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Forget about "tax heavens" and welcome "digital heavens"¹

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Abstract

One of the main economic policy goals of policymakers is to boost competitiveness of countries by creation of a friendly business environment. A great deal of policymakers believe that it is promising to attract new investors and entrepreneurs by lowering effective income tax rates. Entrepreneurs always seek opportunities to reduce their effective tax rates and obtain competitive advantage over their business rivals. Surprisingly, entrepreneurs who seek tax friendly countries may be rolled over by those who seek digital heavens. Endless cuts of effective tax rates are intolerable and reaches its limits, hence it is indispensable to find innovative ways to achieve competitiveness of countries. Recently we witnessed high intensity of digitalization, which has been furthered even more by Covid-19 pandemic. Digitalization has become new extremely potent element which shape business performance, upswing labor productivity, speed up working processes and, with these and many other benefits, accelerates the entire economy. The aim of this paper is to find out whether competitiveness of the European Union Member States statistically significantly depends on the level of current stage of digitalization process. If so, we aspire to detect which dimensions of digitalization do affect competitiveness the most. In addition, we provide comparison between the European Union average DESI scores in the five digitalization dimensions and the Slovakia's stage of digitalization. Our research results show that three out of five dimensions of digitalization play statistically significant effect on competitiveness of the EU Member States, they are: Integration of Digital Technology; Human Capital; Digital Public Services. Sadly said, Slovakia has been lagging far behind the EU average in majority of them.

Keywords: digitalization, competitive advantage, business environment, European Union, taxes

Jel Codes: H25, H26, H7, D41

1. Introduction & literature review

It is well known that taxes often affected business decisions. One of the latest examples is the disclosure of Panama Papers case, or tax motivated location decisions of multinational companies, among others GAFAM. The US tech giants Google, Apple, Facebook, Amazon, and Microsoft are well known for tax motivated decisions. Practice shows companies' effort to pay as low taxes as possible so that they attain a competitive advantage. Maffini, who analyzed 3400 companies in 15 OECD countries found that offshore low-tax operations of multinational companies reduce their marginal effective tax rate (METR), and they reduce marginal effective tax base (METB). (Maffini, 2012) He also found out that larger companies tend to have more opportunities to shift profits to low tax jurisdictions than smaller ones.

In general, companies attempt to increase incomes and reduce their costs, among them also tax costs as they reduce profits of companies. Lowering costs facilitates companies in obtaining competitive advantage on market. (Koop, 2011) Another evidence say that online retail firms do not collect sales tax in case of majority customers. Research has been done in US, and it also agrees that this may give these traders competitive advantage over the trades on traditional market with classical stores. (Hoopes, Thornock, & Williams, 2016) Another research paid attention to comparison between online retailers and brick-and-mortar shops pointed out that differences in taxation in favor of online retailer generates competitive advantage for them. These presumptions of potential competitive advantage may be seen in also in reality, where US retail giant Sears field for bankruptcy. What more, Walmart, who is the largest retail brick-and-mortar retailer in the USA recently introduced completely new business model based on on-line orders with delivery. (Jens, Patin, & Turpin, 2020) As we can see if there are some differences in

¹ Acknowledgement: This research paper is a 1,0 outcome of the research project VEGA No 1/0779/19 Challenges of digitization of the economy in the field of taxation, workable solutions, and their assumptions.

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tax treatment of companies with almost the same business focus (e. g. retail), their competitive advantage is different also. This can be easily extent also to comparisons of companies operating on markets with basic tax rates and companies operating in tax heavens or preferential tax regimes. The second mentioned group of companies obtain competitive advantage by paying less taxes and by these steps they can reach higher profits and thus the competitive advantage over others. (Picciotto, 2018)

However, in past years many things have changed. For example, many initiatives, in favor of avoiding non-taxation or taxation on low tax rates, has occurred. We can mention for example EU Directives ATAD I and II (European Commission, 2021) OECD BEPS Project with 15 Actions which focuses on combating base erosion and profit shifting. The OECD BEPS Action 15 recommends adoption of a Multilateral Instrument which instantly modifies old and obsolete tax treaties with the aim to eliminate double international non-taxation by practices of treaty abuse. (BEPS, 2021) Finally, several most developed countries agreed in 2021 to introduce a measure which might efficiently fight aggressive tax planning practices and tax avoidance, namely the introduction of unified global minimum corporate income tax rate of at least 15%. It is expected to become effective from 2023 and means that it will be applicable to all multinational companies with threshold of revenues more than 750 million EUR. (OECD, 2021) All these initiatives and changes in the latest years makes it harder for companies to obtain competitive advantage by lowering their effective tax rates. At this point the question has raised. Is there any area other than taxes, in which companies can gain competitive advantage? Is there any area where countries can create better conditions for companies to obtain their attention? Is seems that current development of stage of the world has bring this area by itself - Digitalization. (Brennen & Kreiss, 2016) No doubt that digitalization has become the "steam machine" of a new age. As steam machine in past, has launched a technological revolution, is believed that digitalization, IOT, wireless networks and others has launched new technological revolution. What more it creates new Industry 4.0. (Lasi, Fettke, Kemper, & Feld, 2014)

We must not ignore countries' level of digitization as this might be an important constituent which shapes the competitiveness of companies located there. Study about European Union countries observed that digitalization is the third most influential factor on competitiveness after macroeconomics stability, on the first place, and research and development on the second place. It concludes that the importance of digitalization of enterprises of any kind of sector has become fundamental and it is likely that its prominence will only be growing continually in the next decades. (Boikova, Zeverte-Rivza, Rivza, & Rivza, 2021) Should country want to get to long term growth and competitiveness it is unmanageable without innovation-based approach. (Sepashvili, 2020) Studies of digitalization as an important determinant of competitiveness also consider approaches in assessing territorial competitiveness. (Dmitrieva, & Guseva, 2019) It is critical to understand, that previous tactics and strategies that many companies have done until now to reach competitive advantage may need for comprehensive overhaul. (Filipova & Yuleva-Chuchulayna, 2021)

The rest of the paper is organized as follows. Section two provides research question and hypothesis. It followed by section three, where data and methodology are explained. Then section fourth delivers results of the linear regression analysis, and section five shows data about digitalization dimensions in Slovakia and compare them with the European Union average. The last part is conclusion. In appendices there are tables which explain acronyms and show numerical results of our quantitative analysis.

2. Research question and hypothesis

Literature review offered above confirms that digitalization plays a vital role in enhancing competitiveness. For that reason, we presume that prominent levels of digitalization may severely affect countries' competitiveness. The aim of our research displayed in this paper is to examine whether there is statistically significant link between competitiveness and a level of current stage of digitalization process in the EU Member States. We postulate that the higher is the level of digitalization the higher is level of competitiveness of country rated by Global Competitiveness. Should we find a statistically significant dependency of competitiveness on digitalization, then our next step is to identify which distinct dimensions of digitalization affect the competitiveness most. To see it plainly the sub-indices of Digital Economy and Society Index (from here and on only DESI) are employed in our assessment.

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3. Data and methodology

To estimate degree of dependency of competitiveness on digitalization, if there is any, the competitiveness measured by Global Competitiveness Index (from here and on only GCI) was chosen as the dependent variable. On the other hand, the Digital Economy and Society Index (from here and on only DESI) was chosen to stand for independent variable. One asset of the DESI index is that its level is derived from the five separately quantified dimensions of digitalization, namely: Connectivity; Human Capital; Use of Internet Services; Integration of Digital Technology; Digital Public Services. The composition of the DESI index itself conveys potential to evaluate how statistically significant role each of the five distinct dimensions of digitalization plays. Another asset of a DESI index is that each dimension of DESI index consists of collection of sub-indices whereas they echo focal points of the particular dimensions of digitalization as well as the sub-indices including their acronyms are put on view in Table 1) in Appendix.

is put on view in Table 1) in Appendix.

Our methodology is set to make the most of properties of the DESI index. For that reason, our methodology translates five dimensions of digitalization into five linear regression equations. Each equation estimates the relation between competitiveness (CGI) and particular dimension of digitalization including its sub-indices. For example, the first equation represents a relation between GCI and Connectivity dimension of digitalization, whereas Connectivity dimension is controlled by six sub-indices.

Our dataset covers observation from the 28 EU Member States, for each estimated equation there were 28 observations.

The methodology of DESI index uses normalized data of sub-indices, whereas values of sub-indices closer to 0 decode lower level of digitalization, to the contrast their values nearby to 1 higher level. Accordingly, we deduce that the ascending value of sub-indices that reflect distinct dimensions of digitalization shall be translated into ascending value of dependent variable GCI which stands for competitiveness. As well it implies expectation of a positive estimated signs of significant coefficients of independent variables.

Regressions estimated:

1) Group of DESI sub-indices focused on: Connectivity

 $GCI = \alpha 1.FBC + \alpha 2.FBT + \alpha 3.FGC + \alpha 4.MBT + \alpha 5.FBS + \alpha 6.BPI$

2) Group of DESI sub-indices focused on: Human Capital

$$GCI = \beta 1.ALBS + \beta 2.ABS + \beta 3.ALBSW + \beta 4.TE + \beta 5.ICTG$$

3) Group of DESI sub-indices focused on: Use of Internet Services

$$GCI = \gamma 1.IU + \gamma 2.FBTR + \gamma 3.VC + \gamma 4.SN + \gamma 5.BAN + \gamma 6.SHO$$

4) Group of DESI sub-indices focused on: Integration of Digital Technology

$$GCI = \delta 1.ALT + \delta 2.FLTA + \delta 3.SMESO + \delta 4.SIS$$

5) Group of DESI sub-indices focused on: Digital Public Services

$$GCI = \eta 1. EGU + \eta 2. OSC + \eta 3. ODOO$$

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4. Results

Results of regressions (visit Table 2 in Appendix) reveal that competitiveness is positively affected by several dimensions of digitalization. Some dimensions of digitalization encompass more influence on competitiveness than others. In case of Connectivity dimension of digitalization, including its sub-indices, we detected no significant impact on competitiveness measured by GCI. To the contrast, assessment of the "Human Capital" dimension of digitalization shows that two sub-indices, namely at least basic skills, like Word processing (ALBS) and (Above basic skills as advanced spreadsheet skills (ABS) have positive significant impact on competitiveness. Stronger positive influence has been obtained in case of ALBS variable. These results indicate that digital skills represent such the country trait that may notably fuel its competitiveness. Another noteworthy result has shown up in case of DESI sub-indices describing "Integration of Digital Technology" dimension, namely: availability of the latest technologies (ALT) and secure internet servers per million people (SIS). Out of these two variables ALT has the highest significant positive effect on competitiveness (GCI). It implies that the more available for companies or citizens of specific country are the latest technologies, the higher competitiveness country demonstrates. The two sub-indices e-Government users (EGU) and online service completion (OSC) from the last digitalization dimension Digital Public Services, display significant positive influence over competitiveness (GCI) as well. Our findings comply with everyday life, when we see positive increase in number of companies established in countries, where it is easily possible to make business via the internet. (Thompson, Rust, & Rhoda, 2005), (Das & Das, 2021)

5. Discussion and policy implications for Slovakia

Our research proves, that there is strong positive statistically significant dependency of competitiveness on digitalization. In this section we turn our attention to the current stage of digitalization in the Slovak republic. Figure 1 shows that Slovakia ranks 20 among the Member States of the European Union at the overall level of digitization measured by the DESI index. This rank of Slovakian current stage of digitalization reflects the low level in all five dimensions of the digitization. What particularly is noteworthy is that low rank is caught in those dimensions of digitalization including their specific elements that are statistically significant for competitiveness of Slovakia.



