facts are noteworthy of the analysed values:

The first one is related to the maximum values for intellectual resources as elements of human and relational capital whose values are very close – 47.04 and 48.61 respectively, which is a difference of 1.57 percentage points only.

Figure 1. Average rating of intellectual capital according to the criterion of importance



Source: Developed by the author

The second fact is related to the standard deviation values for organizational and relational resources, where the difference is only 0.04 percentage points. This means that the differences in experts' assessments with regard to the contribution of organizational and relational resources in the creation of value for trade chains are almost equal in size. It can

be assumed that the close degrees of variation in the evaluations of organizational and relational resources are due to the approximately equal perception of their importance as a management tool.

The summarised (average) ratings for the importance of each of the intellectual resources at the second research level are presented in Table 7 and illustrated in Fig. 1. The aggregate or average importance rating indicates how important the relevant intellectual resource is according to all respondents.

The data show that, according to all surveyed managers, relational resources are the most important for creating value in the studied trade chains, the second most important are intellectual resources as elements of human capital, and the third position is occupied by organizational resources. The obtained values for the mean scores for the criterion of importance are relatively close, which means that there is a balanced relationship between the three types of intellectual resources of the second research level which are elements of human, organizational and relational capital, respectively.

The ranking of intellectual resources by importance in the value creation process for retail chains in the conjoint analysis differs from the ranking in the first survey related to the compilation of the resource tree of intellectual resources in retail trade and makes visible the effect of the application and the importance of conjoint analysis (Table 7).

According to the results of the conjoint analysis, relational resources which in the first survey the respondent managers ranked third are the most significant according to all respondents for creating value in the studied retail chains. It has been found that "the unique nature of customer relationships is something that competitors cannot imitate" (Dimova, 2009). Intellectual resources as elements of human capital from the first place are repositioned to the second place as a result of the applied conjoint analysis, and organizational resources are repositioned from the second to the third place.

Table 7. Ranking of intellectual capital according to the criterion of importance

First survey (resource tree) Intellectual resources that are elements of:	Second survey (conjoint analysis) Intellectual resources that are elements of:
Human capital	Relational capital
Organisational capital	Human capital
Relational capital	Organisational capital

Source: Developed by the author.

In this study, the conjoint analysis is based on the assessment of combinations of three intellectual resources and their joint influence on the creation of value in retail trade, while the first survey determines the importance of each resource on its own relative to all others.

In conjoint analysis, the significant combinations of intellectual resources making up the experiment design are compared, evaluated, and ordered as a whole, regardless of the possibility for the respondents to see the individual elements of the combinations. In this way, the conjoint analysis considers the joint influence of the intellectual resources of the relevant combination in accordance with the capabilities of the intellectual resources for value

creation in retail trade. At the same time, it allows us to take into account latent and invisible factors influencing the choices and judgements of experts in determining their priorities.

5. Conclusions

The conclusions of the conducted research can be summarised in two directions:

- to what extent the method applied is suitable for the achievement of the goal set;
- assessing the significance of joint impact and the extent to which elements of intellectual capital contribute to value creation and the establishment of conditions for manifestations of competitive advantages in retailing.

The answer regarding the use of conjoint analysis is positive. Although its main application is in the field of marketing, it is obvious that this method is closely related to the analysis of hierarchical processes created by T. Saati, as well as to the methodology of G. Roos, S. Pike and L. Fernstroem for the management of intellectual capital and with its help a wide range of tasks from various fields are solved. The present study answered questions managers are faced with in practice and not only in retail trade. They are related to the possibility to define the most important intellectual resources and their joint effect for the achievement of various economic goals. With the quantitative assessments of the "utility" and "importance" of intellectual capital, a step forward is made in evaluating their significance for value creation in retail trade. The application of conjoint analysis in retailing provides a better understanding and deeper justification of the role of different elements of intellectual capital on market performance.

The analysis of the results obtained for the partial and overall "utility" and "importance" makes it possible to draw the following conclusions:

The maximum individual values of utility are concentrated in two groups of intellectual resources. The first group includes intellectual resources as elements of human capital and the second – intellectual resources as elements of relational capital. Personal qualities as an intellectual resource are indicated as the greatest contributor to utility creation. The average positive values for utility show that the intellectual resources of the third research level – personal qualities, customers and motivation, affect the process of value creation in the surveyed commercial firms the most. This fact suggests that they create to the greatest extent prerequisites for manifestations of competitive advantages in consumer goods trade chains.

The results for "utility" show that there is no group of intellectual resources that has clearly positive or only negative average utility values. All three types of intellectual resources at the second research level – human, organizational and relational – have elements with both positive and negative values. Therefore, at the moment there is no reason to single out a leading intellectual resource in the creation of value and prerequisites for manifestations of competitive advantages in the surveyed trade chains.

The analysis of the "importance" and of the standard deviation values in particular for the organisational and relational resources shows a minimal difference. This means that the

differences in the experts' assessments with regard to the contribution of organizational and relational resources in creating value for trade chains are almost equal in size.

The summary assessment of the importance of each of the intellectual resources at the second research level shows that the greatest importance in creating value for the studied trade chains is assigned to relational resources, followed by intellectual resources, elements of human capital, and the third position is occupied by organisational resources.

The results obtained from the conducted empirical research do not contradict the theoretically conditioned logic about the decisive role of human capital in the process of value creation and sustainable competitive advantages for commercial companies in retail trade. Organizational and relational resources, including the intelligence, knowledge and experience created and accumulated by previous generations can be considered derivatives of the human factor development in modern economic activity. The undisputed significance of man and human capital as a main creator and bearer of intellectual resources requires its constant and multifaceted analysis, but the results from this research also raise the question about the deeper study of relational capital and its potential as a modern management tool.

To sum up, the conducted research leads to the conclusion that a balanced relationship is observed between intellectual resources, elements of human, organizational and relational capital, without any of the three groups of intellectual resources establishing themselves, at the present moment, as the undisputed leader in the process of value creation for the researched retail chains.

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ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
ECONOMIC STUDIES

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Oleh Kolodiziev[1]
Andrii Gukaliuk[2]
Valeriia Shcherbak[3]
Tetiana Riabovolyk[4]
Ilona Androshchuk[5]
Yaryna Pas[6]

THE IMPACT OF REFUGEE STARTUPS ON HOST COUNTRY ECONOMIES: BUSINESS MODELS AND ECONOMIC ADAPTATION[7]

The current global economic landscape is characterized by turbulence and crises, such as the COVID-19 pandemic and military conflicts, which have disrupted the development of innovative startups. In this context, it becomes essential to explore how refugee startups influence the economies of host countries and facilitate their adaptation to specific conditions. This article aims to examine the most suitable and optimal business models for such startups, the industries they predominantly operate in, their overall impact on economic growth, and the potential for cross-border collaboration among refugee entrepreneurs. Additionally, the article intends to analyze the relevance of existing financing models for startup sustainability and explore innovative methods and instruments that can effectively address the challenges faced

[1] *Oleh Kolodiziev is the Professor of the Department of Customs and Financial Services, Simon Kuznets Kharkiv National University of Economics, D.Sc. (Economics), Professor, Ukraine. Tel: +380503232890. E-mail: kolodizev107@ukr.net.*
[2] *Andrii Gukaliuk is the First Vice-Rector, Associate Professor of the Department of Economics of Enterprise, Ivan Franko National University of Lviv, Ph.D. (Economics), Associate Professor, Ukraine. Tel: +38(032)239-43-22. E-mail: andrii.gukaliuk@lnu.edu.ua.*
[3] *Valeriia Shcherbak is the Professor of the Department of Economics and Entrepreneurship, Sumy National Agrarian University, D.Sc. (Economics), Professor, Ukraine. Tel: +380999687135. E-mail: valery.shcherbak@gmail.com.*
[4] *Tetiana Riabovolyk is the Head of the Department of Economics, Management and Commercial Activities Central Ukrainian National Technical University, Ph.D. (Economics), Associate Professor, Ukraine, Tel:+380500871913. E-mail: ryabovolik@ukr.net.*
[5] *Ilona Androshchuk is the Associate Professor of the Department of Economics, Management and Commercial Activities Central Ukrainian National Technical University, Ph.D. (Economics), Associate Professor, Ukraine, Tel: +380967343224. E-mail: ilonka.tsarenko@gmail.com.*
[6] *Yaryna Pas is the Senior Lecturer of the Department of Finance, Banking and Insurance, Lviv University of Business and Law, Ph.D. (Economics), Ukraine. Tel: +380972470486. E-mail: yaruna86@ukr.net.*
[7] This paper should be cited as: *Kolodiziev, O., Gukaliuk, A., Shcherbak, V., Riabovolyk, T., Androshchuk, I., Pas, Y. (2024). The Impact of Refugee Startups on Host Country Economies: Business Models and Economic Adaptation. – Economic Studies (Ikonomicheski Izsledvania), 33(2), pp. 175-201.*

by refugee startups. By investigating the alignment between financing models and the current economic state, this study provides valuable insights for fostering economic recovery and development in regions hosting refugee populations. In summary, this analysis offers insights into the impacts of refugee startups on host economies, focusing on their suitability and impact on economic growth, the relevance of financing models in sustaining these startups, and the potential for cross-border collaboration among refugee entrepreneurs.
Keywords: start-ups; business models; financing; turbulent
JEL: D25; G11; M13

1. Introduction

The global economic landscape faces turbulence and crises, like the COVID-19 pandemic and military conflicts, impacting innovative startups. Changing startup trends since 2019 offer lessons for 2022. Amid crises, like Ukraine's military actions, we must learn from these events and seek new solutions for economic recovery. Startup history shows financing's pivotal role, despite positive innovation infrastructure and venture capital. Globalization offers market access but adversely affects regional startups. Despite available financing tools, many startups (70-90%) cease within 2-5 years. We need to analyze existing business models and explore new ones. This study is relevant for: 1) Understanding startup financing models at different stages, 2) Identifying effective financing methods for economic recovery, and 3) Aligning financing models with the current economic state.

In today's turbulent economy, due to COVID-19 and conflicts like Ukraine, startups are vital for adaptive recovery and economic development. Different "business models" for startup financing create added value. However, the theoretical basis for financing startups depending on their lifecycle stage remains open. This article summarizes research on startup business models and defines their conceptual framework, structure and financing methods.