Figure 1. Digital society and economy index, 2021 ranking

Source: Digital Economy and Society Index (DESI) 2018 Country Report Slovakia

Figure 2 shows the value of five dimensions of the DESI index in Slovakia and EU average. As can be seen, of the three statistically significant dimensions of digitization indicated in our research above, Slovakia reaches value below the European Union average in two dimensions, to be excet the Human Capital dimension and the Digital Public Services dimension. Just slightly above the European Union average is the value in Integration of Digital Technology dimension of digitalization.



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Figure 2. DESI 2018 - relative performance by dimension

Source: authors' own work based on data from Digital Economy and Society Index (DESI) 2018 Country Report Slovakia

It is quite obvious that the level of digitalization in Slovakia has been lagging behind the average level in the European Union, and what more it lags radically behind current stage of digitalization reached by leading countries, to be precise Denmark, Sweden, Finland, Netherland and Luxembourg.

Since the level of digitalization is a factor that statistically significantly affects the competitiveness of countries, we make aware of urgent adoption of the effective tools to support digitalization in Slovakia. Among other measures tax policy instruments aimed at promoting digitalization could be adopted, as companies use to highly value opportunities for tax savings. In support of Integration of Digital Technologies dimension of digitalization, it might be allowed for an accelerated depreciation regime in corporate income taxation if company buys and uses the latest technologies and secure internet servers. Also consider a reduced VAT rate for digital technologies. In support of the Human Capital dimension of digitalization, to be exact in supporting the acquisition of basic skills and above basic skills of individuals, it might be worth to consider enabling advantageous tax treatment of those expenditures self-employed persons and companies spent to further educate employees in digital skills. Also, nonschool further education and courses could join favorable tax treatment. Encouraging tax treatment of individuals' expenditures to learn the latest knowledge and skills in the field of advanced digital skills might be considered.

6. Conclusion

To summarize our research results we can declare that several dimensions of digitalization have statistically significant impact on competitiveness, they are: Integration of Digital Technology; Human Capital; and Digital Public Services. To the contrast, dimensions of digitalization which do not play statistically significant role in terms of enhancing competitiveness of European Union Member States are Connectivity and Use of Internet Services. Overall, we can pronounce, that specific areas of digitalization measured by DESI sub-indices exhibit significant positive impact on competitiveness, our results reveal the following: at least basic skills (Word processing); above basic (advanced spreadsheet skills); availability of latest technologies; secure internet servers per million people; eGovernment users; online service completion.

Slovakia ranks twentieth among the European Union Member States, which is far from being suitable. Unsatisfactory level of digitalization in Slovakia might adversely affect its competitiveness even withing the European Union, not voicing World leaders in third countries. In the dimensions of digitalization that have statistically significant impact on competitiveness Slovakia ranks only at or below the European Union average. This implies the urgent need to take effective measures to promote digitalization, whereas policy measures should

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focus in particular on Human Capital, Digital Public Services, Integration of Digital Technology dimensions of digitalization.

Overall, our research proves that to enhance competitiveness of the country, not only traditional economic policy measures like taxes might play meaningful role. To the contrast, currently, when digitalization has rushed, it is mandatory to pay attention to other, relatively new determinants of competitiveness, among them to digitalization. Should taxes be used to enhance competitiveness of Slovakia, economic policymakers might think about specific tax policy measures to promote statistically significant dimensions of digitalization, that is Human Capital, Integration of Digital Technology and Digital Public Services.

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Appendix

 Table 1. Summary of independent variables

Independent variable (DESI sub-indices)	Variable acronym					
Connectivity (GROUP 1)						
1a1 Fixed Broadband Coverage	FBC					
1a2 Fixed Broadband Take-Up	FBT					
1b1 4G Coverage	FGC					
1b2 Mobile Broadband Take-Up	MBT					
1c1 Fixed (wired)-broadband speed; in Mbit/s	FBS					
1d1 Broadband Price Index	BPI					
Human Capital (GROUP 2)						
2a1 At least basic skills (Word processing)	ALBS					
2a2 Above basic (advanced spreadsheet skills)	ABS					
2a3 At least basic software (coding)	ALBSW					
2b1 Telecommunication emps FTEs	TE					
2b2 ICT Graduates	ICTG					
Use of Internet Services (GROUP 3)						
3a1 Internet Users	IU					
3a2 Fixed broadband traffic (GB/mth/person)	FBTR					
3b1 Video Calls	VC					
3b2 Social Networks	SN					
3c1 Banking	BAN					
3c2 Shopping	SHO					
Integration of Digital Technology (GROUP 4)						
4a1 Availability latest technologies	ALT					
4a2 Firm-level technology absorption	FLTA					
4b1 SMEs Selling Online	SMESO					
4b2 Secure Internet Servers per million people	SIS					
Digital Public Services (GROUP 5)						
5a1 eGovernment Users	EGU					
5a2 Online Service Completion	OSC					
5a3 Open Data OKF OECD	ODOO					

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Table	2.	Results	of	regressions
		1.0000100	· · ·	- Bressions

Connectivit	y (GROUP 1)	Human Capit	al (GROUP 2)	Use of Inter (GRC	rnet Services)UP 3)	Integratio Technology	n of Digital (GROUP 4)	Digital Pul (GRC	olic Services JUP 5)
Independent		Independent		Independent		Independent		Independent	
varable	Coefficient	varable	Coefficient	varable	Coefficient	varable	Coefficient	varable	Coefficient
FBC	1.8336294	ALBS	2.9231368**	IU	26677968	ALT	.97407228***	EGU	1.5948347***
p-value	0.224	p-value	0.001	p-value	0.801	p-value	0.001	p-value	0.001
FBT	1.3242829	ABS	1.4743956*	FBTR	.81391915	FLTA	.2712431	OSC	.91775471**
p-value	0.115	p-value	0.026	p-value	0.057	p-value	0.315	p-value	0.002
FGC	-2.7444038	ALBSW	86666706	VC	23248087	SMESO	.34845349	0000	49723681
p-value	0.429	p-value	0.105	p-value	0.695	p-value	0.347	p-value	0.109
MBT	1.1441766	TE	.14844978	SN	41490196	SIS	.51198702*	_cons	3.5350172***
p-value	0.089	p-value	0.830	p-value	0.511	p-value	0.032	p-value	0.000
FBS	1.0479319	ICTG	01266614	BAN	.95098621	_cons	3.9034601***		
p-value	0.070	p-value	0.977	p-value	0.133	p-value	0.000		
BPI	.34057251	_cons	2.9897071***	OHS	1.4755949				
p-value	0.286	p-value	0.000	p-value	0.113				
_cons	4.6115744			cons	3.670112^{***}				
p-value	0.178			p-value	0.000				

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Modelling the impact of energy security, trade openness, urbanization and environmental deterioration on natural gas consumption: Evidence from Egypt

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Abstract

Diversifying energy sources together with achieving energy security and supporting sustainable development plans are crucial worldwide goals, and achieving these goals mainly depends on natural gas as the cushion to the prompt switch to renewable energy resources. In accordance with these goals, the development of natural gas has been given great concern in Egypt being rich with energy sources especially natural gas. Thus, the paper aims at exploring the links between natural gas consumption, energy security, trade openness, urbanization, carbon dioxide emissions, economic expansion and population growth in Egypt. To achieve this goal, the auto-regressive distributed lag (ARDL) approach is employed using yearly data from 1971 to 2014. The long-run estimations show that energy security, trade openness, environmental deterioration, and population growth enhance natural gas consumption whilst economic growth and urbanization decrease it. Accordingly, this study proposes that critical policy implications related to natural gas have to be strengthened in order to gradually replace the most polluting energy sources and secure a tangible transition to renewables by promoting energy efficiency and widespread deployment of carbon capture, utilization, and storage, as well as hydrogen generation technologies.

Keywords: natural gas, energy security, trade openness, urbanization, carbon dioxide emissions.

Jel Codes: F50, Q47

1. Introduction

Many environmental challenges have come about as a result of human activity and the industrial revolution, as well as societal changes such as population growth and urbanization. Atmospheric, hydrosphere, and land deterioration, overutilization of natural deposits, desertification, halting biodiversity, and climate variations are among the most noticeable environmental concerns facing our world (Ibrahiem and Hanafy 2021).

To tackle climate change, many governments around the world are considering reducing their greenhouse gas emissions. The energy sector is the most greenhouse gas emitting sector in the world. The energy sector, like other sectors such as transportation and industry, is transitioning away from carbon-intensive fuels and toward less carbon-intensive fuels. Some argue that the transition should be clear and straightforward while the reality is highlighting the complexity of energy systems and the uncertainty surrounding the transition pathway as governments need to secure not only environmental progress but also energy security and affordability (Adel. Mustafa A. 2020).

Global energy consumption is continually increasing, and the energy mix is shifting toward lower-carbon alternatives. Natural gas (NG) is thought to be a "transition fuel" to a more sustainable, cleaner, and ecologically good energy source. As a result, there is universal agreement that NG usage is an influential part of the evolution and progress process that benefits energy security and the environment (Kutcherov et al. 2020). In all energy scenarios, NG production and consumption are predicted to grow gradually (BP 2020; Gas Exporting Countries Forum 2021; IEA 2019). This has prompted numerous scholars to investigate the factors that influence NG consumption. These drivers can then be classified into a number of different categories such as regulatory, social environmental, economic, energy, and technical causes which must be confronted simultaneously within the framework of a coordinated strategy.

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When it comes to NG consumption, two major issues are energy security and the alteration of energy facilities toward energy sustainability. Energy security is critical for economic growth because it boosts capital accumulation and productivity, creates jobs and improves income distribution. Moreover, NG may support energy security through the critical roles of advanced energy technology innovation in maintaining a sustainable domestic energy supply for the future. Various technologies and fuels are projected to be required, including major coal-togas conversion and broad deployment of technologies for carbon capture, utilization, and storage and hydrogen generation (Alvera 2020). Another driver of NG use is the rapid expansion of urbanization in various parts of the globe, which contributes to energy consumption, either renewable energy or unstainable energy, resulting in ecological difficulties as a result of energy poverty (J. Zhao et al. 2021).

This has implications on Egypt where long-term energy strategy 'Egypt Vision 2030' discussed the energy sector's strategic objectives, which included ensuring energy security, increasing the energy sector's contribution to the gross domestic product, maximizing the use of energy resources by increasing production and increasing energy sector reliability, reducing energy intensity and increasing energy efficiency, and finally, minimizing the impact on the environment by limiting emissions and pollution (Ouki 2018). The strategy suggests that the Egyptian government diversify its energy mix to achieve energy security, as well as maximize exploration and production for importing purposes to achieve the goal of boosting the energy sector's contribution to GDP (Adel. Mustafa A. 2020).

Also, because NG consumption and exports are closely linked, Egypt's experience can help countries that target increasing domestic NG consumption establish plans to meet both internal and international demand (Ayaburi, Sharma, and Bazilian 2021). Furthermore, Egypt is a growing country where fossil fuels, mainly oil and NG, contribute more than 95% of the country's primary energy, as indicated in Fig. 1. According to the IEA (International Energy Agency), electricity generation met more than 60% of total NG demand (IEA 2017).





Data source: IEA, 2017

As a result, the purpose of this paper is to evaluate the particular drivers of NG consumption in Egypt. To achieve this goal, a time series data analysis using the auto-regressive distributed lag (ARDL) dynamic model is conducted for Egypt from 1971 to 2014, the period chosen is based on the available data, to evaluate the long-run relationships between NG consumption and its main determinants such as energy security, trade openness, urbanization, emissions of carbon dioxide (CO₂), population, and GDP. The following are the substantial contributions of this paper to the existing literature review: First, from all we really know, this is the first paper in Egypt that focuses on the relationships between key variables such as energy security, trade openness, urbanization, carbon dioxide, GDP, population growth, and NG use. Second, based on the conclusions of this study, officials in Egypt may be able to choose the best appropriate policies for enhancing NG depending on their specific conditions. Third, focusing on Egypt could be a useful model for other emerging countries in general and African countries in particular, in terms of improving energy security and environmental quality.

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2. Literature Review

Because of the close internal association between NG consumption and human activities, energy economists and ecological economists have been providing more consideration to the effects of energy security, trade openness, urbanization, CO₂ emissions, population growth, and economic development on NG usage at the cross-national and country level. The findings are inconsistent, with the dependent variables having either positive or negative effects on NG consumption (Bulkani, Sonedi, and Putra 2020; Cai, Yu, and Zhu 2021; D. Wu, Geng, and Pan 2021).

Energy security, or the accessibility of energy supplies at reasonable prices, is a key driver of NG. Continuous energy availability is a requirement for long-term growth, thus sufficient energy supplies must be secured to fulfill future demand. As a result, it is evident that energy security is an important component to consider when studying the factors that influence NG consumption. So, scholars have highlighted that for many countries as Russia (Senderov and Edelev 2019), Europe (Matsumoto, Doumpos, and Andriosopoulos 2018), China (Fang, Shi, and Yu 2018), Organization for Economic Co-operation and Development (OECD) (Cohen, Joutz, and Loungani 2011), and Egypt (Atlam and Rapiea 2016). Energy security, according to some experts, obstructs NG via the energy transition, which serves as a connecting energy source in the transfer of energy systems from a non-sustainable-based to a sustainable energy supply, and has a detrimental impact on NG usage (Gillessen et al. 2019; Kruyt et al. 2009; Tolliver et al. 2018), others back up the positive effect (Aydin 2018; Vivoda 2019; Wang and Xue 2017; K. Wu 2014), while others are concerned with energy security risks related to geographic factors which extend their effects on NG (Bradshaw 2009; Chiyemura 2020; Söderbergh, Jakobsson, and Aleklett 2010).

Two of the most crucial components of NG across all countries in general, and for the developing world in particular, are trade openness and CO₂ emissions. Less-developed countries are striving to find a balance between the goals of open trading and lifting restrictions to trade that could stifle trade and lead to new protectionist actions ahead of them. Industrial economies enforce internal ecological rules on less-developed economies that cover not just the combustion of fossil fuels on their own soil, but also the use of fuels with a large carbon footprint throughout the supply chain (P Balcombe, Brandon, and Hawkes 2018; Paul Balcombe et al. 2017). As a result, academics are paying great attention to the influence of imports and exports, as well as environmental concerns, on nonrenewable energy usage on the whole and NG consumption especially. (Solarin and Shahbaz 2015) studied if increased trade openness in Thailand increases energy consumption which confirmed the interlinked between trade openness and energy usage. The influence of trade openness on the use of nonrenewable energy in Indonesia by (Kurniawan and Managi 2018) was investigated, and it was found that trade openness increases non-renewable energy consumption. Several studies have delved into the underlying relationships between energy consumption and trade openness, with mixed results. Without concluding any feedback effect, some studies looked into the causal relationship between global trade and NG usage (Akadiri, Akadiri, and Gungor 2019) while others concerned this positive association between trade openness and NG consumption (Solarin and Shahbaz 2015) with a feedback effect (Alam and Paramati 2015).

It's worthy to note that the effecting of trade openness and CO_2 emissions on NG gains considerable attention from scholars where carbon capture, utilization, and storage and hydrogen generation technologies are widely NG demand (Nerheim, Æsøy, and Holmeset 2021; Stern 2019). So, for instance, (Paramati, Shahbaz, and Bhattacharya 2016) discuss a method for evaluating the economics of producing blue hydrogen from steam methane amending with carbon capture, storage, and utilization, and (Díaz-Herrera et al. 2021) look for ways to reduce CO_2 emissions, such as using post-combustion carbon capture technologies or incorporating blue and green hydrogen into current NG combined cycles.

In emerging countries, urbanization is one of the most significant economic and demographical processes, with significant implications for progress, energy consumption, and prosperity. So, scholars have given much thought to the urban-energy consumption nexus, and the results have been mixed. Some researchers concluded the existence of negative correlation where urbanization is highly dependent on non-clean energy resources (S. P. Nathaniel 2020; Su 2020). Other experts, on the other hand, agree that urbanization has a favorable impact on NG consumption when adjusted for labor income, promoting a rapid move away from conventional fuels and toward advanced fuels such as electricity and NG in India (O'Neill et al. 2012). Some scholars confirm significant effects

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of urbanization on energy consumption including NG for its industrialization and modernization in China (Shen et al. 2005) and in MENA (S. Nathaniel, Anyanwu, and Shah 2020). Furthermore, some research suggests that urbanization contributes to rising domestic energy usage, but that this trend is reducing over time (Fan, Zhang, and Wang 2017).

The relationship between NG use and GDP has been studied extensively, with inconsistent results. Some researchers found positive correlations for Bangladesh (Das, McFarlane, and Chowdhury 2013), for Tunisia (Farhani et al. 2014), for GCC countries (Ozturk and Al-Mulali 2015), for 26 OECD countries (Destek 2016). Others believe there is an association between economic expansion and NG consumption for European Union (Balitskiy et al. 2016) for Pakistan (Shahbaz, Lean, and Farooq 2013). A relationship between population, GDP, and NG use has also been discovered in various research (Azadeh et al. 2011; Bianco, Scarpa, and Tagliafico 2014; Nepal and Paija 2019).

All of the aforementioned studies could imply that there are still few studies on a variety of NG consumption determinants, as well as no evidence for studies on Egypt in particular. As a result, identifying the most important NG consumption drivers appears to be critical in assisting political leaders in comprehending the critical engines of NG consumption and formulating the indispensable policies to achieve sustainable development targets as well as secure and diverse energy resources.

3. Data analysis & Method

The study explores the impact of economic expansion, energy security, trade openness, urbanization, carbon dioxide emissions and population growth on NG consumption in Egypt from 1971 to 2014 based on (Ibrahiem and Hanafy 2021) using the following equation:

 $ng = \vartheta_0 + \vartheta_1 ecgr_t + \vartheta_2 ensecu_t + \vartheta_3 tropen_t + \vartheta_4 urg_t + \vartheta_5 carbdio_t + \vartheta_6 popg_t + \varepsilon_t$ (1)

Where ng is NG consumption in billion cubic meters, ecgr is gross domestic product (GDP) per capita (constant 2010 US\$), ensecu is energy imports (net) as percentage of energy use, tropen is trade openness (as percentage of GDP), urg is urban population growth (annual percentage), carbdio is CO_2 emissions (kilo tonne), popg is population growth (annual percentage).

Where data for all variables are extracted from World Bank 2021 except that of NG consumption from British Petroleum statistical review of World Energy 2021. The descriptive statistics for the mentioned variables are presented in Table (1).

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Variables	ng	ecgr	ensecu	tropen	urg	carbdio	popg
Mean	16.13068	7.342990	-54.99392	50.38930	2.262423	11.34786	2.188992
Median	10.15919	7.365316	-52.95243	50.43683	2.112295	11.32265	2.190777
Maximum	50.63713	7.881671	1.539153	74.45958	3.152541	12.33645	2.708580
Minimum	0.048125	6.610101	-121.7866	30.08535	1.698586	10.04530	1.751693
Standard Deviation	16.38164	0.391119	35.57821	11.52087	0.439404	0.683089	0.281990
Skewness	0.832750	-0.397780	-0.180530	0.250266	0.597575	-0.278245	0.272085
Kurtosis	2.288856	2.172953	1.717708	2.377232	2.195328	2.052079	2.003853
Jarque- Bera	6.012629	2.414359	3.253503	1.170350	3.805778	2.215098	2.362120

Table 1. Descriptive statistics

Source: authors' calculations

The empirical method that will be employed is auto-regressive distributed lag (ARDL) approach that has been developed by (Pesaran 1997, 2008; Pesaran, Shin, and Smith 2001) as it has several advantages among them; it is considered more robust and provides consistent results for small sample sizes, it is applied irrespective the regressors are integrated of order one or zero and it can stipulate unbiased estimates of the long-run model and valid t-statistics (Ibrahiem and Sameh 2020, 2021). To carry out the ARDL bounds testing approach to cointegration first, stationary of all our variables have to be estimated and this will be examined using Augmented Dickey-Fuller (ADF) (Dickey and Fuller 1979) and Phillips-Perron (PP) tests (Phillips and Perron 1988) to ensure that the variables are integrated of order zero or one. Second, two asymptotic critical value bounds; upper critical value (UCV) and lower critical value (LCV) have been provided by (Pesaran, Shin, and Smith 2001) where the first category assumes that all variables are integrated of order zero and the existence of cointegration among all the variables means that the value of F-statistic is exceeding the UCV.

And this will be explored by estimating the ARDL model as follows:

$$\begin{split} \Delta \mathbf{ng}_{t} &= \varphi_{1+} \quad \delta_{1} \mathrm{ecgr}_{t-1} + \delta_{2} \mathrm{ensecu}_{t-1} + \delta_{3} \mathrm{tropen}_{t-1} + \delta_{4} \, \mathrm{urg}_{t-1} + \delta_{5} \mathrm{carbdio}_{t-1} + \delta_{6} \, \mathrm{popg}_{t-1} + \\ \Sigma^{\mathcal{H}}_{\mathcal{G}=0} \, \mathfrak{I}_{1\mathcal{G}} \quad \Delta \mathrm{ecgr}_{t-\mathcal{G}} + \Sigma^{\mathcal{H}}_{\mathcal{G}=0} \, \mathfrak{I}_{2\mathcal{G}} \, \Delta \, \mathrm{ensecu}_{t-\mathcal{G}} + \Sigma^{\mathcal{H}}_{\mathcal{G}=0} \, \mathfrak{I}_{3\mathcal{G}} \, \Delta \, \mathrm{tropen}_{t-\mathcal{G}} + \Sigma^{\mathcal{H}}_{\mathcal{G}=0} \, \mathfrak{I}_{4\mathcal{G}} \, \Delta \, \mathrm{urg}_{t-\mathcal{G}} + \\ \Sigma^{\mathcal{H}}_{\mathcal{G}=0} \, \mathfrak{I}_{5\mathcal{G}} \, \Delta \, \mathrm{carbdio}_{t-\mathcal{G}} + \Sigma^{\mathcal{H}}_{\mathcal{G}=0} \, \mathfrak{I}_{6\mathcal{G}} \, \Delta \, \mathrm{popg}_{t-\mathcal{G}} + \mathcal{E}_{t} \quad (2) \end{split}$$

Where Δ is the first difference operator, $\mathfrak{I}_{1\mathfrak{g}} \dots \mathfrak{I}_{6\mathfrak{g}}$ are short run parameters and $\delta_1 \dots \delta_6$ are long run coefficients.