Refugee startups play a crucial role in adaptive economic recovery and economic development. This article explores their business models, conceptual framework, structure, and financing methods. It examines their impact on host country economies through a qualitative research approach, emphasizing their contribution to economic growth and innovative solutions. Successful business models include social entrepreneurship, impact investing, and collaborative networks, operating mainly in technology, healthcare, and food services. Understanding and implementing appropriate business models and financing methods can support refugee startups' growth and sustainability, benefiting host country economies.

2. Literature Overview

The study of startups has gained attention for driving innovation and growth. Startups introduce new products, services, and business models, often in high-growth sectors, using technology. Understanding startups is crucial for policymakers, investors, and researchers. They're prominent in tech, e-commerce, biotech, fintech, and renewable energy. These

sectors offer growth and disruption opportunities. Financing options include venture capital, angel investors, crowdfunding, and incubators/accelerators. Refugee startups, created by displaced entrepreneurs, face unique challenges like language barriers and limited resources but bring diverse perspectives. Ukrainian startups, influenced by the tech sector and local support, have their characteristics. Analyzing startup literature provides insights into their nature, industry preferences, business models, and funding. Researchers and practitioners can use this information to support startup growth and economic contributions.

1.1. Crowdfunding as a financing mechanism: Exploring the economics and challenges for startups

Agrawal et al. (2014) publication "Some simple economics of crowdfunding" explores the economics of crowdfunding as a financing mechanism for startups. The authors discuss how crowdfunding platforms enable entrepreneurs to access capital from a large number of individuals, thus bypassing traditional funding channels. They analyze the incentives and motivations of both entrepreneurs and investors in crowdfunding campaigns, highlighting the importance of signalling, social networks, and project quality in determining campaign success. While the study provides insights into the potential benefits and challenges of crowdfunding, it does not specifically address the use of crowdfunding for refugee startups. The article by Gokce et al. (2023) explores job satisfaction and organizational commitment in Syrian refugee textile enterprises in Turkey, providing insights relevant to the context of refugee startups. The study investigates the impact of Syrian refugee entrepreneurs in the Turkish textile industry on job satisfaction and organizational commitment among refugee employees (Carrigan, 2020). "2019 small business failure rate: Startup statistics by industry (National Business Capital and Services Report)." This report presents startup failure rate statistics by industry based on data from 2019. It provides insights into the challenges faced by startups across different sectors, including factors contributing to their failure. The report also includes valuable information on the failure metrics of refugee startups, taking into account the unique challenges they might encounter in the business environment of the recipient country (CB Insights, 2021). "The Top 20 Reasons Startups Fail." This analysis by CB Insights identifies the top reasons for startup failure based on an examination of startup post-mortems. It highlights common pitfalls and challenges faced by startups, such as market-related issues, team dynamics, and financial mismanagement. While the analysis sheds light on the general challenges faced by startups, it specifically discusses the unique challenges and solutions related to refugee startups (Chatterji et al., 2019). "When does advice impact startup performance?" In this study, the authors investigate the impact of advice on the performance of startups. They analyze the types of advice received by entrepreneurs and examine how different sources of advice, such as mentors and investors, influence startup outcomes. The unique challenges faced by refugee entrepreneurs, such as limited access to resources, language barriers, and legal constraints, require specific attention in the context of business model development and implementation. Future research should explore the applicability and effectiveness of different business models for supporting and empowering refugee startups, considering their distinct circumstances and needs (Chesbrough et al., 2006). "Open Innovation. Researching a new paradigm." This book explores the concept of open innovation, which involves leveraging external ideas,

technologies, and resources to drive innovation and create value. While it does not specifically focus on business models for startups, the concept of open innovation can be relevant to the creation of startup ventures, as it encourages collaboration, knowledge sharing, and the integration of external inputs into the business model (Dietsch, Petey, 2004). "Should SME exposure be treated as retail or as corporate exposures? A comparative analysis of default probabilities and asset correlation in French and German SMEs." This research paper analyzes the default probabilities and asset correlation in small and medium-sized enterprises (SMEs) in France and Germany. While it does not directly address business models for startups, understanding the credit risk and financial performance of SMEs is relevant to the assessment of the viability and sustainability of startup ventures. Drucker (2007). "Innovation and entrepreneurship: practice and principles." This book by Peter Drucker explores the concepts and principles of innovation and entrepreneurship. It provides insights into the entrepreneurial mindset, the importance of identifying and exploiting opportunities, and the role of innovation in creating and sustaining successful ventures. While it does not focus specifically on business models for startups, it offers valuable guidance on the overall entrepreneurial process (Fisch, 2019). "Initial coin offerings (ICOs) to finance new ventures." This journal article examines the use of Initial Coin Offerings (ICOs) as a means of financing new ventures. ICOs involve the sale of digital tokens or cryptocurrencies to fund projects or startups. The study explores the advantages, challenges, and regulatory considerations associated with ICOs. While ICOs are a specific form of fundraising, they represent an alternative business model for startups to secure capital (Hill, 2018). "Fintech and the Remaking of Financial Institutions." This book discusses the impact of financial technology (fintech) on the remaking of financial institutions. It explores how technological advancements and innovations in financial services are disrupting traditional banking and finance models. The utilization of specific business models for refugee startups and an understanding of the financial technology landscape in the recipient country can provide insights into the potential opportunities and challenges of refugee startups in the financial sector.

1.2. Banking System Stability and Refugee Entrepreneurship: Insights from Financial Perspectives and Policy Frameworks

Kolodiziev et al. (2021) propose an approach in their publication, "The Level of Digital Transformation Affecting the Competitiveness of Banks," focusing on the implementation of innovative digital technologies to maintain a bank's competitive position and assess the effectiveness of its investments, providing insights applicable to the financing stage of startup activity. Additionally, Wise and Feid's (2017) book, "Startup Opportunities: Know When to Quit Your Day Job," offers guidance on recognizing startup opportunities and transitioning to full-time entrepreneurship, emphasizing strategic considerations for aspiring entrepreneurs, albeit not extensively covering specific business models for startups. In the publication by Yehorycheva et al. (2017) "Actual Problems of the Ukraine's Banking System Capital Stability Management" the authors emphasized the need to overcome risks, which requires the construction of a strong and financially stable banking system that will effectively perform its main function – the optimal redistribution of capital to finance accelerated economic development. "Refuge: Transforming a Broken Refugee System" by

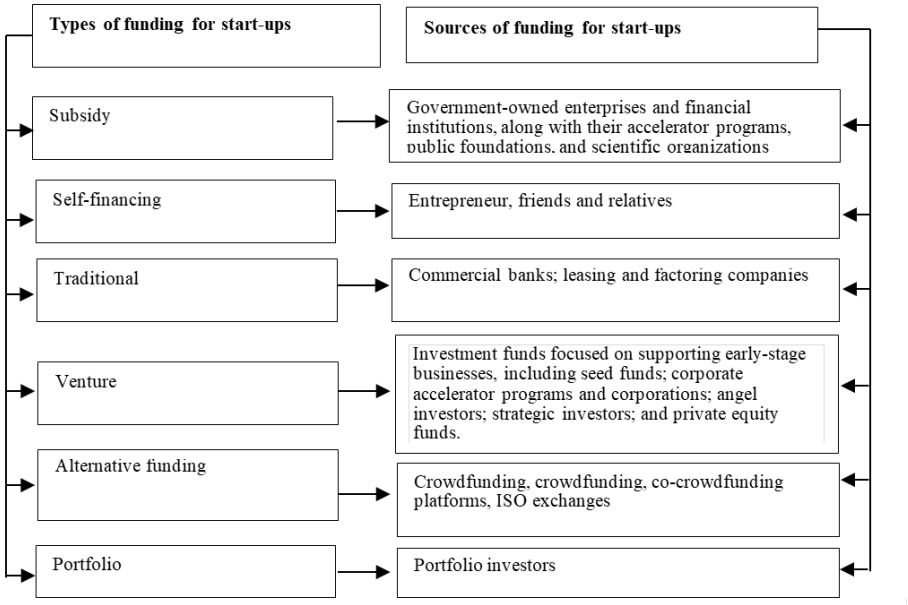
Betts and Collier (2017) sheds light on the challenges and potential solutions for improving the refugee system, which is crucial for creating a conducive environment for refugee startups. "Diasporas Reimagined: Spaces, Practices and Belonging" edited by Sigona et al. (2018) explores the concept of diaspora communities and their role in fostering entrepreneurship and economic integration, including among refugees. "Refugee Economies: Forced Displacement and Development" edited by Daccord and Lubkemann (2019) examines the economic impact of forced displacement and how refugee communities can contribute to local and national development through entrepreneurial activities. "Refugee Startups: Critical Approaches to the Social and Economic Integration of Refugees through Entrepreneurship" by Likić-Brborić (2020) offers a critical analysis of the social and economic integration of refugees through entrepreneurship and highlights the potential benefits and challenges they face in startup ventures. "The Refugee Entrepreneur: The Microeconomic Impact of Forced Displacement" by Ionescu (2018) explores the microeconomic impact of forced displacement and emphasizes the potential of refugee entrepreneurs in driving economic growth and innovation. "Refugees and Forced Displacement: International Security, Human Vulnerability, and the State" edited by Callo and Grote (2019) examines the intersection of refugee issues with international security, human vulnerability, and state policies, providing insights into the broader context of refugee startups. "Advancing Refugee Protection in a Turbulent Era" by Fine and Yamin (2017) focuses on the legal and policy aspects of refugee protection, which are crucial for creating an enabling environment for refugee startups. "Disrupting Entrepreneurship Education: Challenging Current Perspectives in Contexts of Refugee Migration and Forced Displacement" edited by Gerdes and Wadhwani (2020) explores innovative approaches to entrepreneurship education in the context of refugee migration, aiming to empower and support refugee entrepreneurs. "Refugees and Forced Labour: Regimes of Exclusion and Inclusion" edited by Wickramasekara and Carroll (2021) examines the relationship between forced displacement and labour exploitation, highlighting the importance of addressing labour rights and inclusion for refugee entrepreneurs. "Routledge Handbook of Migration and Development" edited by Weinar et al. (2018) provides a comprehensive overview of migration and development issues, including the role of entrepreneurship and startups in the economic and social integration of migrants and refugees. These selected sources cover a range of topics related to refugee startups, including policy frameworks, economic impacts, social integration, entrepreneurship education, and labour rights. They contribute to a better understanding of the challenges and opportunities associated with refugee entrepreneurship and provide valuable insights for policymakers, researchers, and practitioners working in the field of refugee startups.