Finally, diagnostic tests for the residuals' heteroscedasticity, serial correlation and stability tests have to be carried to ensure the stability of the equation parameters.

4. Empirical Results and Discussion

We begin our analysis by conducting unit root tests and the findings are shown in Table (2). Using ADF test, ecgr and tropen are integrated of order zero while ng, ensecu, urg, carbdio and popg are integrated of order one. The same findings are shown using PP test except that ecgr is integrated of order one. Based upon these findings,

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ARDL is assessed and F-Statistics reported in Table (3) confirm the presence of long-run relations among the variables as it is greater than the UCV I(1).

After that, the long-run and short run coefficients are estimated and the findings are reported in Table (4). The findings show that ensecu, tropen, carbdio and popg are positively and significantly associated with ng while ecgr and urg are negatively and significantly associated with ng.

 Table 2.
 Unit root

ADF test			PP test	
variables	At level	First Difference	At level	First Difference
ng	-0.2177	-2.3357 ⁿ	1.5531	-2.3357 ⁿ
ecgr	-3.7781 ^m	-2.3357 ⁿ	-2.1167	-3.8258 ^m
ensecu	-1.6356	-6.8326 ^m	-1.9930	-6.7367 ^m
tropen	-3.4773 ⁿ	-5.1686 ^m	-2.6767 ^q	-5.1780 ^m
urg	-2.1410	-3.7033 ^m	-2.0616	-3.6168 ^m
carbdio	-1.7575	-2.3673 ⁿ	-2.1269	-5.4571 ^m
popg	-1.6534	-2.1417 ⁿ	-1.3843	-2.3464 ⁿ

q, n and m imply 10%, 5% and 1% level of significance respectively

Source: authors' calculations

Model	Model	5 percent		1 perc	ent	F-values
		LCV(0)	UCV(1)	LC B(0)	UCV(1)	
F(ng;ecgr, ensecu, tropen,urg, carbdio, popg)	(3, 4, 4, 4, 4, 4, 0)	2.27	3.28	2.88	3.99	6.56227 0

Source: authors' calculations

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Table 4. ARDL Short-run and Long run estimates
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endogenous variabl	le: fndv				
Long-run results			Short-run results		
Explanatory variables	Coefficients	Prob.	Regressors	Coefficient	Prob.
ecgr	-106.2079 ^m	0.0001	Δ ecgr	-102.4584 ^m	0.0000
ensecu	0.2707 ^m	0.0000	∆ensecu	0.0335 ⁿ	0.0234
tropen	75.2744 ^m	0.0000	∆tropen	0.2102 ^m	0.0000
urg	-4.1033 ^q	0.0913	∆urg	7.701457 ^m	0.0016
carbdio	0.4445 ^m	0.0000	∆carbdio	11.056375 ^m	0.0005
popg	17.3658 ^m	0.0000	Δpopg	24.148307 ^m	0.0001
Intercept	-86.6753 ^m	0.0011	ECT(-1)	-1.4008 ^m	0.0000

Diagnostic tests

Tests	Prob. values
Breusch-Pagan-Godfrey	0.9034
Breusch-Godfrey LM	0.1274
Jarque-Bera	0.5693
Ramsey Reset	0.1423

q, n and m imply 10%, 5% and 1% level of significance respectively.

Source: authors' calculations





These findings are in line with Egypt as a developing country. If the energy security increases by 1%, NG consumption rises by 0.27 percent. This positive outcome is defined by insights gained in the face of an unanticipated increase in NG consumption and it is consistent with the previous research (Ayaburi, Sharma, and Bazilian 2021). Following an unexpected rise in domestic demand in 2011, Egypt's NG governance concentrated

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on growing NG output. The government made it easier to get exploration and production licenses, as well as pay debts owing to global oil companies doing business in the country, under this strategy. Additional investments were encouraged in 2015 by the government's resolve to repay a substantial portion of the country's debts, resulting in the discovery of the country's largest field, the Zohr. Thus, providing the required energy while maintaining the aspired growth rates ensuring energy security. The export industry has a significant impact on boosting NG demand, as it plays an effective role in the industrial sector, and trade openness increases NG consumption since it improves the country's competitiveness in global markets and these are consistent with some previous studies (Alam and Paramati 2015; Kruyt et al. 2009).

Because of subsidies and local energy pricing that were phased out after then, Egypt became a net importer of NG after being a net exporter (Ouki 2018). When the effect of urbanization is examined, the results suggest that if urbanization increases by 1%, NG consumption decreases by roughly 4.1 percent. This result is also consistent with people who are drawn to the industrial sector in cities that rely heavily on power, with access to electricity in urban areas increasing to 100% in Egypt by 2019 which struggling to promote and increase dependence on renewables to address energy poverty (S. P. Nathaniel 2020).

As for CO₂, it is related positively to NG consumption, the statistics show that a 1% increase in CO₂ emissions grows NG by roughly 0. 44% and it is logical with Egypt which is in the initial stages of development and depends mainly on energy resources (especially oil and NG) which is polluting and destroying the environment. But Egypt tries to apply new technologies and enhance the direction towards blue and green hydrogen especially that Egypt is going to be an NG exporting hub under decarbonization restrictions(Adel. Mustafa A. 2020).

Finally, the findings reveal a negatively link of GDP with NG consumption. This stresses how, in order to meet expanding demand, policies must be focused on increasing investment in renewable energy sources (P. Zhao et al. 2020). The positive link between population growth and NG consumption is consistent with (Bianco, Scarpa, and Tagliafico 2014; Nepal and Paija 2019; Shahbaz, Lean, and Farooq 2013).

The error correction term (ECT), diagnostic tests reported in Table (4) together with the CUSUM and CUSUMQ in Figures 3&4 ensure the stability of the equation parameters.



Figure 3. CUSUM Test

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Figure 4. CUSUM of Squares Test

5. Conclusion

The literature research found no significant data on the drivers of NG use in Egypt. So, the goal of this research is to look at the long-term correlations between NG use, energy security, trade openness, urbanization, CO₂, population growth and economic growth. This is performed by applying the auto-regressive distributed lag (ARDL) approach using yearly data from 1971 to 2014 and the presence of a long-run link between the variables was proven.

Furthermore, while economic development and urbanization lower NG consumption, long-term energy security, trade openness, environmental degradation and population growth increase it. These findings have a number of policy implications for Egypt, including a positive relationship between energy security and NG utilization. As a result, the most effective strategy for enhancing Egypt's future energy security is to increase the rate of new oil and natural gas discoveries, followed by the elimination of energy subsidies and increased investment in new and renewable energy. For greater trade openness, Egyptian policymakers must lower import tariffs, particularly for imported components on which Egyptian domestic industrial production is heavily reliant. Concerning the negative effects of economic expansion and urbanization on NG usage. Policymakers might encourage the use of clean energy sources like renewables, improve adequate efficient technology, and implement suitable regulatory enforcement and public awareness campaigns on energy efficiency.

It is expected if the global warming problem is not addressed, Egypt will be exposed to many climatic phenomena as a result of climate change such as dust storms, heat waves, and torrential rains, as well as an increase in desertification rates, deterioration of agricultural production, and a negative impact on food security. Climate change will also affect water resources, causing an increase in water scarcity rates, as well as deteriorating public health and the spread of diseases. As a result, the study suggests that key policy implications related to NG be strengthened in order to gradually replace the most polluting energy sources and secure a tangible transition to renewables by promoting energy efficiency and widespread deployment of carbon capture, utilization, and storage, as well as hydrogen generation technologies.

It is important to mention that working on encouraging products with high energy efficiency, such as electrical devices that carry energy-saving cards, which are environmentally friendly, in addition to supporting companies to produce or import these types of devices to ensure their spread. With the need to raise awareness of the importance of these energy-saving devices, especially in light of the high electricity prices. Moreover, attempting to introduce and activate the idea of carbon certificates in the Egyptian Stock Exchange to contribute in reducing greenhouse gas emissions is vital.

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Industrial agglomeration and income inequality in East Java of Indonesia

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Abstract

Regional disparities and equitable development are the main problems in regional economic growth. The uneven pattern of development and the different characteristics in each district in East Java Province is the beginning of problems that arise, causing the pattern of economic growth in each region to be different. Some regions can develop faster than other regions, resulting in inequality in the Regency/City of East Java Province. This research comprehensively aims to analyze how the impact of industrial agglomeration and income inequality in East Java. This study also involves other variables, namely economic growth, investment, labor, and minimum wages. The data for this study were obtained from Statistics Indonesia, the Investment Office, and the Department of Manpower and Transmigration of East Java Province from 2017 to 2019. The findings indicate that industrial agglomeration and economic growth have a negative and significant effect on income inequality. While investment and minimum wage have a negative and insignificant effect on Income Inequality. Likewise, labor has a positive and insignificant effect on Income Inequality in East Java of Indonesia.

Keywords: industrial agglomeration, economic growth, investment, labor, minimum wage, income inequality.

Jel Codes: D63, E24, I24

1. Introduction

Economic development is a multidimensional process that involves fundamental changes in social structure, social behavior, and social institutions. Such development includes acceleration of economic growth, the elimination of absolute poverty, and reduction in inequality. Each region certainly makes various efforts in economic development. In the process of implementing regional development, local governments are expected to strive for the implementation of development that can be carried out in accordance with well-developed directives and plans to enhance the quality of development results that will later be achieved (Dwiputri, Kusufi, and Allo; 2019). In general, economic development includes the community's efforts as a whole to develop economic activities and increase the level of community welfare (Todaro, 2000). Economic development encourages economic growth, while economic growth facilitates the process of economic development (Meyer et al., 2017). In addition, leading indicators of economic development are described by economic growth, income distribution, and poverty alleviation (Lin, 2003; Goh et al., 2009; Fosu, 2017; Rachmawati et al., 2018; Wulandari et al., 2019).

Economic growth that is not balanced with equity will lead to regional inequality. Regional disparity is seen in the presence of developed regions with underdeveloped or less developed regions. Inequality illustrates that the level of distribution in each regional income has a different level. Inequality causes various other problems that arise, including poverty. This happens because the distribution of income is only enjoyed by the rich. Inequality of income distribution is measured by the Gini coefficient value, which is assisted by the Lorenz curve (Todaro, 2004).

Along with some dynamics of the global economy, national development is oriented towards the state's direct involvement in global competitiveness. One of the strategies adopted aims to implement industrial agglomeration policies. The agglomeration has spawned several centers of economic activity in various regions in Indonesia. In aggregate, this policy can boost the performance of the national economy. Economic growth shows the role of the regional economy in national development. The leading economic area can be transformed into an industrial

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agglomeration area that leads to increased economic output. In this case, the Marshall Economist connects economic and social conditions, often referred to as the "Marshallian Industrial District," which means that the concentration of companies or industries influenced by geographical conditions has a relationship with regional and labor growth (Tappi, 2001). Economic disparities are still a concern for policy researchers in Europe. Geppert and Stephan (2008) explained that the increase in economic agglomeration had triggered an escalation in disparity in the UK. Agglomeration also encourages economic growth (Brulhart & Sbergami, 2009; Gardiner et al., 2010). Economic inequality and agglomeration have the potential to increase economic growth (Castells, 2011).