1.3. Evolution of startup financing: A comprehensive analysis of funding types, sources, and life cycle stages

Over the past two decades, the financing landscape for startups has witnessed a substantial transformation on a global scale. Simultaneously, diverse funding experiences for startups have emerged worldwide. By examining, synthesizing, and organizing these varied financing experiences, it becomes possible to establish effective startup ecosystems through an analysis of both positive and negative instances. Throughout the history of the startup economy, it has

been intrinsically connected to the advancement of innovation and innovation infrastructure. Therefore, it is advisable to consider the innovation domain as the external environment for startups and explore the common innovation factors that influence their ability to attract funding. The analysis reveals various types and sources of funding available for startups (Figure 1).

Figure 1. Categories and origins of funding for startup enterprises



Source: compiled by the authors.

The examination of each funding type and its corresponding sources based on the startup's life cycle stage (LCC) will be conducted separately. During the seed and early stages of the startup life cycle, subsidized financing is commonly utilized. The primary sources of self-financing include the entrepreneurs themselves and funds from friends and relatives (Jabeur et al., 2017). Traditional startup financing sources in this stage encompass commercial banks, leasing companies, and factoring companies (Kaili et al., 2019). Venture financing is characterized by supporting entrepreneurial talent in transforming ideas into globally recognised products and services (Keogh, Johnson, 2021). The venture capital market comprises venture capital funds, accelerators, business angels, and strategic investors. In the early and expansion stages, venture capital funds are frequently employed as commercial financial institutions that invest in innovative and high-risk projects. Corporate accelerators aim to intensively develop companies through mentorship, training, and financial and expert support in exchange for equity participation (Melegati et al., 2019). Business angels, as individual investors, often provide their own funds in smaller amounts during the early stages of development. Strategic investors, whether individuals or entities, purchase shares in

companies primarily during later growth stages. Acquiring a mature company with significant potential can yield substantial synergy benefits for the buyer (Rupeika-Apoga, 2014).

After the acquisition, the company typically transitions from a startup to becoming part of an established business. Private equity funds are investment funds that secure a stake of at least 10% in a company's share capital in exchange for direct investment. Acquiring a stake allows the fund to have representation on the board of directors and participate in company management. Their activities primarily involve financing companies during later stages of growth. Alternative financing options are now widely utilized during the early stages of startup development. Crowdfunding is the prevailing model within alternative financing, encompassing crowdfunding, crowdsourcing, and crowdfunding platforms as funding sources for startups. Crowdfunding involves raising third-party funds from the general public through an intermediary, typically an online platform (Valanienea, Jegeleviite, 2014).

According to a report by the European Commission, crowdfunding platforms can be categorized as follows: debt and equity crowdfunding platforms, debt crowdfunding platforms, and invoice trading platforms where businesses sell invoices or receivables to investors (Silva, Carreira, 2017). Reward-based crowdfunding involves individuals or businesses contributing funds to a project or business and receiving goods or services in return. Philanthropic crowdfunding entails individuals or businesses donating funds to charitable projects without expecting any returns (Tomczak, Brem, 2013).

Hybrid crowdfunding models combine elements from different crowdfunding types. Portfolio funding relies on portfolio investors as funding sources for startups. These investors can be individuals, banks, or other financial institutions that trade the securities of startups that have reached the initial public offering (IPO) stage during late-stage growth. An IPO represents the first sale of shares by the issuing company on the open stock market (Teker et al., 2016). A secondary public offering (SPO) refers to the additional sale of shares after the IPO. Table 1 presents the main advantages and disadvantages of startup financing.

The various types and sources of funding are exemplified through different forms and instruments of financing (Kaili et al., 2019; Kaya, Persson, 2019). These forms of financing include subsidized funding, equity financing, debt financing, and hybrid financing. The "hybrid" form of financing refers to utilizing a funding source that combines elements of both equity and debt financial instruments, such as a profit-sharing loan or a convertible loan that transitions from debt to equity over time. The publication of Ponomarenko et al. (2017) “Benchmarking of Bank Performance Using the Life Cycle Concept and the DEA Approach” modified the technology of bank performance benchmarking based on the concept of the life cycle and the DEA approach, which determines the differences between certain stages in strategic orientations, intensity of development, financial needs and goals. The authors state that benchmarking can be considered as a method of assessing and comparing the situation in the venture capital market or a method of comparing the effectiveness of the management of small and medium-sized enterprises. These listed types, along with their corresponding sources, instruments, and forms of financing, are allocated to different life cycle stages of startups (see Table 2).

Table 1. Pros and cons of different startup funding types

Type of Financing	Advantages	Disadvantages
Subsidy	The potential for securing non-repayable funds. The chance to establish a reputation as a recipient of grants or subsidies. Connections and assistance from government institutions. Opportunities for knowledge acquisition and human resource development.	Challenges in completing technical documentation. Limited funding amounts. Primarily utilized during the early stages of the startup life cycle.
Self-financing	Potential for maintaining control over the business and the opportunity for independent management (though not always guaranteed).	Limited funding availability. Impeded growth potential due to insufficient external funding. Lack of communication channels with potential investors.
Traditional	Potential for maintaining control over the business and the opportunity for independent management (though not guaranteed in all cases). Ability to secure additional funding.	Challenges in completing technical documentation. Sectoral reluctance to provide loans to startups. High-interest rates and collateral requirements.
Venture	Opportunity to secure additional funding. Potential for knowledge acquisition and sharing experiences. Personal interest from investors, fostering personal relationships. Specialization in specific industries.	Organizational and financial obstacles in accessing funding. Lack of interest from investors in seed-stage companies.
Alternative	Potential to secure funding. Opportunity to validate and enhance the product. Time-saving by avoiding the need to search for individual investors. If investors are involved, it indicates their interest in the startup's further development.	Primarily employed during the early stages of the life cycle. Limited capacity to secure substantial funds for accelerated growth.
Portfolio	Potential to secure capital for expansion, acquiring assets, or fulfilling other corporate objectives. Capability to provide cash payouts to founders, employees, venture capitalists, and other investors. Enhancing the market value of the company. Achieving an exit strategy for the founders of the business.	Typically applicable only during the later stages of the life cycle. The IPO (Initial Public Offering) process is time-consuming and expensive. Following the IPO, owners are required to provide regular financial reports on the company's condition.

Source: compiled by the authors.

Table 2. Categorization of start-up financing elements across life cycle stages

Types of financing	Sources of financing	Forms of financing	Financing instruments	Start-up lifecycle stage*		
				1	2	3
non-commercial						
Subsidised funding	Government-owned enterprises and state banks, state foundations, and scientific organizations	Subsidy	Grants	✓	✓	✓
			Subsidies	✓	✓	✓
	Nonprofit organizations, benefactors of the arts	Subsidy	Donations	✓		
commercial						
Self-financing	Entrepreneurs, friends, relatives	Equity	Contribution to share capital	✓		
			Purchase of a block of shares	✓		
Traditional finance (banking, leasing, factoring)	Commercial banks	Hybrid	Convertible loan	✓		
			Profit-sharing loan	✓		
			Warrant	✓		

Types of financing	Sources of financing	Forms of financing	Financing instruments	Start-up lifecycle stage*		
				1	2	3
			Mezzanine loan		✓	✓
			Subordinated loan		✓	✓
		Debt	Bridge loan		✓	✓
			Bank loan		✓	✓
			Promissory note			✓
			Bond			✓
	Leasing and factoring companies	Hybrid	Leasing			✓
			Factoring			✓
Venture funding	Investment funds focused on supporting early-stage businesses, such as seed funds, and specialized banking divisions dedicated to start-ups.	Equity	Contribution to share capital	✓	✓	✓
			Purchase of a block of shares	✓	✓	✓
		Hybrid	Convertible loan	✓		
			Profit-sharing loan	✓		
			Warrant	✓		
			Mezzanine loan		✓	✓
		Debt	Venture loan		✓	✓
	Corporate accelerators, corporations	Shared	Equity contribution	✓	✓	✓
			Equity purchase	✓	✓	✓
		Hybrid	Convertible loan	✓		
			Equity loan	✓		
	Business angels	Equity	Equity contribution	✓	✓	✓
			Acquisition of shareholding	✓	✓	✓
		Hybrid	Convertible loan	✓		
			Equity loan	✓		
	Strategic investors	Equity	Equity contribution		✓	✓
			Equity purchase		✓	✓
	Private equity funds	Debt	Equity contribution			✓
			Acquisition of block of shares			✓
			Venture capital loan			✓
Alternative Financing	Crowdfunding platforms, and exchanges for Initial Coin Offerings (ICOs)	Equity	Equity contribution	✓	✓	
			Share purchase	✓	✓	
		Hybrid	Convertible loan	✓		
			Equity loan	✓		
			ICO	✓	✓	✓
			STO	✓	✓	✓
		Debt	Loan		✓	✓
Portfolio funding	Portfolio investors	Debt	Buying a block of shares			✓
			Promissory note			✓
			Bond			✓

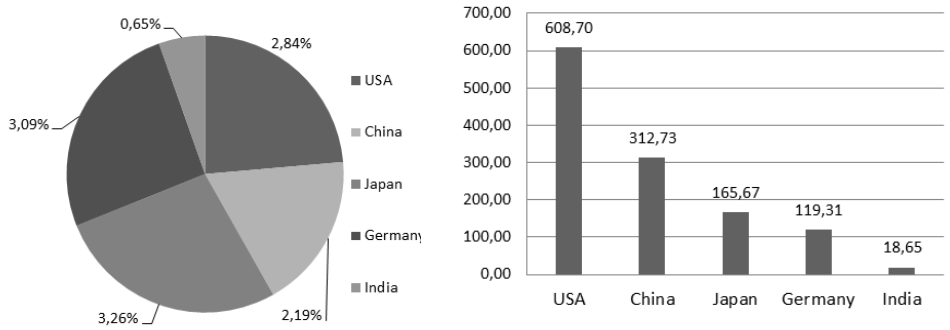
*Comment: * Start-up lifecycle stage (1-seeded, 2-early growth, 3-late growth).*

The provided classification demonstrates the established connection between funding elements, and its primary benefit lies in the flexibility to include or exclude any funding instrument.

1.4. Global trends in startup financing: A comprehensive analysis of sectors, valuation, and funding models

The examination of funding trends in the startup ecosystem involves analyzing the primary sectors and their funding amounts across different countries. For instance, according to research conducted by the Startup Genome research centre, the global startup economy (SE) witnessed a significant increase in its total valuation, reaching USD 2.8 trillion between 2016 and 2018. This indicates a growth of 21.7% from 2015 to 2017 (USD 2.3 trillion) and a 53% increase from 2014 to 2016 (USD 1.83 trillion). In 2019, the estimated value approached USD 3 trillion. However, due to the impact of the COVID-19 pandemic, the valuation dropped to USD 1.32 trillion in 2021 and had not fully recovered to pre-pandemic levels by 2022 (GFDR, 2021/2022) (Figure 2).

Figure 2. Startup financing across different countries

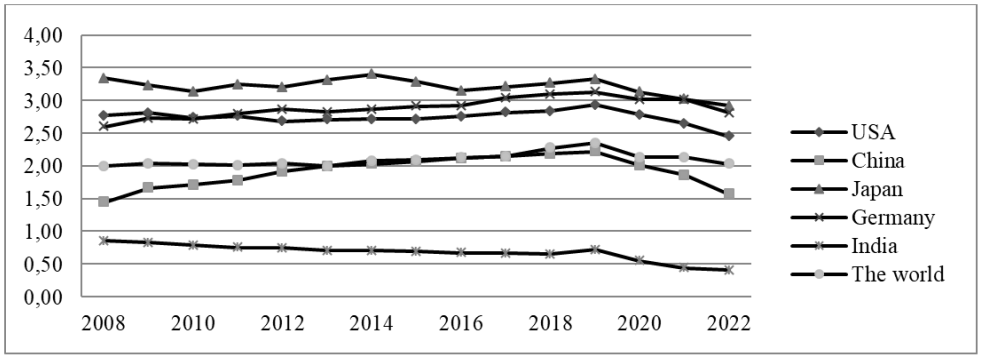


Share of GDP expenditure on R&D in 2022 *Estimated R&D expenditure in billion USD, 2022*

Source: GFDR, 2021/2022

Based on the 2022 GDP data in US dollars, the significant economic dominance of the USA is evident, followed by China, Japan, Germany, and India, reflecting the diversity of the global economic landscape. The analysis of statistical data during the period of startup proliferation reveals a significant surge in the global startup economy (SE), particularly in specific sectors, starting from 2008. In 2008, only one of the top ten largest companies globally was an innovative technology developer, namely Microsoft. However, by 2019, this number increased to seven, with Apple, Google, Microsoft, Amazon, Facebook, Alibaba, and Tencent all being recognized as major players in the industry. The proportion of GDP allocated for research and development (R&D) expenditures is depicted in Figure 3 (ITR, 2022).

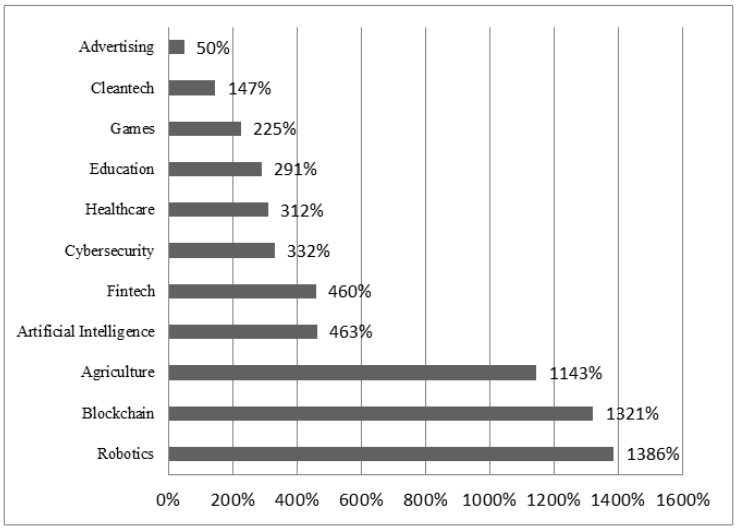
Figure 3. Proportion of GDP allocated to research and development (R&D) Expenditure (GAFMBR, 2020)



Source: ITR, 2022.

Figure 4 illustrates the progression of startup funding across various sectors from 2012 to 2022 (GSEIR, 2022).

Figure 4. Trends in Start-up Financing by Sector from 2012 to 2022



Source: ITR, 2022.

Factors leading to changes in startup financing in the current context

Examining the historical progression of startups within the financial technology sector and the broader financial industry sheds light on the shifting priorities of established traditional companies, financial institutions, and banks. While banks remain the primary source of credit for small and medium-sized enterprises (SMEs), the growth of the startup ecosystem has

brought about changes in the traditional finance sector. This shift has given rise to a plethora of new financial services and products, including peer-to-peer (P2P) and peer-to-business (P2B) lending, mobile payments, e-insurance, and others.

These innovative solutions offered by startups leverage modern digital technology and present viable alternatives to banks, with fewer barriers to obtaining funding. In 2022, the total value of alternative finance options reached $131 billion. Among these, the P2P consumer credit marketplace model emerged as the dominant alternative finance model globally, attracting $34.7 billion in investments.

The P2B consumer credit market model followed closely behind, accounting for 31% of total investment with $34.7 billion. Additionally, the P2B business lending market model attracted $15.4 billion (Table 3) (GSER, 2022). The market structure remains relatively unchanged when excluding the largest Chinese market; however, there are significant variations in volume.

Table 3. Quantities of alternative funding by model

Model of alternative funding	2020		2022	
	billion USD	market share (%)	billion USD	market share (%)
P2P consumer lending	103,1	59	34,7	31
P2P business lending	20,8	12	15,4	14
Business lending	19,8	11	28	25
Consumer lending	10,7	6	13,01	11
P2P property lending	4,6	3	3,1	3
Property lending	4	2	1,8	2
Account trading	3,7	2	3,9	3
Crowdfunding for property purchases	2,9	2	2,8	2
Equity crowdfunding	2,7	2	7	6
Equity crowdfunding	1,1	1	1,5	1
Benefit crowdfunding	0,9	0,51	1,25	1
Consumer financing	0,6	0,34	0,5	0,44
Debt securities	0,5	0,28	0,38	0,34
Microfinancing	0,2	0,1	0,15	0,13
Revenue/profit sharing	0,04	0,02	0,08	0,07
Common ownership of shares	0,02	0,01	0,02	0,02
Minibonds	0,01	0,00	0,43	0,04
Other	0,001	0,00	0,003	0,00
TOTAL	176		131	

Source: SGSE, 2022.

The study emphasizes the significance of alternative funding sources in facilitating the growth of the startup economy, particularly in the context of economic crises that have impacted the state of the startup ecosystem since 2022. To comprehend the factors influencing their development, an empirical study is necessary (Chatterji et al., 2019; Fisch, 2019). Existing literature reveals various business models, methods, and tools for funding startups. However, many entrepreneurs still tend to adhere to traditional approaches. Therefore, the research seeks to establish the necessity for new business models in financing startups in a turbulent world, aiming to identify key drivers and factors for effective economic recovery and development.

The rationale for initiating and investing in startups should be grounded in effective startup lifecycle management practices, leading to the formulation of two research hypotheses.

The first hypothesis, "The effectiveness of financing business models for refugee startups is influenced by the alignment with specific life cycle stages and needs," enables the development of a mechanism for utilizing these methods.

The second hypothesis, "Efficient startup financing and optimal industry selection for refugee startups are determined by threshold values identified through data-driven analysis," allows for identifying the threshold values of efficient startup financing and selecting the most viable industry for their operations.

3. Methodology

To confirm the *first hypothesis*, "The effectiveness of financing business models for refugee startups is influenced by the alignment with specific life cycle stages and needs", the following methodology is proposed:

Stage 1: Exploration of refugee startup characteristics:

Analyze existing refugee-founded startups in various industries and countries.

Study the factors contributing to the success or failure of refugee startups.

Identify the main needs and challenges encountered by refugees in creating and financing startups. This stage can employ observation methods.

Stage 2: Analysis of financing types:

Examine the key types of startup financing, including subsidized, traditional, venture, and alternative options.

Analyze the advantages and limitations of each financing type.

Evaluate the suitability of each financing type for the needs and goals of refugee startups. A prioritization dendrogram can be used for this stage.

Stage 3: Identification of life cycle stages:

Divide the startup life cycle into key stages, such as ideation, product development, launch, growth, and scaling.

Determine the main tasks and needs of startups at each stage.

Cluster analysis can be applied to this stage.

Stage 4: Development of selection criteria for business models:

Define a set of criteria that will help assess the suitability of each business model for refugee startups at different stages of their life cycle.

Develop an evaluation and weighting system for these criteria based on priorities and startup goals. Factor analysis can be utilized for this stage.

Stage 5: Application of the methodology:

Apply the developed methodology to individual refugee startups.

Evaluate each financing business model based on the criteria, considering the specific life cycle stages of the startup.

Analyze the results and select the most suitable financing business model for each stage.

The algorithm for developing the methodology for justifying the choice of business model for refugee startups should consider the specific research objectives and characteristics while incorporating stages for analysis, evaluation, and selection of the most appropriate business model based on the life cycle and needs of refugee startups.

To confirm the *second hypothesis*, "Efficient startup financing and optimal industry selection for refugee startups are determined by threshold values identified through data-driven analysis" to determine the threshold values of efficient startup financing and identify the most viable industry for their operations, the following methodology is proposed:

Stage 1: Data collection:

Gather information on the number of successful refugee-founded startups in various countries and industries.

Obtain data on the financing received by these startups. Statistical data collection and processing methods can be employed for this stage.

Stage 2: Assessment of financing effectiveness:

Conduct an analysis of the financing effectiveness for each startup using key indicators such as total investment volume, revenue growth, profitability, and other relevant metrics.

Evaluate the level of success and sustainability of these startups based on financial performance.

Factor analysis can be utilized for this stage.

Stage 3: Clustering of countries and industries:

Apply a clustering algorithm to group countries and industries based on the number of successful refugee startups and their financial effectiveness.

Determine threshold values for efficient financing by identifying clusters that demonstrate high productivity and stability.

Stage 4: Identification of the most viable industries:

Explore additional factors such as market trends, growth potential, competition, and innovation within each cluster.

Identify the most viable industries for refugee startups based on the analysis of financial effectiveness and development prospects.

Multiple correlation analysis can be employed for this stage.

The calculation algorithm for the second hypothesis includes data collection on successful refugee startups, assessment of financial effectiveness, clustering of countries and industries based on financial indicators, and identification of the most viable industries. This algorithm allows for the determination of threshold values for efficient financing and the selection of the most suitable industry for the activities of refugee startups.