Investment is one of the essential components in economic development as it relates to the sustainability of economic activities in the future. This is because the production process of goods and services increases, which will absorb the workforce. Therefore, these workers obtain wages and enlarge purchasing power. With more investment used to carry out the production process of goods and services, where more labor can be absorbed as well so that there is an even distribution of income per capita (Sukirno, 2004). Another factor that causes agglomeration is the existence of a workforce that drives the economic structure of a country as an indicator in assessing the performance of economic development. Labor is one of the important production factors in the business cost structure because the company pays wages as compensation for the company. In addition to industrial sector workers, there are other factors that also affect the occurrence of agglomeration of the manufacturing industry, namely wages, which are input costs that must be incurred by companies having policies that the Government has set. Setting the minimum wage that is too high in an area will cause an increase in production costs that must be incurred by a company. The level of wages has a positive influence on the number of industries by looking at the concept of "agglomeration savings" through the concept of externalities, in this case, wages are economies of scale savings (Scott, 1992). The study of Hanson (1997) examined the relationship between wages and proximity to industrial centers. The results show that differences in access to industrial centers make regional wage differences. The strength of the relationship between regional wage differentials and their proximity to industrial centers illustrates that trade policy plays a very important role in regional economic development.

East Java Province has an economic growth rate above the national average. The Province of East Java also carries out the agglomeration strategy in economic development. Agglomeration is applied in industrial estates, industrial centers, and clusters of sectoral economic activities spread across Pasuruan, Surabaya, Gresik, Sidoarjo, Mojokerto. As an illustration, in 2018, economic growth in East Java Province reached 5.50%. The performance of economic agglomeration and regional economic growth in various districts/cities in East Java also contributes to poverty and income inequality among the population. However, not all residents can access the available economic resources. In addition, the need for labor competencies has not been met by the workforce in the regions. The level of income inequality (measured by the Gini ratio) in 2018 was 0.371 (BPS East Java, 2019). Based on the data and description previously, this study intends to analyze the effect that can be generated from the existence of income inequality in one region on other regions and analyze the effect with variables of agglomeration, economic growth, investment, labor, and minimum wages by taking the title of research on industrial agglomeration analysis and income inequality in East Java Province.

2. Literature review

2.1. Industrial Agglomeration

Agglomeration is the spatial concentration of economic activity in urban areas due to savings due to economies of proximity associated with spatial clusters of firms, workers, and consumers (Kuncoro, 2002). Regional economic development is uneven and tends to agglomerate (concentrate) in growth centers. In turn, these growth centers will affect areas that are slow to develop. Tarigan (2007) argues that agglomeration occurs because of a mutual need for products between various industries. Agglomeration arises from the behavior of economic actors in seeking localization and urbanization savings (Kuncoro, 2010). Alfred Weber is the founder of modern location theory, which deals with place, location, and geography of economic activity. Cost minimization combined with different inputs from firms and industries determines the optimal location for a firm. Weber explicitly introduced the concepts of agglomeration economies, minimum efficient scale, and forward and backward linkages.

2.2. Economic Growth

Economic growth is an increase in the long-term capacity of a country concerned to provide various economic goods to its population (Todaro, 2007). Economic growth is one factor that affects inequality in a region, as seen from the value of GRDP (Gross Regional Domestic Product). Successful economic growth is needed to boost the pace of economic development. The higher the level of economic growth, the better the level of community

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welfare. With high economic growth, development problems such as unemployment, poverty, and inequality in the distribution of development will be resolved. However, in the Kuznets Hypothesis, the relationship between economic growth and income inequality is negatively correlated. The Kuznets hypothesis gave birth to a new discourse that development in a country within certain limits can trigger economic disparities among its citizens.

2.3. Investment

Investment, also called capital formation, is the second component that determines the level of aggregate expenditure. Investment can be interpreted as spending made by investors or companies to buy capital goods and production equipment to incline the ability to produce goods and services available in the economy (Sukirno, 2000). Based on the Harrod-Domar theory, which explains that there is a positive correlation between the level of investment and the rate of economic growth. It implies that the lack of investment in an area makes economic growth and the low level of people's income per capita in the region due to there being no productive economic activities. With the centralization of investment in a region, the inequality of investment distribution is considered one of the main factors leading to inequality in development or economic growth.

2.4. Labor

Labor is the population of working age (15-64 years) of the total population in a country who can produce goods and services if there is a demand for their labor and if they are willing to participate in these activities (BPS, 2004). The workforce in East Java Province is divided into three workforces, labor force, and work. Labor is any person who can work to produce goods or services to meet their own needs and the community. The total amount of labor provided to an economy depends on the population, the percentage of the population who choose to enter the labor force, and the number of hours offered by the labor force (Bellate, 2000).

2.5. Regional Minimum Wage

The minimum wage should be carefully defined as an anti-poverty instrument because its impact depends on the distribution of employment at the household level. A balance must be ensured when setting minimum wages. Setting a high minimum wage in an area will cause an enhance in production costs that a company must incur. That is one of the attractions of the decision to be located somewhere at the low wage level. (ILO, 2011). Theory of Structural Change (W. Arthur Lewis). In his theory, Lewis assumes that a country's economy is basically divided into two, namely the traditional rural economy dominated by the agricultural sector and the modern economy in urban areas with industry as the main sector. The difference in wage levels between the agricultural and the industrial sector encourages the movement of labor from the agricultural to the industrial sector, and urbanization occurs. Workers who move from the agricultural to the industrial sector will earn higher incomes so that the demand for agricultural products (food) increases, this is what drives output growth in that sector.

3. Methodology

This study engaged quantitative methods using a descriptive research approach. The adoption of this method is useful in understanding the relationship between variables comprehensively. This study involved secondary data from 2017 to 2019 and applied the Balassa index to measure industrial agglomeration (Sbergami, 2002). The investment variable was proxied by domestic investment data, considering foreign investment data is uneven for each region, even in some districts, there is no incoming investment. For economic growth, we incorporated data on the rate of economic growth from Statistics Indonesia (BPS), labor using data on the working population aged 15 years from the BPS. District/City Minimum Wage data was obtained from the Department of Manpower and Transmigration of East Java Province, while income inequality was performed by the Gini index for each district/city in East Java. The Gini index value ranges from 0 to 1. A value of 0 indicates perfect equality. While the value of 1 indicates the highest inequality.

This research was performed using the panel data regression analysis technique employing EViews 9 software. Panel data was chosen because the data in this study used a time span of several years and also many districts/cities in one province. There are three models used to perform panel data regression analysis, namely Common Effect Model, Fixed Effect Model, and Random Effect Model. To select the best model, several tests were carried out: Chow Test, Hausman Test, and Lagrange Multiplier Test. The Chow test was performed to choose between the Common Effect Model (CEM) and the Fixed Effect Model (FEM). Hausman test was conducted to determine between Fixed Effect Model (FEM) and Random Effect Model (REM). While the Lagrange Multiplier Test was applied to decide between the Random Effect Model (REM) and the Common Effect Model (CEM). A classical

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assumption test was also performed to determine whether or not the variables used in this study were feasible. This study also followed the classical assumption test, including normality test, autocorrelation test, heteroscedasticity test, and multicollinearity test. This study also conducted a significance test in the form of t-test and f-test. The t-test was conducted to determine the effect of each independent variable on the dependent variable, while the F-test was used to determine the effect of all independent variables on the dependent variable together. In more detail, the econometric model used is described in the following formula.

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 \mu$$

where:	
Y	= Income Inequality
X1	= Industrial Agglomeration
X2	= Economic Growth
X3	= Investment
X3	= Labor
X4	= Minimum Wage
$\beta_0 \beta_1 \beta_2 \beta_3 \beta_2$	$_4 \beta_5 = \text{coefficient of independent variable}$
μ	= Error of term

4. Results and Discussions

X X 71

This research was performed with the Chow Test and Hausman Test, Lagrange Multiplier Test because from the previous two tests, and it was known that the best model was using the Fixed Effect Model (FEM). Table 1 and Table 2 inform the determination of the regression model using both tests. From the table, it is known that the probabilities of the Chow test and Hausman test, in this case, are 0.000 and 0.0005, respectively. This implies that the suitable model of this study is the Fixed Effect Model (FEM).

Table 1. Results of Determination of Regression Model with Chow Test

Effects Test	Statistics	d.f.	Prob	
Cross-section F	4.125266	(37.71)	0.0000	
Cross-section Chi-square	130.796155	37	0.0000	
Q	1 2021			

Source: Authors' own research, 2021

|--|

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f	Prob
Cross-section random	22.268029	5	0.0005

Source: Authors' own research, 2021

In addition, the classical assumption tests carried out in this study were multicollinearity and heteroscedasticity tests, normality tests, and autocorrelation tests.

The normality test aims to see if the residual value is normally distributed or not declared normally distributed if the probability of Jarque-Bera < 5% alpha or 0.05, and otherwise, the data is not normally distributed. Based on the normality test, it can be known that the probability value is 0.232418. This value shows > 0.05, meaning that the data is normally distributed.

Table 3. Results of Multicollinearity Test

	AGL	ECG	LN_INV	LN_LBR	LN_MNW
AGL	1.000	0.415	0.332	0.151	0.590
ECG	0.415	1.000	0.253	-0.248	0.486
LN_INV	0.332	0.253	1.000	0.364	0.438
LN_LBR	0.151	-0.248	0.364	1.000	0.157
LN_MNW	0.590	0.486	0.438	0.157	1.000

Source: Authors' own research, 2021

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The multicollinearity test is a test by comparing the correlation values obtained from the Panel regression calculation, if the correlation value between variables is less than 0.8, thus there is no multicollinearity. The test results between the independent variables have a correlation smaller than 0.8. From the statistical calculation, it can be concluded that there is no multicollinearity between the independent variables. The assumption test of the absence of multicollinearity can be fulfilled (See Table 3).

Table 4. Results of Heteroscedasticity Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AGL	-0.069	0.037	-1.839	0.070
ECG	-0.009	0.082	-0.106	0.916
LN_INV	0.002	0.002	1.049	0.298
LN_LBR	0.087	0.046	1.883	0.064
LN_MNW	0.025	0.024	1.035	0.304
С	-1.446	0.641	-2.258	0.027

Source: Authors' own research, 2021

Based on Table 4, it can be seen that the probability value of industrial agglomeration, economic growth, investment, labor, and minimum wage is > 0.05. Therefore, it can be said that there is no heteroscedasticity issue.

Table 5. Results of autocorrelation Test				
DI	Dua	4-dua	4-dl	
1.6042	1.7869	2.2131	2.3958	

Source: Authors' own research, 2021

As informed in Table 5, it can be seen that the DW value is 2.208, then considering the DW table with the provisions of k = 5 and n = 114. The results of the autocorrelation test with a value of 2.208 are located between the values of du and 4-du. It can be concluded that there is no autocorrelation between variables.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AGL	-0.213	0.091	-2.335	0.022
ECG	-0.567	0.201	-2.827	0.006
LN_INV	-0.005	0.004	-1.041	0.302
LN_LBR	0.101	0.112	0.899	0.372
LN_MNW	-0.044	0.060	-0.742	0.461
С	-0.820	1.564	-0.524	0.602
R-squared	0.722	Mean dependent var	•	-6.737050
Adjusted R-squared	0.557	S.D. dependent var		4.258237
S.E of regression	0.071	Sum squared resid		2.620317
F-statistic	4.385	Durbin-Watson stat		2.084981
Prob (F-statistic)	0.000			

Source: Authors' own research, 2021

Table 6 presents the results of the regression test using the Fixed Effect Model. Based on the table, it is known that either partially or simultaneously, industrial agglomeration, investment, and economic growth have a significant effect on income inequality. More specifically, the following equation is provided as below.