4. Empirical Results

To confirm the first hypothesis in Stage 1, data for calculation were obtained from the following sources: Organizations and programs supporting refugee entrepreneurs, whose reports contain information on the number of startups by country and sectors: Mercy Corps (www.mercycorps.org), The Entrepreneurial Refugee Network (TERN) (http://wearetern.org), International Rescue Committee (IRC) (https://www.rescue.org/), Softr (https://www.softr.io/case-studies/skylight-ventures), United Nations High Commissioner for Refugees (UNHCR) (https://www.unhcr.org/), Centre for Entrepreneurs (CE) (https://centreforentrepreneurs.org/), Refugee Investment Network (RIN) (https://www.devex.com/), International Organization for Migration (IOM) (https://www.iom.int/), International Labour Organization (ILO) (https://www.ilo.org/). Some research organizations, academic institutions, and non-profit organizations release reports containing data on refugee startups. Information on the number of Ukrainian refugee startups by country and sector was obtained from reports by The Global Entrepreneurship Monitor (GEM), Migration Policy Institute (MPI), and other organizations (Table 4).

Data from public and government organizations indicate that the most common obstacles to successful startup development are limited access to external financing and a lack of funds to expand the team. This was indicated by 39.2% and 48.1% of the respondents, respectively. Among the surveyed startups, three-quarters are at the seed stage, and over 25% are in the early growth stage. 19.6% of these projects were initiated by a single founder. 24.7% resulted from the collaboration of three individuals, but the majority, 37.3%, were initiated by two founders. Among the surveyed business entities, the most numerous group of founders consists of eight individuals. 60% of startups operate on a B2B (business-to-business) model, creating products and services for other businesses (micro, small, medium, and large enterprises). Only 29% of the surveyed companies serve customers in the B2C (business-to-customer) segment. The majority of Ukrainian refugee startups operate in industries related to the development of new technologies and computer software. 84.2% of them rely on their own funds as one of the sources of financing, and for 39.2%, it is the only available source of funding. One-third of the enterprises (31%) have also utilized support from various funds and organizations. Another 18.4% have received funding from other government grants.

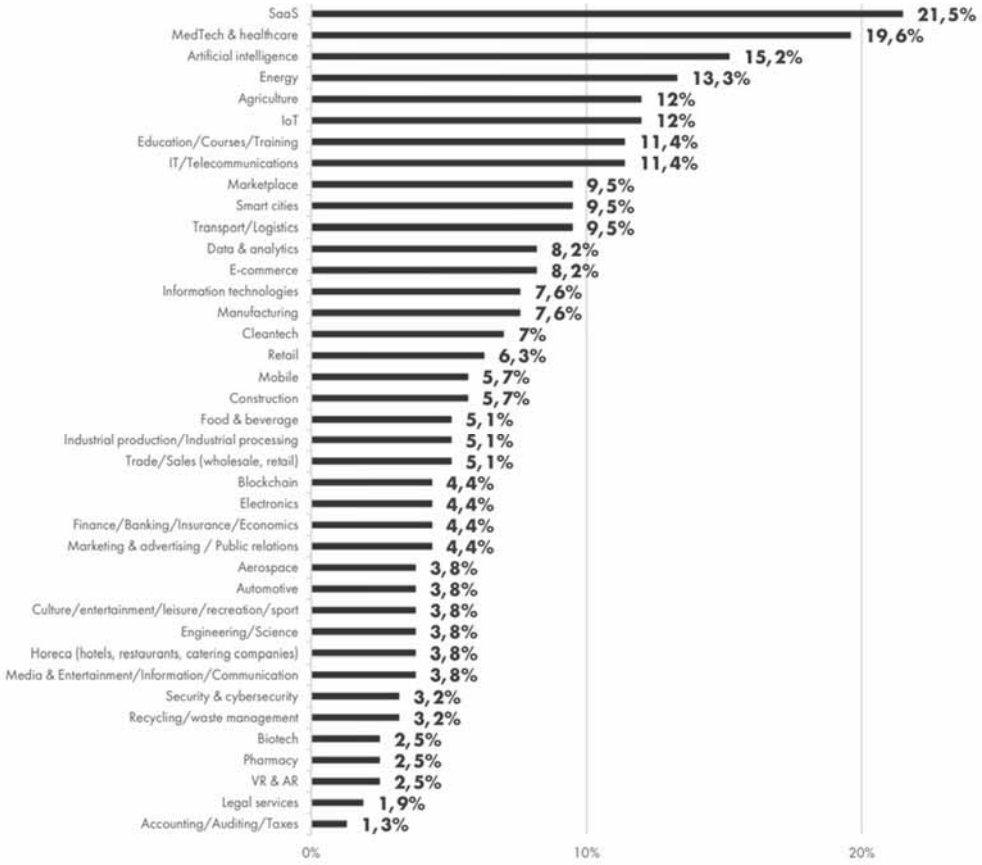
Table 4. Startups of Ukrainian refugees by types of activities and countries

Countries of location	Number of Ukrainian refugees, thousands.	Number of startups by types of activities								
		Agriculture and Food Systems	Inclusive Fintech	Service Sector	IT (Information Technology)	Cybersecurity	Construction and Infrastructure	Healthcare and Medicine	Educational Projects	Green Technologies
Poland	1577	120	200	280	220	20	17	50	57	28
Germany	1010	118	108	170	158	11	16	44	37	13
Czech Republic	502	118	109	166	152	10	25	41	25	10
Italy	173	118	107	176	151	11	34	48	50	17
Bulgaria	155,5	108	98	158	159	10	12	42	26	11
Spain	171	108	99	154	99	11	20	39	22	38
United Kingdom	147	108	97	164	99	11	28	46	28	15
Romania	123,8	89	81	134	90	11	10	41	25	10
France	118	89	82	130	90	11	21	38	23	37
Slovakia	112,7	88	79	139	98	11	29	45	27	11
Moldova	98	82	75	128	92	15	9	40	22	39
Austria	92,4	82	75	124	88	12	27	38	22	36
Netherlands	85,2	82	74	134	87	51	26	44	26	13
Switzerland	78,89	78	70	124	70	19	29	41	22	10
Lithuania	76,2	77	70	120	78	11	27	39	23	37
Ireland	72,6	79	70	132	66	12	25	44	16	13
Belgium	64,4	74	66	121	60	14	29	40	11	39
Portugal	57,1	73	66	116	68	10	27	38	12	36
Sweden	51,2	76	67	130	57	11	25	43	15	12
Finland	49,3	70	63	118	50	11	29	39	13	38
Latvia	46,9	69	62	112	48	11	27	37	12	36
Estonia	44,4	73	65	127	48	13	26	42	11	11
Norway	38,6	68	61	115	39	11	28	39	12	38
Denmark	37,7	66	60	109	39	13	28	37	11	36
Hungary	34,2	70	62	84	37	10	25	41	13	10
Greece	20,9	67	60	54	31	10	30	38	11	37
Cyprus	20,6	65	59	68	28	10	27	37	11	36
Croatia	20,5	69	62	73	19	23	18	40	12	10
Slovenia	8,7	72	27	82	16	19	16	39	8	13
Montenegro	7,9	67	17	72	16	18	15	39	11	9
Iceland	2,2	54	11	42	17	21	17	39	9	11
Malta	1,5	50	8	55	15	18	14	18	21	17
Serbia and Kosovo	1,2	45	9	37	19	17	14	17	20	17
Liechtenstein	0,54	42	7	38	16	19	15	44	47	13

Source: TERN, IRC, Softr, UNHCR, CE, RIN, IOM, ILO, GEM, MPI.

The industries in which Ukrainian refugee startups are represented are illustrated in Figure 5.

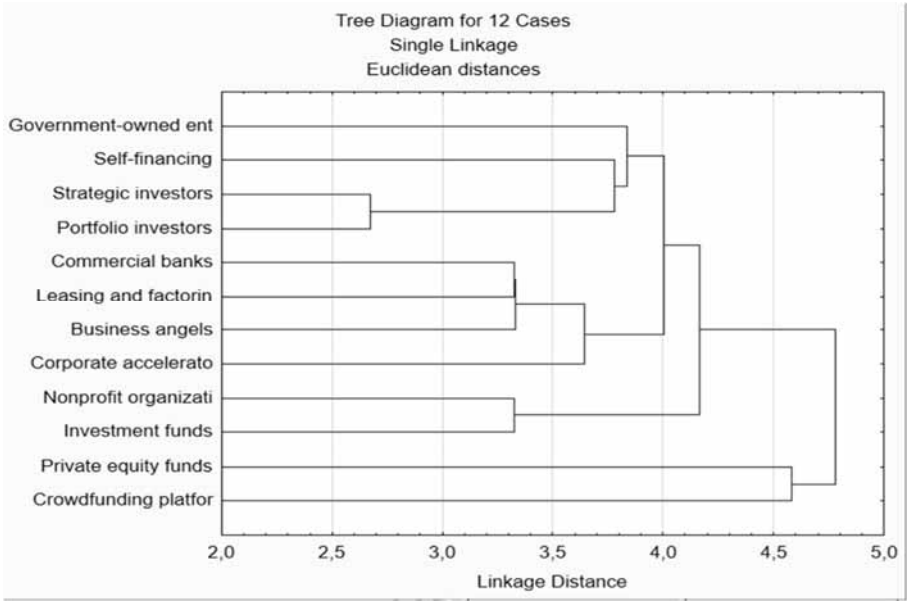
Figure 5: Percentage distribution of Ukrainian refugee startups by industries and types of activities



Source: GEM, MPI.

The analysis conducted in Stage 2 examined the main types of funding for startups, including subsidized, traditional, venture, and alternative financing. The results of the analysis are presented in Figure 6 in the form of a dendrogram.

Figure 6. Analysis of funding sources for startups



Source: compiled by the authors.

Advantages and limitations of each type of financing for Ukrainian refugee startups:

Business Angels:

Advantages: Business angels can provide not only financial support but also their knowledge, experience, and connections, which can be valuable for startups. They are typically willing to invest in the early stages of development when other sources of funding may be unavailable.

Limitations: Business angels may have limited resources and capabilities, so the amount of funding they can provide may be limited. Additionally, reliance on a single investor can create risks, especially if the business angel decides to exit the project.

Direct Investment Funds:

Advantages: Direct investment funds can provide significant amounts of funding, supporting the growth of startups at more advanced stages. They may also possess expertise and resources to aid in business growth and scalability.

Limitations: Competition for funding from direct investment funds can be high, and not all startups may attract their attention. Funds may also require significant equity stakes or controlling rights, which can limit the autonomy of entrepreneurs.

Crowdfunding, Crowdinvesting, Crowdlending platforms, and ICO exchanges:

Advantages: Crowdfunding and crowd-investing platforms offer the opportunity to obtain financing from a wide audience of people, which can help startups attract not only money but also popularity and community support. ICO exchanges provide a means to raise funds through token or cryptocurrency issuance.

Limitations: Crowdfunding and crowd-investing require active marketing campaigns and the ability to capture public attention. ICO exchanges may be subject to regulation and entail certain legal and financial risks.

According to the dendrogram, the most impactful types of financing are business angels, followed by direct investment funds, crowd-funding, crowd-investing and crowd-lending platforms, including ICO exchanges. These financing sources have their own advantages and limitations, and entrepreneurs should consider them when choosing the optimal funding path for their startups.

The analysis revealed that 84.2% of the surveyed enterprises rely on their own funds as one of the sources of financing, and for 39.2%, it is the only available source of funding. One-third of the startups (31%) have also utilized support from various startup funds. Additionally, 18.4% have received funding from government and private grants. It is worth noting that over half of the startups are not generating any revenue yet. This makes them highly dependent on external financing and vulnerable to obstacles in their development. This could result in falling behind the competition and the need to deviate from strategic goals in favour of short-term profitability. Barriers and expected forms of support for startups include limited access to external funding (39.2%), difficulties in finding customers (18.4%) and business partners (15.8%), as well as excessive bureaucracy (19%). These external challenges are indicated by founders as having a significant impact on the development of their projects. On the other hand, just over 48% of the respondents identified the lack of funds for expanding the team as the most significant internal obstacle to their development. Difficulties in financing the development of already employed workers rank second (25.9%). Practical forms of development are considered the most valuable: a practical approach to training based on the analysis of real examples from existing companies and their management decisions (39.9%), coaching (33.5%), and business simulations (30.4%). Forms of a more academic nature, such as lectures, theoretical training, and conferences, are perceived as less useful by founders. Expected forms of support also include activities that contribute to the implementation of enterprises' plans to enter external markets.

The criteria for selecting a business model for refugee startups at each stage of the lifecycle have been determined. A comprehensive evaluation system has been developed, weighing the criteria according to the startup's priorities and goals.

The following criteria have been considered:

1. Market fit: The extent to which the business model aligns with the needs and requirements of the target audience and market. The market potential and competitive advantages of the model have been researched.
2. Financial sustainability: Potential revenue sources, monetization opportunities, and funding requirements at each stage of the startup's development have been examined. The business model's ability to ensure financial stability and growth has been assessed.

3. Resilience and adaptability: The business model's ability to withstand changes in the external environment, including economic, political, and social factors, has been evaluated. The model's adaptability to new conditions and trends has been considered.
4. Uniqueness and competitive advantages: The business model's unique value proposition, differentiation from competitors, and competitive advantages that will attract customers have been assessed.
5. Resource efficiency: The availability and efficient utilization of necessary resources, including finances, technology, human capital, and networks, have been examined. The business model's optimal resource allocation has been evaluated.
6. Growth and scalability potential: The business model's potential for growth and scaling at national and international levels has been explored. Opportunities for expansion and market share increase have been assessed.
7. Social and environmental value: The business model's consideration of social and environmental aspects, such as job creation, support for sustainable development, and addressing social issues, has been taken into account.

The evaluation and weighting system for these criteria has been developed in line with the startup's priorities and goals. The most significant criteria for the project have been identified and applied to assess and compare different business models.

Based on these criteria, two models were constructed using factor analysis, corresponding to the first two stages of the lifecycle: 1 - Seed Stage, and 2 - Early Growth Stage (Table 5).

Table 5. Results of factor analysis in constructing business models for Ukrainian refugee startups (STATISTICA 10 listing)

Variable	Factor Loadings (Unrotated) (data) Extraction: Principal components (Marked loadings are >,700000)	
	1 - Seed Stage	2 - Early Growth Stage
Market fit (MF)	-0,297093	***0,979545***
Financial sustainability (FS)	***0,995299***	0,097449
Resilience and adaptability (RA)	***0,808188***	0,322435
Uniqueness and competitive advantages (UCA)	-0,291799	***0,704990***
Resource efficiency (RE)	***0,858041***	0,137791
Growth and scalability potential (GSP)	-0,291575	***0,969519***
Social and environmental value (SEV)	-0,391173	***0,907704***
Expl.Var	6,027448	3,027447
Prp.Totl	0,317485	0,217474

Source: Calculated by the authors.

The results of the factor analysis are interpreted as follows: indicators highlighted in red have an impact on the process, while those in black do not. The Prp.Totl indicator shows the amount of variance explained by each factor (model).

As a result, two models were obtained.

The first business model describes a startup at the Seed Stage of the lifecycle and accounts for 31.75% of the variance:

$$1\ Stage = {}^{1}/_{6,027} \times (0{,}995 \cdot \mathrm{FS} + 0{,}808 \cdot \mathrm{RA} + 0{,}858 \cdot \mathrm{RE}) \quad (1)$$

The second business model pertains to a startup at the Early Growth stage of the lifecycle and explains 21.75% of the variance:

$$2\ Stage = {}^{1}/_{3,027} \times (0{,}979 \cdot \mathrm{MF} + 0{,}704 \cdot \mathrm{UCA} + 0{,}969 \cdot \mathrm{GSP} + 0{,}907 \cdot \mathrm{SEV}) \quad (2)$$

To assess each financing business model according to the criteria, taking into account the stages of the startup's lifecycle, we can analyze the factor loadings in the provided table. The variable factor loadings indicate the strength of the relationship between each criterion and the respective business model.

Based on the factor loadings, we can determine the suitability of each business model for the corresponding stage:

Seed Stage:

Financial sustainability (FS), Resilience and adaptability (RA), and Resource efficiency (RE) have significant loadings, indicating their strong influence on this stage.

Market fit (MF), Uniqueness and competitive advantages (UCA), and Social and environmental value (SEV) have relatively lower loadings but still contribute to the model.

Growth and scalability potential (GSP) has a non-significant loading in this stage.

Early Growth Stage:

Market fit (MF), Uniqueness and competitive advantages (UCA), Growth and scalability potential (GSP), and Social and environmental value (SEV) have significant loadings, indicating their strong influence on this stage.

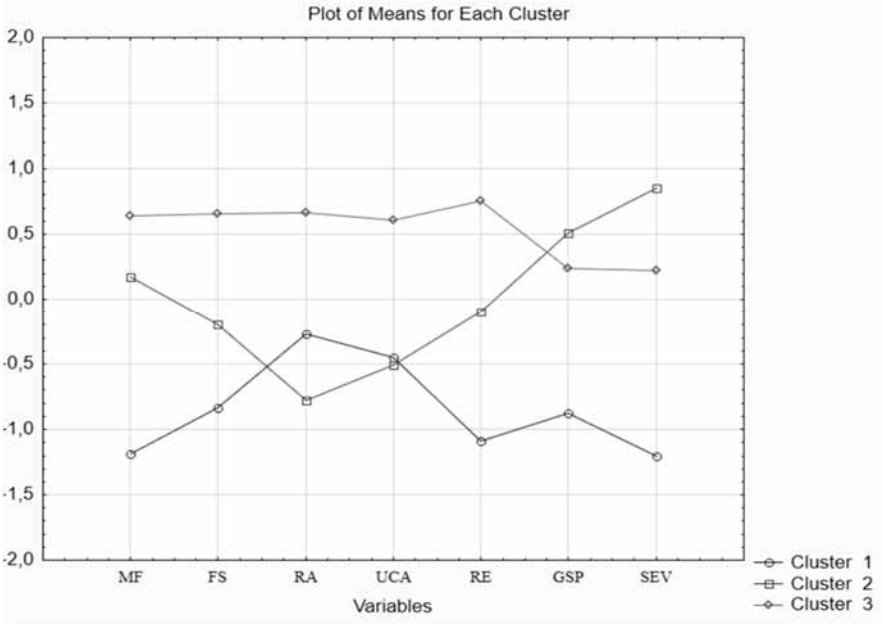
Financial sustainability (FS), Resilience and adaptability (RA), and Resource efficiency (RE) have relatively lower loadings but still contribute to the model.

By examining the factor loadings, we can conclude that for the Seed Stage, the business model with a focus on financial sustainability, resilience and adaptability, and resource efficiency (Equation 1) seems more suitable. For the Early Growth Stage, the business model emphasizing market fit, uniqueness and competitive advantages, growth and scalability potential, and social and environmental value (Equation 2) appears to be more appropriate.

It is important to note that the selection of the most suitable business model for each stage should be based on a comprehensive analysis that considers the specific characteristics and goals of the research. The algorithm for developing the methodology for justifying the choice of business models for refugee startups should encompass stages of analysis, evaluation, and selection of the most suitable business model, aligned with the startup's lifecycle and needs.

To confirm the second hypothesis, "The need for clustering countries and industries based on the number of successful refugee startups" in order to determine threshold values for effective startup financing and select the most viable industry for their operations, a cluster analysis was conducted. The analysis aimed to group countries and industries based on the number of successful startups and their financial performance (Figure 7).

Figure 7. Results of cluster analysis for country positioning of refugee startups

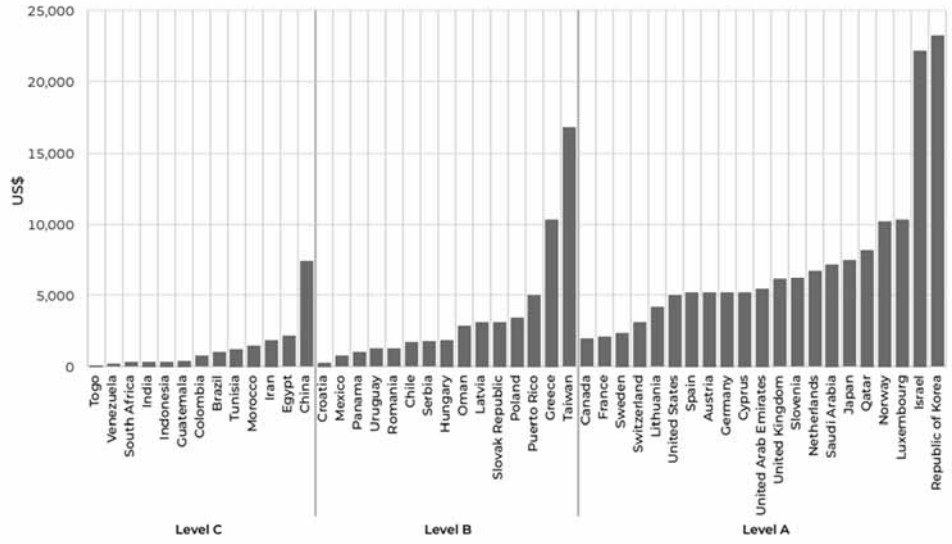


Source: Calculated by the authors.