Yit = -0.820 - 0.213 X1 - 0.567 X2 - 0.005 X3 + 0.101 X4 - 0.044 X5

According to the statistical calculation in Table 6, the R-squared is 0.698599, indicating that the ability to explain the independent variable is 69.85 percent. It can be concluded that the income inequality variable (Y) can be explained by Industrial Agglomeration (X1), Economic Growth (X2), Investment (X3), Labor (X4), Minimum Wage (X5). From the regression results, the coefficient of industrial agglomeration (X1) is -0.213, meaning that if

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the industrial agglomeration value increases by 1%, it will reduce income inequality in East Java by 0.213 points with the assumption that other variables are held constant. The regression results show that the coefficient of economic growth (X2) is -0.567, meaning that if the value of economic growth increases by 1%, it will diminish income inequality in East Java by 0.567 points with the assumption that other variables are held constant. Furthermore, statistical estimation indicates that the investment coefficient value (X3) is -0.005, indicating that when the investment value increases by 1%, it will decline income inequality in East Java by 0.005 points assuming other variables are held constant. Based on the regression results, the coefficient value of the labor (X4) is 0.101, implicating that if the value of labor has increased by 1%, it will raise income inequality in East Java by 0.101 points assuming other variables are held constant. The regression result indicates that the minimum wage coefficient value (X5) is -0.044, meaning that if the minimum wage value increases by 1%, it will diminish income inequality in East Java by 0.044 points assuming other variables are considered constant. Based on Table 6, it can be concluded that the probability value of the F-statistic is 0.000000. This means that all independent variables, namely industrial agglomeration, investment, and economic growth, significantly affect income inequality.

4.1. Industrial Agglomeration and Income Inequality in East Java

Based on the statistical calculation previously, it shows that the industrial agglomeration variable has a significant influence on inequality. The coefficient value is negative, which means that Industrial Agglomeration has a negative and significant effect on Income Inequality. This finding is supported by research by Anshori (2021), which states that the industrial agglomeration variable has a negative and significant effect on inequality. This reveals that the greater the agglomeration that occurs in an area, the greater the inequality between regions and vice versa, the lower the agglomeration can occur in an area due to the existence of economic actors who have a motive to gain profits in economic activities, namely the advantages of localization and urbanization advantages. The emergence of agglomeration in a region or region will encourage economic growth in the region due to the creation of production efficiency. An agglomeration is a form of savings due to the presence of adjacent locations (economies of proximity) (Kuncoro, 2002).

4.2. Effects of Economic Growth on Income Inequality in East Java

The prior hypothesis testing shows that the variable Economic Growth has a significant influence on income inequality. The coefficient value is negative, which means that Economic Growth has a negative and significant effect on Income Inequality. This result is in accordance with a prior study by Yusica et al. (2018), which remarked that an increase in economic growth can lead to a decrease in inequality in a region. The economic growth of a region can reflect the success of development in that region. When a region can expand its economic growth rate, then the region can be stated to have been able to carry out economic development well. The relationship between economic growth and inequality is also explained by Simon Kuznets (Kuznet, 1995) or better known as the Kuznets Hypothesis, namely, at the beginning of development, the distribution of income will be more uneven, but after reaching a certain level of development, the distribution of income will be more even.

4.3. Investment and Its Impact on Income Inequality in East Java

The following hypothesis estimation indicates that the investment variable has no significant effect on inequality. The coefficient value is negative, which means that investment has a negative and insignificant effect on Income Inequality. This result of this study is in line with the findings of Yuki (2010), which stated that there is a negative relationship between investment and inequality. It implies that more investment is used for the production process of goods and services, where more labor can be absorbed so that there is an even distribution of income per capita. The results of this study state that the insignificant effect shows that domestic investment has not provided maximum results in accordance with Myrdal's theory. According to Myrdal, there is a profit motive that can encourage the development of development in each region which only occurs in areas that have profit expectations investment is high, while other areas remain neglected and increasingly underdeveloped.

4.4. Effects of Labor on Income Inequality in East Java.

The statistical examination remarks that the variable labor has no significant effect on inequality. The value of the coefficient is positive, which means that labor has a positive and insignificant effect on Income Inequality. This research supports a prior study by Sudibia and Adipuryanti (2015), which mentioned that labor has no significant effect on the inequality of income distribution. An increase in manpower in region A which is not followed by an increase in manpower in region B, will lead to high production in region A while region B will not. Therefore, production activities in area A will be higher while in area B will be slower. If left unchecked, this will widen income inequality (Ebel and Yilmaz, 2002).
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4.5. Minimum wage and Its Impact on Income Inequality in East Java

Based on the results of hypothesis testing that has been carried out, it shows that the minimum wage variable has no significant effect on inequality. The value of the coefficient is negative, which means that the minimum wage has a negative and insignificant effect on Income Inequality. The result of this study corroborates with research by Nangarumba (2015), which stated that the minimum wage variable has a negative effect on income inequality. At the minimum wage, an increase in this variable will diminish income inequality due to an incline in the Minimum Wage will reduce migration flows, especially for low and middle-income people. The reduced flow of migration is driven by the theory that migration occurs due to economic factors, in the sense of increasing income, one of which is measured by wages. If wages increase, some low- and middle-income workers are expected to reduce migration rates because their purchasing power increases.

5. Conclusion

This study examines the relationship between industrial agglomeration, economic growth, investment, labor, minimum wages on income inequality. Based on the previous discussion, it can be concluded that Industrial Agglomeration and economic growth have a negative and significant effect on Income Inequality. Additionally, investment and minimum wage have a negative and insignificant effect on Income Inequality. Lastly, labor has a positive and insignificant effect on Income Inequality.

Several suggestions can be provided to take a government function that has the power to regulate the placement of industries evenly so that economic activity is not only centered in certain areas. Furthermore, local governments are required to help optimize the various potentials that exist in their regions because, without assistance from the government, the investment will certainly not enter areas that are considered not to have great potential as well as efforts to enhance community empowerment in the region to improve the community's economy through leading sectors in the region.

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Factors determining countries' innovation performance: The case of European Union¹

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Abstract

Innovations are considered to be one of the main driving forces leading to the development of companies, regions as well as national economies. They create preconditions for future competitiveness in the form of new knowledge, products and increase the overall efficiency of the economy. Due to their interdisciplinary nature, there is not one uniform, binding procedure for assessing and measuring countries' innovation performance, moreover, scientific consensus on specific (set of) determinants relevant for the evaluation is missing. The aim of this paper is to analyze the creation of a selected innovation index and specify factors that determine the position of a particular country in terms of innovativeness. The research is focused on the Summary Innovation Index (SII) – a composite indicator used for the measurement of EU national innovation systems – and is carried out on a sample of EU27 countries over the period 2017-2021.

Keywords: innovation performance, Summary Innovation Index, innovation determinants

Jel Codes: O30, O31, O10

1. Introduction

Nowadays, a major preoccupation of the policy-makers in both developing and developed countries is the national innovativeness and searching for possibilities how they can increase it. As stated by May and Schedelik (2019) or Potts (2019), innovations play a key role in the development of a modern market economy. They not only bring new ideas and solutions, propose measures to overcome current and future problems, but also lead to improved living conditions. From an economic point of view, innovations are considered to be an important factor driving economic growth through the creation of new job opportunities, new products and services, and thus contribute to creating the conditions for cities, regions as well as countries in the context of improving their competitiveness (Sattigeri et al., 2016).

In this paper, we analyze the creation of a selected innovation index – the Summary Innovation Index – and specify factors that determine the innovativeness of EU27 countries. For the analysis we use an EIS 2021 database, including data for EU27 countries for a period of 5 years (2017-2021). To achieve the aim of the paper and to test our hypothesis we use the stepwise regression, which is performed in the IBM SPSS.

Our paper contributes to the expansion of knowledge in the field by analysis of EU27 countries grouped into performance groups by their innovation performance level considering indicators and dimensions with significant impact on their innovativeness. The results may help the policy-makers to decide which economic issues should intervene in order to enhance (international) innovativeness of their country.

The paper is structured as follows: The first section presents the theoretical background and the hypothesis of the study, describing also the creation of the Summary Innovation Index, section 2 presents the methodology of the research used. Section 3 reflects the results and discusses the main findings of the empirical study, finally, the last section summarizes the conclusions and shows the limits as well as future directions of our research.

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2. Theoretical background and hypothesis

In recent decades, a growing number of studies on innovation and their performance at the micro, meso, and macro level can be observed. In general, there is no doubt about the importance of innovation, more notably they are considered a key factor of the growth of business competitiveness (Tidd, 2001; Lin and Chen, 2007; Neira et al., 2009), regions (Malecki, 2007; Fundeanu and Badele, 2014) and the economy as a whole (Ulku, 2004; Westmore, 2013).

The word "innovation" is originated from the Latin word innovare, meaning to update and create or change. Innovation itself was witnessed to be developed into a theory at the beginning of the 20th century by the Austrian-American economist Joseph Alois Schumpeter (Li and Huang and Zhou, 2011), whose interest concerned predominantly social life being and determinants of its changes. He began to deal with the importance of knowledge and the realization of innovations (Braun and Thürmann, 2005), whereby he combined his knowledge of economics, sociology, and history into a very original approach to studying long-term economic and social change, focusing on the crucial role of innovation and the factors that affect it (Fagerberg and Martin and Andersen, 2013).

2.1. Innovation in the EU

In the European context, with the rise of globalization, the emergence of very cost-effective nations, and the improvement of transport as well as communication channels, innovation and innovation process came to the forefront relatively late, in 1997, by signing the Treaty of Amsterdam. The Treaty of Amsterdam, which is one of the founding treaties of the EU defined the implementation of European research policy and the implementation of European research programs as a legal and political obligation of EU member states while emphasizing the importance of R&D as basic elements of the functioning of industrialized countries (Zaušková and Madleňák, 2012). Innovation has become a dominant topic in Europe's economic debate at the time when the EU member states have agreed on a common ambitious goal: to make Europe "the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion" by 2010 (European Council, 2000). This intention was formulated by the European Council in March 2000 in Lisbon, which is why it was called the Lisbon Strategy.