The composition of the resulting three clusters is presented in Figures 8, 9.

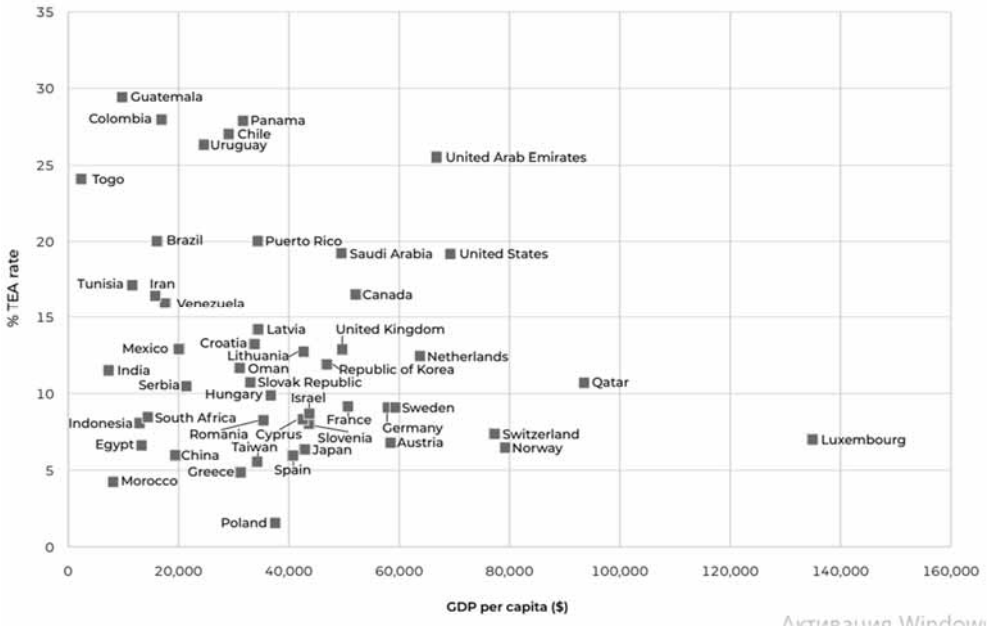
By identifying clusters that demonstrate high performance and stability based on the median investment amount ($US) in new businesses, threshold values for effective financing can be determined.

Figure 8. Median investment amount ($US) among investors in new business



Source: GEM Adult Population Survey 2022

Figure 9. Relationship between total early-stage entrepreneurial activity and GDP per capita



Sources: GEM Adult Population Survey 2022 and https://data. worldbank.org

Figure 7: The cluster analysis revealed distinct groups based on the number of successful refugee startups and their financial efficiency. This analysis helps in identifying clusters that demonstrate high performance and stability, aiding in the determination of threshold values for effective startup financing.

Figure 8: The clustering of countries and industries based on the number of successful startup ventures provides valuable insights into the positioning of refugee startups. The composition of the clusters indicates different levels of entrepreneurial activity and financial performance, which can guide decision-making regarding industry selection and investment opportunities.

Figure 9: The relationship depicted between the levels of total early-stage entrepreneurial activity and GDP per capita highlights the potential correlation between entrepreneurial activity and economic development. Higher levels of entrepreneurial activity in a country could contribute to economic growth and prosperity.

These findings underscore the importance of considering clustering and economic indicators in supporting and fostering the success of refugee startups. The analysis provides valuable insights for policymakers, investors, and stakeholders in designing effective strategies and allocating resources to promote entrepreneurial initiatives and economic development.

The article discusses the advantages and limitations of different types of financing options for Ukrainian refugee startups. One of the financing options discussed is business angels. Business angels can provide not only financial support but also valuable knowledge, experience, and connections to startups, especially in the early stages when other funding sources may be unavailable. However, the limitations of relying on business angels include limited resources and funding availability, as well as the risk of relying on a single investor who may exit the project Betts and Collier (2017).

Another financing option mentioned is direct investment funds. These funds can provide significant funding for startups in more advanced stages of growth. They may also offer expertise and resources to support business growth and scalability. However, competition for funding from these funds can be high, and they may require significant equity stakes or controlling rights, limiting the autonomy of entrepreneurs Calabrese and Osmetti (2013).

Crowd-funding, crowd-investing, crowd-lending platforms, and ICO exchanges are also discussed as financing options Agrawal et al. (2014). These platforms allow startups to obtain financing from a wide audience, which can help attract not only funds but also popularity and community support. ICO exchanges provide a means to raise funds through token or cryptocurrency issuance. However, these crowdfunding and crowd-investing platforms require active marketing campaigns and the ability to capture public attention, while ICO exchanges may be subject to regulation and involve legal and financial risks.

The article highlights that Ukrainian refugee startups face challenges in accessing external funding, finding customers and business partners, and dealing with excessive bureaucracy. The lack of funds for expanding the team is identified as a significant internal obstacle to their development. The startups express a need for practical forms of support, such as practical training, coaching, and business simulations, rather than more academic approaches like lectures and theoretical training Callo and Grote (2019).

To determine the most suitable business models for Ukrainian refugee startups at different stages of their lifecycle, a comprehensive evaluation system based on several criteria is developed. The criteria include market fit, financial sustainability, resilience and adaptability, uniqueness and competitive advantages, resource efficiency, growth and scalability potential, and social and environmental value. Two business models are constructed based on factor analysis, one for the Seed Stage and another for the Early Growth Stage. Each model emphasizes different criteria based on their factor loadings Carrigan (2020).

The article also discusses the clustering of countries and industries based on the number of successful refugee startups and their financial performance. Cluster analysis helps identify high-performing and stable clusters, enabling the determination of threshold values for effective financing. The relationship between total early-stage entrepreneurial activity and GDP per capita is examined to understand the potential correlation between entrepreneurial activity and economic development Chesbrough et al. (2006).

Overall, the article provides valuable insights into the advantages and limitations of different financing options for Ukrainian refugee startups. It emphasizes the importance of considering specific criteria and stages of the startup's lifecycle when selecting the most suitable business models and the need to analyze clustering and economic indicators to support the success of refugee startups and promote economic development.

5. Concluding Remarks

Assessing the financing landscape for Ukrainian refugee startups, this study investigates the validity of its hypotheses within the scope of “The Impact of Refugee Startups on Host Country Economies: Business Models and Economic Adaptation”. The research underscores the significant role of business angels in providing expertise and connections to Ukrainian refugee startups but highlights associated risks due to overreliance on a single investor and limited resources. While direct investment funds offer substantial funding, potential drawbacks include limitations on autonomy and heightened competition.

Exploring diverse financing avenues such as crowd-funding, crowd-investing, crowd-lending, and ICO exchanges, the study acknowledges their potential benefits but emphasizes the importance of meticulous attention to marketing and regulatory compliance. The article emphasizes the essential role of external financing for startups while cautioning against potential vulnerabilities and deviations from long-term goals.

The proposed evaluation system in the article proves valuable for selecting suitable business models based on diverse criteria, taking into account the varying importance of these criteria across different stages of a startup's lifecycle.

Furthermore, the study delves into the clustering of countries and industries based on successful refugee startups. The cluster analysis identifies high-performing clusters, providing strategic insights to guide investment decisions.

In conclusion, the article enriches our understanding of financing options for Ukrainian refugee startups, offering practical guidance on business model selection and considerations

related to clustering and economic indicators. Suggested avenues for future research encompass a long-term impact assessment, comparative analysis, policy examination, investor engagement, impact investing, mentoring programs, capacity-building initiatives, and cross-sector collaboration.

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SUMMARIES

Fisnik Morina, Duresa Kilaj, Sadri Alija

NEXUS BETWEEN MACROECONOMIC FACTORS AND FINANCIAL DEVELOPMENT: EMPIRICAL EVIDENCE FROM TRANSITION COUNTRIES

The main purpose of this study is to analyze how different macroeconomic factors have influenced the financial development of countries in transition as well as the effect of these factors on the volatility of the banking sector in these countries. Secondary data acquired and processed from yearly statistics reports of the World Bank, the International Monetary Fund, the OECD, the European Central Bank, Eurostat, and others were used to develop this research. In the analytical section of the literature review, numerous scientific papers by various authors that have examined the issue of financial development in the economies of various countries have been reviewed. This research covers data from 2005 to 2020, which will be examined using panel and time series econometric models.

Based on the study's econometric findings, we can conclude that non-performing loans, natural resources, market liberalization, GDP per capita, inflation, and interest rates have a statistically significant impact on the financial development of transition countries by determining the amount of broad money and the volume of bank loans and deposits in these countries' financial systems. The empirical findings of this study will serve as good scientific and empirical evidence for future studies in the field of financial development and economic growth, as well as practical evidence for governments around the world in the form of strategic macroeconomic policies that will positively affect the financial development of countries in transition. In relation to essential conclusions, this research offers true and consistent findings. The studied period (2005-2020) offers a compelling time frame for making sound findings and recommendations.

Keywords: financial development; economic growth; broad money; deposits; loans
JEL: G21; B22; E44; N2; O11

Iana Paliova

CHALLENGES OF BULGARIA‘S FISCAL POLICY TOWARDS GREEN TRANSITION IN THE EUROPEAN UNION

The article is dedicated to the challenges of the fiscal policy of Bulgaria in the context of the European Union’s (EU) priorities for a green, climate neutral economy’s transition. The article analyzes the fiscal aspects of the EU Green Deal and related initiatives NextGenerationEU, Fit for 55 package, RePower Plan, Just Transition Mechanism for the EU program period 2021-2027. It examines the objectives of the EU Green Deal’s implementation in the context of the EU Strategy for Financing the Transition to a Sustainable Economy. It studies the mechanisms, tools and alternative approaches in the application of EU funding and modern financial instruments to stimulate the green transformation of the EU economy.