In the same year, the Single European Research Area (ERA) initiative was officially presented and adopted by the Council of the European Union, which main motive was to increase European competitiveness, improve coordination of research activities at the national and European level, develop human resources and increase the attractiveness of the European research for the best researchers from around the world (European Commission, 2021c). In order to successfully implement the ERA in practice, as well as to provide more comprehensive support for research activities in the EU, several framework programs and strategies for research and innovation have subsequently been implemented, e.g. Europe 2020 strategy - the EU reform program which aim was to help Europe to recover from the crisis in 2008 and transform it into a smart, sustainable and inclusive economy with high employment, productivity and social cohesion levels (EHSV, 2021). As a part of the Europe 2020 strategy, in 2010, the Innovation Union initiative was adopted, which aimed to improve the conditions and access to finance for research and innovation in the EU and, ultimately, to create a single European market for innovation that would attract innovative businesses. In this context, in order to measure and monitor innovation performance as well as the progress of the EU member states, several tools have been put in place, incl. European Innovation Scoreboard (EIS), Regional Innovation Scoreboard, and Innobarometer (European Commission, 2013). Similar to the implementation of ERA, also in this case several framework programs have been adopted, namely Horizon 2020 or the current 9th Framework program for research and innovation called Horizon Europe, designed for the period 2021 - 2027. This most ambitious research and innovation program to date is expected to strengthen science and technology in the EU and to address major global challenges in key areas such as health, aging, safety, pollution, and climate change (CVTI SR, 2020).

Last but not least, it is also necessary to take into account the activities of The Organization for Economic Cooperation and Development (OECD) and its member states, which resulted in the concept of adopting the so-called Oslo manuals, representing a key OECD innovation model, seeking to comprehensively embrace the innovation process and its economic impacts. In addition to creating the characteristics of innovative companies, identifying internal and systematic factors influencing the innovation process, the Oslo Manuals also introduce a uniform definition of innovation at the level of European Union and OECD countries (Zaušková and Madleňák, 2012), according to which an innovation is a "new or improved product or process (or a combination thereof) that differs

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significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)" (OECD and Eurostat, 2018).

2.2. Measuring innovation and innovation performance

To evaluate and compare the innovation performance of individual countries as well as the effectiveness of innovation policy interventions, several innovation indices and surveys have been developed. These measures can also be used for the identification of innovation determinants and the interrelationships between them. In general, Grupp and Maital (2001) distinguish between two basic approaches to measuring innovation and innovation performance:

- indicators approach,
- modeling / econometric approach.

The approach based on the measurement of individual indicators usually assumes that innovation consists of a series of activities that can lead to basic and applied research, increased productivity or economic growth, and individual indicator statistics have their informative value within individual phases of the innovation process. An example of these indicators may be e.g. the investment in research and development, the number of employees working in R&D departments, or the number of patent applications (Tidd - Bessant, 2013). Although, following the study of national innovation systems, the differences between these approaches are blurred (Porter - Stern, 1999), modeling and econometric approaches based on the study of a set of several indicators still dominate in economic studies. It is often the use of so-called innovative surveys or composite indicators comparing the performance of individual countries and regions, which provide a comprehensive view of complex issues in a wide range of areas, such as economy, society, and technological development.

Due to the purpose of this paper, we focus the attention on the creation of the Summary Innovation Index (SII) – a composite indicator of the European innovation scoreboard (EIS). The annual EIS published by the European Commission provides a comparative assessment of the research and innovation performance of EU member states and selected third countries, and the relative strengths and weaknesses of their research and innovation systems (European Union, 2021). The EIS measurement framework varies year-on-year due to the new policy developments and its regional extensions, however, the last revisions maintain the same structure in terms of innovation activities (Figure 1).



Figure 1. EIS measurement framework **Source:** European Union, 2021

The last edition – the EIS 2021 distinguishes between 12 innovation dimensions within the mentioned 4 innovation activities, capturing in total 32 individual indicators. Framework conditions capture the main drivers of innovation performance external to the firm and differentiate between the following three innovation dimensions: Human resources (includes 3 indicators measuring the availability of a high-skilled and educated workforce), Attractive research systems (includes 2 indicators measuring the international competitiveness of the science base) and Digitalisation (includes 2 indicators measuring the level of digital technologies). The next innovation activity captures both public as well as business sector investments and differentiates between Finance and support (measured by 3 indicators including private funding), Firm investments (measured by 3 indicators on R&D and non-R&D investments that firms make to generate innovations), and Use of information technologies (measured by 2 indicators) as innovation dimensions. Innovation activities represent different aspects of innovation in the business sector and consist of dimension Innovators (including 2 indicators measuring the share of SMEs that have

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introduced innovations on the market or within their organizations, covering both product and business process innovations), Linkages (including 3 indicators measuring innovation capabilities), and Intellectual assets (capturing different forms of Intellectual Property Rights generated by the innovation process by 3 indicators). The last activity – Impacts – relates to the effects of enterprises' innovation activities and differentiates between Employment impacts (measuring the impact of innovation on employment by 2 indicators), Sales impacts (measuring the economic impact of innovation by 3 indicators), and Environmental sustainability (capturing improvements to reduce a negative impact on the environment including 3 individual indicators) (European Union, 2021).

For calculating the individual indicators, the EIS uses the most recent statistics obtained from different internationally recognized sources such as Eurostat, the Scopus database, Global Entrepreneurship Monitor, World Bank, World Economic Forum, or European Environment Agency. The overall performance of each country's innovation system is then summarised in a composite indicator – the SII – following the methodology explained below.

1. Setting reference years	For each indicator, a reference year is identified, for all countries, based on data availability for all those countries for which data availability is at least 75%. For most indicators, this reference year lags 1-2 years behind the year to which the EIS refers.
2. Imputing for missing values	Reference year data are then used for "2021", etc. If data for a year- in-between are not available, missing values are replaced with the value for the previous year. If data are not available at the beginning of the time-series, missing values are replaced with the next available year. If data are missing for all years, no data is imputed (i.e., the indicator does not contribute to the SII).
3. Identifying and replacing outliers	Positive outliers are identified as those country scores which are higher than the mean across all countries for all years plus twice the standard deviation. Negative outliers are identified as those country scores which are lower than the mean across all countries for all years minus twice the standard deviation. These outliers are replaced by the respective maximum and minimum values observed over all the years and all countries.
4. Transforming data that have highly skewed distributions across countries	For indicators where the degree of skewness across the full eight- year period is above one, data have been transformed using a square root transformation, i.e. using the square root of the indicator value instead of the original value
5. Determining Maximum and Minimum scores	The Maximum score is the highest score found for the eight-year period within all countries excluding positive outliers. Similarly, the Minimum score is the lowest score found for the eight-year period within all countries excluding negative outliers.
6. Calculating re-scaled scores	Re-scaled scores of the country scores (after correcting for outliers and a possible transformation of the data) for all years are calculated by first subtracting the Minimum score and then dividing by the difference between the Maximum and Minimum score. The maximum re-scaled score is thus equal to 1, and the minimum re- scaled score is equal to 0. For positive and negative outliers, the re- scaled score is equal to 1 or 0, respectively.
7. Calculating composite innovation indexes	For each year, a composite SII is calculated as the unweighted average of the rescaled scores for all indicators where all indicators receive the same weight $(1/32 \text{ if data are available for all } 32 \text{ indicators}).$
8. Calculating relative-to-EU performance scores	Performance scores relative to the EU are then calculated as the SII of the respective country divided by the SII of the EU multiplied by 100.

 Table 1. SII methodology framework

Source: European Commission, 2021b

Based on the average performance score calculated by the SII, we distinguish between 4 performance groups:

- innovation leaders with innovation performance above 125% of the EU average,
- strong innovators with innovation performance between 100-125% of the EU average,
- moderate innovators with innovation performance between 70-100% of the EU average,
- emerging innovators with innovation performance below 70% of the EU average (European Union, 2021).

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From the 2021 results of the SII, the innovation performance of the EU27 countries reached 0,53 points, corresponding improvement of 2,50%-points compared to 2020. From the perspective of the individual countries, the innovation performance in 2021 (compared to 2020) has improved for 20 member states, most notably for Estonia (20,92%-points) and Cyprus (15,58%-points), the performance has declined for 7 member states, most notably for Portugal (-8,21%-points) and Latvia (-5,54%-points). Based on the resulting innovation performance, Sweden, Finland, Denmark, and Belgium are considered as innovation leaders with the highest innovation performance. Strong innovators include Netherlands, Germany, Luxembourg, Austria, Estonia, France, and Ireland. The ranking then continues with the moderate innovators Italy, Cyprus, Malta, Slovenia, Spain, Czechia, Lithuania, Portugal, and Greece. The remaining countries, namely Croatia, Hungary, Slovakia, Poland, Latvia, Bulgaria, and Romania are considered emerging innovators.



Figure 2. The state of innovativeness of EU27 in 2021 **Source:** Own elaboration based on European Commission, 2021a

Figure 2 graphically represents the performance of 4 groups of countries distinguished by the SII, as well as the performance of the EU within individual innovation dimensions, also highlighting the best performer respectively. Seeing the differences among performance groups and individual innovation dimensions, we formulate the major hypothesis of our study, namely: the factors that determine the position of a particular country in terms of innovativeness are different according to the level of innovation performance of that country represented by the affiliation to one of the 4 performance groups.

3. Data & Methodology

For the purpose of this paper, a data published in the European Innovation Scoreboard 2021 Database (European Commission, 2021a) have been used. We considered all individual indicators (Table 2) withhin innovation activities and dimensions, as well as values of the SII between 2017 and 2021 in the EU27 countries.

In order to fulfill the goal of this paper - to specify factors that determine the position of a particular country in terms of innovativeness – a stepwise regression has been applied. The purpose of this algorithm is to add and remove potential variables in model, keeping only those which have a significant impact on the dependent variable. We used the algorithm separately for all 4 performance groups – innovation leaders, strong innovators, moderate innovators and emerging innovators in the observed time period. As a software tool to analyze the data IBM SPSS was used, which is according to Šebjan and Tomine (2015) considered as one of the most used software for manipulating, analyzing and presenting data.

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Table 2.	EIS measurement framework
Α	FRAMEWORK CONDITIONS
A.1	Human resources
A.1.1	New doctorate graduates per 1000 population aged 25-34
A.1.2	Percentage population aged 25-34 having completed tertiary education
A.1.3	Percentage population aged 25-64 participating in lifelong learning
A.2	Attractive research systems
A.2.1	International scientific co-publications per million population
A.2.2	Scientific publications among the top-10% most cited publications worldwide as percentage of total
	scientific publications of the country
A.2.3	Foreign doctorate students as a percentage of all doctorate students
A.3	Digitalisation
A.3.1	Broadband penetration
A.3.2	Individuals with above basic overall digital skills
В	INVESTMENTS
B.1	Finance and support
B.1.1	R&D expenditure in the public sector (percentage of GDP)
B.1.2	Venture capital expenditures (percentage of GDP)
B.1.3	Direct and indirect government support of business R&D
B.2	Firm investments
B.2.1	R&D expenditure in the business sector (percentage of GDP)
B.2.2	Non-R&D innovation expenditures (percentage of turnover)
B.2.3	Innovation expenditures per person employed
B.3	Use of information technologies
B.3.1	Enterprises providing ICT training
B.3.2	Employed ICT specialists
C	INNOVATION ACTIVITIES
<u>-</u> C.1	Innovators
$\frac{c_{11}}{C_{11}}$	SMEs introducing product innovations (percentage of SMEs)
C12	SMEs introducing business process innovations (percentage of SMEs)
<u>C.2</u>	Linkages
$\frac{\mathbf{C}}{\mathbf{C}}$	Innovative SMEs collaborating with others (percentage of SMEs)
C_{22}	Public-private co-publications per million population
C 2 3	Interview corported on populations per minion population
$\frac{0.2.5}{C.3}$	Intellectual assets
$\frac{c.c}{C.3.1}$	PCT patent applications per billion GDP (in Purchasing Power Standard)
C 3 2	Trademark applications per billion GDP (in Purchasing Power Standard)
C 3 3	Design applications per billion GDP (in Purchasing Power Standard)
D	IMPACTS
D 1	Employment impacts
D11	Employment in knowledge-intensive activities (percentage of total employment)
D.1.1	Employment in innovative enterprises (percentage of total employment)
$\frac{D.1.2}{D2}$	Sales impacts
$\frac{D.2}{D.2.1}$	Exports of medium and high technology products as a share of total product exports
D.2.1	Knowledge intensive services exports as percentage of total services exports
D.2.2	Sales of new-to-market and new-to-firm innovations as percentage of turnover
D.2.3	Environmental sustainability
D 3 1	Pasouroa productivity
D.3.1	Air emissions by fine particulators
D 3 3	Environment-related technologies
<i>L</i> .J.J	

Source: European Commission, 2021a

In 1960 Efroymson proposed choosing the explanatory variables for a multiple regression model from a group of candidate variables by going through a series of automated steps. At every step, the candidate variables are

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evaluated, one by one, typically using the F statistics for the coefficients of the variables being considered (Tjora, 2018).