The research assesses the opportunities for the green transition in Bulgaria through the application of national and European financial instruments. The study assesses the effects of the fiscal instruments for mitigating and adaptation to climate change on fiscal deficit of Bulgaria. The study shows that the fiscal policy with EU funding and national co-financing for green policies under the National Recovery and Resilience Plan and the Partnership Agreement for 2021-2027 could augment the green transition and have a net positive impact on the fiscal balance. The study also outlines the possible risks and negative impact on budgetary aggregates.

Keywords: Environmental Sustainability; Government Policy; Economic Integration
JEL: Q56; Q58; F15

Olesea Speian

DEBT DYNAMICS UNDER UNCERTAINTY: EVIDENCE FROM THE REPUBLIC OF MOLDOVA

Public debt management plays a pivotal role in ensuring fiscal stability and fostering economic growth, particularly amidst unprecedented challenges like the COVID-19 pandemic and energy crises. The main aim of this study is to provide accurate projections for public debt, offering valuable insights to guide sustainable debt management practices. Utilizing historical data from the Republic of Moldova spanning the period 2003-2023, the study employs the Monte Carlo simulation method to construct a fan chart. This chart presents a probability distribution of the general government debt-to-GDP ratio for the Republic of Moldova during 2023-2027. By generating multiple alternative scenarios for real GDP growth, real interest rates, and primary balances, policymakers can gain a comprehensive understanding of future debt trajectories and potential impacts of various policy decisions. These projections are essential tools to facilitate informed decision-making and promote effective debt management strategies in the face of economic uncertainties and challenges.
Keywords: public debt; Monte Carlo method; Republic of Moldova
JEL: E17; H63; H68

Assel Tapalova, Zhanarys Raimbekov, Gulzhakhan Zhunussova, Altynbek Zhakupov, Zhanar Yerzhanova

EXPORT POTENTIAL AND ORIENTATION OF THE ECONOMY OF THE BORDER REGIONS OF KAZAKHSTAN

The main purpose of this paper is to analyze the current export potential of Kazakhstan, highlight its shortcomings, and implement solutions that will help to avoid them, form the poles of economic development, as well as explore ways to develop and improve them. This paper is aimed at the study of the economy of the border territories of Kazakhstan, it used the method of logical analysis, the method of comparative analysis, the method of analysis of scientific literature, the method of synthesis, the method of deduction, as well as the economic and statistical method. The result of this work is the definition and development of the theoretical and practical foundations of the activities of border territories, their impact on the economy of this region, as well as the creation of an algorithm and methods for the development of the poles of economic development.
Keywords: Growth pole; border region; emigration; economic potential; economic space.
JEL: E00

Gezim Jusufi, Donat Rexha, Besime Ziberi

INNOVATIONS AND ENTREPRISES PERFORMANCE IN TRANSITION COUNTRIES, WITH SPECIAL EMPHASIS ON KOSOVO: CDM MODEL APPROACH

The main aim of this study is to analyze the impact of innovation and enterprises performance in the transition countries with special emphasis in the case of Kosovo. The innovations play crucial impact on firm development especially for small and medium sized enterprises in countries in transition. This study uses primary data with specific sample thus the enterprises that operate in Kosovo in order to

analyze the relationship between innovations and firm performance. This study was conducted within a six-month period, specifically January 2022 – June 2022. The research sample consists of 400 Kosovar enterprises. These enterprises are from different economic sectors, such as production, services, and in terms of size, 80% of them are SMEs. The study used the CDM (Crépon, Duguet and Mairesse) model which include fourth phase. The first phase of this model is about the tendencies of enterprises to carry out innovative activities, the second phase is about the enterprises that invested in research and development, the third stage of the model, the conversion of inputs into outputs is analyzed. At the end, the impact of innovation outputs on the performance of the analyzed enterprises is investigated. The study concludes that enterprises that export to the EU and the Western Balkans region are significant, so this positively affects the tendencies of these enterprises for innovative activities, whereas enterprises that are oriented only to the local market, do not present significance and even have a negative relationship with the enterprises' tendencies for innovations. A large part of the enterprises think that innovations have high costs and are even unaffordable therefore this represents a big obstacle for the development of innovations. The lack of qualified personnel, lack of knowledge about markets and technology represents a big obstacle for the development of innovations, and it even negatively affects the decisions of these enterprises about innovations.
Keywords: Innovations; performance; transition countries; CDM model; enterprises
JEL: L25; L26; M20

Khairul Amri, Raja Masbar, B. S. Nazamuddin, Hasdi Aimon

DOES UNEMPLOYMENT MODERATE THE EFFECT OF GOVERNMENT EXPENDITURE ON POVERTY? A CROSS-PROVINCES DATA EVIDENCE FROM INDONESIA

Our study aims to investigate the effect of government expenditure on the poverty rate and detect the moderating role of the unemployment rate in the functional relationship between the two variables. Using a panel data set of 24 provinces in Indonesia during 2005-2018, we use the dynamic model of the Generalized Methods of Moment to estimate the functional relationships. Our findings discovered that government expenditure on goods, services, and capital significantly reduces poverty. Conversely, grant and social aid expenditures have a positive and significant effect. The unemployment rate substantially increases the poverty rate and moderates the impact of the three types of public spending on the poverty rate. The higher the unemployment rate, the smaller the poverty reduction effect of government expenditure. These findings imply that the government budgetary allocation for a particular spending component should consider the unemployment rate as the primary consideration. It is due to the effectiveness of each expenditure group in reducing poverty differing at the various level of the unemployment rate.
Keywords: Poverty rate; government expenditure; unemployment rate; moderating effect; GMM-Estimation
JEL: I32; E24; H72; C33

Mihaela Angelova

CHANGES IN DETERMINANTS OF LIFE SATISFACTION OF PEOPLE AGED 50 AND OVER BEFORE AND AFTER THE OUTBREAK OF COVID-19

The goal of this longitudinal study is to analyse the changes in determinants of life satisfaction of older people in Europe and highlight risk predictors of frustration before and after the outbreak of Covid-19. Parallel analyses of Wave 7 and Wave 8 data of Survey of Health, Ageing and Retirement

in Europe (SHARE) are performed to examine the relationship between different determinants and life satisfaction at basic model and post covid model. Logistic regression models are evaluated for both scenarios to explore the dependence between life satisfaction and various demographic, economic, health and behavioural factors. Transformation of the main model on Wave 8 data is applied to assess whether friends net, use of internet, vigorous sport activities and health care factors affect life satisfaction. The research provides an up-to-date picture of the changes in the behaviour of older people in Europe with a focus on specific challenges related to the global pandemic. Results suggest directions for interventions that will improve the life satisfaction of older people in ordinary scenarios and in severe times, as well as directions for better fit between academic research and the needs of policymakers and practitioners at the sphere of design and implementation of social policies focused on increase the life satisfaction and ultimately aiming to foster economic growth.
Keywords: SHARE; Europe; older people; life satisfaction; pandemic; social policies
JEL: I3

Ainel Abuova, Mukhit Assanbayev, Talgat Basmurzin, Talgat B. Kilybayev, Alua Assanbayeva

A COMPARATIVE ANALYSIS OF MARKETING RESEARCH IN UNIVERSITY WEBSITES: INSIGHTS FROM KAZAKHSTAN

This study utilized a multi-faceted approach to explore marketing research strategies employed by Kazakhstani higher education institutions and their corresponding websites. The research highlighted gaps in current theory amid contemporary global crises and identified opportunities for enhancing the efficacy of marketing research. Utilizing official data from both Kazakhstani and foreign sources, the study conducted a comparative analysis of the 2016 and 2021 international Webometrics ratings of the top-10 university websites in Kazakhstan, observing a generally positive trend. The results generated actionable recommendations for improving marketing research, promoting educational services, and augmenting the effectiveness of university websites as primary marketing tools. These findings are expected to guide higher education institutions and policy makers in enhancing national educational competitiveness and efficiency amidst socio-economic instability.
Keywords: Marketing of educational services; digital technologies in education; tools for promoting educational services; higher educational institutions
JEL: R00

Ivanka Nikolova

ASSESSING THE SIGNIFICANCE OF INTELLECTUAL CAPITAL IN RETAIL TRADE THROUGH CONJOINT ANALYSIS

In the conditions of widespread application of information and communication technologies, intellectual resources as a result of human intelligence, knowledge and experience are the leading source of development and growth. Intellectual capital, encompassing all the intellectual resources from which businesses derive growth in various forms, is emerging as the leading form of capital today.
The aim of this publication is to assess the significance of joint impact and the extent to which elements of intellectual capital contribute to value creation and the establishment of conditions for manifestations of competitive advantages in retail trade.
The study was carried out using conjoint analysis. After a brief historical overview of the development of the conjoint analysis methodology, its relationship with the hierarchical process analysis developed by Thomas Saaty is shown and a full profile conjoint analysis is conducted. The necessary data were obtained by carrying out surveys with managers from consumer goods retail

chains. Based on the obtained ratings - partial, average, and overall - of the 'utility' and 'importance' categories, conclusions have been drawn regarding the joint impact and the extent to which the elements of intellectual capital contribute to value creation in retail trade.
Keywords: intellectual resources; intellectual capital; conjoint analysis; retail trade, retail chains.
JEL: M21; O34

Oleh Kolodiziev, Andrii Gukaliuk, Valeriia Shcherbak, Tetiana Riabovolyk, Ilona Androshchuk, Yaryna Pas

THE IMPACT OF REFUGEE STARTUPS ON HOST COUNTRY ECONOMIES: BUSINESS MODELS AND ECONOMIC ADAPTATION

The current global economic landscape is characterized by turbulence and crises, such as the Covid-19 pandemic and military conflicts, which have disrupted the development of innovative startups. In this context, it becomes essential to explore how refugee startups influence the economies of host countries and facilitate their adaptation to specific conditions. This article aims to examine the most suitable and optimal business models for such startups, the industries they predominantly operate in, their overall impact on economic growth, and the potential for cross-border collaboration among refugee entrepreneurs. Additionally, the article intends to analyze the relevance of existing financing models for startup sustainability and explore innovative methods and instruments that can effectively address the challenges faced by refugee startups. By investigating the alignment between financing models and the current economic state, this study provides valuable insights for fostering economic recovery and development in regions hosting refugee populations. In summary, this analysis offers insights into the impacts of refugee startups on host economies, focusing on their suitability and impact on economic growth, the relevance of financing models in sustaining these startups, and the potential for cross-border collaboration among refugee entrepreneurs.
Keywords: start-ups; business models; financing; turbulent
JEL: D25; G11; M13