A forward (Step-Up) selection rule starts with no explanatory variables and then adds variables, one by one, based on which variable is the most statistically significant, until there are no remaining statistically significant variables. This method is often used to provide an initial screening of the candidate variables when a large group of variables exists. Forward selection is also used when multicollinearity is a problem. A backward (Step-Down) selection starts with all possible explanatory variables and then discards the least statistically significant variables, one by one. The discarding stops when each variable remaining in the equation is statistically significant. Backward elimination is challenging if there is a large number of candidate variables and impossible if the number of candidate variables is larger than the number of observations (Borboudakis and Tsamardinos, 2019).

A bi-directional stepwise procedure or Stepwise regression is a combination of forward selection and backward elimination. As with forward selection, the procedure starts with no variables and adds variables using a pre-specified criterion. Stepwise regression essentially does multiple regression several times, each time removing the weakest correlated variable. At the end you are left with the variables that explain the distribution best (Keith, 2014).

4. Results

In this section the stepwise regression results and their interpretation are presented.

Before being analysed in IBM SPSS we assigned each variable a specific code according to its affiliation to innovation activity (A, B, C, D) and innovation dimension (A.1, A.2, A.3, B.1, B.2, B.3, C.1, C.2, C.3, D.1, D.2, D.3). Individual indicators were then labelled in order stated in the EIS measurement framework, all individual indicators with their codes are shown in Table 2 respectively. Moreover, we devided the analyzed EU27 countries into 4 separate groups based on their innovation performance levels (analogous to the EIS 2021 performance groups).

In order to perform the stepwise regression, dependent and independent variables were selected. The SII measuring the overall innovation performance was adopted as the dependent variable and the individual indicators listed in Table 2 were considered as the independent variables. The results of the stepwise regression, which we applied separately for innovation leaders, strong innovators, moderate innovators as well as emerging innovators are presented in the following figures.

As shown in the Figure 3, based on the selected criterion for the stepwise regression (probability of F to enter $\leq 0,050$, probability of F to remove $\geq 0,100$), 7 models were created, each of them incorporating different indicators and accounting for different SII variation. Model 1 incorporates only 1 indicator – A.3.1 Broadband penetration, which accounts for 78,9% of the SII variation. By adding the D.1.1 Employment in knowledge-intensive activities, C.2.3 Job-to-job mobility of HRST, D.1.2 Employment in innovative enterprises, D.2.3 Sales of new-to-market and new-to-firm innovations, C.1.2 SMEs introducing business process innovations the model explains additional 19,7% of SII variance (R² =0,986). Comparing the Model 6 and Model 7, we can see that by removing the variable D.1.2 Employment in innovative enterprises, the explained variance did not change (R² change =0,000), Sig. F change =0,787 implies the removed variable did not significantly improve the model prediction. Based on these results, we assume there are 6 determinants affecting innovation performance of the countries with the highest rating.

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					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	,888ª	,789	,777	,01564	,789	67,221	1	18	<,001
2	,935 ^b	,874	,859	,01244	,085	11,456	1	17	,004
3	,951°	,904	,886	,01117	,030	5,060	1	16	,039
4	,981 ^d	,963	,953	,00720	,059	23,490	1	15	<,001
5	,988 ^e	,976	,968	,00592	,014	8,197	1	14	,013
6	,993 ^f	,986	,980	,00470	,010	9,274	1	13	,009
7	,993 ⁹	,986	,981	,00454	,000	,076	1	13	,787

Model Summary - Innovation Leaders

a. Predictors: (Constant), A.3.1

b. Predictors: (Constant), A.3.1, D.1.1

c. Predictors: (Constant), A.3.1, D.1.1, C.2.3

d. Predictors: (Constant), A.3.1, D.1.1, C.2.3, D.1.2

e. Predictors: (Constant), A.3.1, D.1.1, C.2.3, D.1.2, D.2.3

f. Predictors: (Constant), A.3.1, D.1.1, C.2.3, D.1.2, D.2.3, C.1.2

g. Predictors: (Constant), A.3.1, D.1.1, C.2.3, D.2.3, C.1.2

Figure 3. Results of the estimating model parameters – innovation leaders **Source:** own calculations based on European Commission, 2021a

Figure 4 presents the results of the stepwise regression for the group of strong innovators (8 resulting models). Model 1 incorporates C.1.1 SMEs introducing product innovations only and accounts for about 71% of the variation ($R^2 = 0,707$) in SII. Following models add more indicators based on the mentioned criteria. Model 8 which accounts for 98,8% of the SII variation incorporates C.1.1 SMEs introducing product innovations, D.3.1 Resource productivity, C.1.2 SMEs introducing business process innovations, B.1.2 Venture capital expenditures, B.3.1 Enterprises providing ICT training, A.3.1 Broadband penetration, C.2.1 Innovative SMEs collaborating with others, and A.1.1 New doctorate graduates. In this model all added variables significantly improve the model prediction (Sig. F change $\leq 0,05$). Based on the results we assume there are 8 determinants affecting innovation performance of the strong innovators.

Model Summary - Strong Innovators

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	,841 ^a	,707	,697	,03681	,707	67,684	1	28	<,001
2	,945 ^b	,893	,885	,02266	,186	46,879	1	27	<,001
3	,970°	,941	,935	,01708	,048	21,516	1	26	<,001
4	,983 ^d	,966	,961	,01323	,025	18,351	1	25	<,001
5	,987 ^e	,973	,968	,01200	,007	6,367	1	24	,019
6	,991 ^f	,982	,977	,01016	,008	10,477	1	23	,004
7	,992 ^g	,985	,980	,00946	,003	4,567	1	22	,044
8	,994 ^h	,988	,983	,00865	,003	5,310	1	21	,032

a. Predictors: (Constant), C.1.1

b. Predictors: (Constant), C.1.1, D.3.1

c. Predictors: (Constant), C.1.1, D.3.1, C.1.2

d. Predictors: (Constant), C.1.1, D.3.1, C.1.2, B.1.2

e. Predictors: (Constant), C.1.1, D.3.1, C.1.2, B.1.2, B.3.1

f. Predictors: (Constant), C.1.1, D.3.1, C.1.2, B.1.2, B.3.1, A.3.1

g. Predictors: (Constant), C.1.1, D.3.1, C.1.2, B.1.2, B.3.1, A.3.1, C.2.1

h. Predictors: (Constant), C.1.1, D.3.1, C.1.2, B.1.2, B.3.1, A.3.1, C.2.1, A.1.1

Figure 4. Results of the estimating model parameters – strong innovators **Source:** own calculations based on European Commission, 2021a

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					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	,690ª	,476	,464	,03195	,476	39,083	1	43	<,001
2	,820 ^b	,672	,656	,02559	,196	25,051	1	42	<,001
3	,872°	,760	,742	,02216	,088	14,990	1	41	<,001
4	,907 ^d	,824	,806	,01923	,064	14,457	1	40	<,001
5	,944 ^e	,891	,877	,01530	,067	24,135	1	39	<,001
6	,964 ^f	,929	,918	,01249	,038	20,585	1	38	<,001
7	,972 ⁹	,944	,933	,01128	,015	9,591	1	37	,004
8	,979 ^h	,959	,949	,00982	,015	12,823	1	36	,001
9	,982 ⁱ	,964	,954	,00932	,005	4,983	1	35	,032
10	,986 ^j	,972	,964	,00827	,008	10,405	1	34	,003
11	,985 ^k	,971	,963	,00837	-,002	1,849	1	34	,183
12	,987 ¹	,975	,968	,00783	,004	5,974	1	34	,020
13	,991 ^m	,982	,976	,00680	,007	12,107	1	33	,001
14	,993 ⁿ	,985	,980	,00616	,004	8,156	1	32	,007
15	,993°	,985	,981	,00607	,000,	,001	1	32	,974

Model Summary - Moderate Innovators

a. Predictors: (Constant), B.3.2

b. Predictors: (Constant), B.3.2, C.1.2

c. Predictors: (Constant), B.3.2, C.1.2, D.2.3

d. Predictors: (Constant), B.3.2, C.1.2, D.2.3, B.1.2

e. Predictors: (Constant), B.3.2, C.1.2, D.2.3, B.1.2, C.3.1

f. Predictors: (Constant), B.3.2, C.1.2, D.2.3, B.1.2, C.3.1, A.1.2

g. Predictors: (Constant), B.3.2, C.1.2, D.2.3, B.1.2, C.3.1, A.1.2, A.1.1

h. Predictors: (Constant), B.3.2, C.1.2, D.2.3, B.1.2, C.3.1, A.1.2, A.1.1, D.1.2

i. Predictors: (Constant), B.3.2, C.1.2, D.2.3, B.1.2, C.3.1, A.1.2, A.1.1, D.1.2, D.2.1

j. Predictors: (Constant), B.3.2, C.1.2, D.2.3, B.1.2, C.3.1, A.1.2, A.1.1, D.1.2, D.2.1, A.3.2

k. Predictors: (Constant), B.3.2, C.1.2, D.2.3, B.1.2, C.3.1, A.1.2, A.1.1, D.2.1, A.3.2

I. Predictors: (Constant), B.3.2, C.1.2, D.2.3, B.1.2, C.3.1, A.1.2, A.1.1, D.2.1, A.3.2, B.2.3

m. Predictors: (Constant), B.3.2, C.1.2, D.2.3, B.1.2, C.3.1, A.1.2, A.1.1, D.2.1, A.3.2, B.2.3, A.2.1

n. Predictors: (Constant), B.3.2, C.1.2, D.2.3, B.1.2, C.3.1, A.1.2, A.1.1, D.2.1, A.3.2, B.2.3, A.2.1, C.2.3

o. Predictors: (Constant), B.3.2, C.1.2, D.2.3, B.1.2, C.3.1, A.1.1, D.2.1, A.3.2, B.2.3, A.2.1, C.2.3

Figure 5. Results of the estimating model parameters – moderate innovators

Source: own calculations based on European Commission, 2021a

Following the stepwise regression results for the group of moderate innovators, we can assume there are 15 different models with main drivers of the innovation performance. From Model 1 to Model 10 we can observe increasing variance explained, whereby the number of individual indicators also increases. In Model 11, removing the indicator D.2.1 Exports of medium and high technology products caused a decrease in explained variation (R² change =-0,002), the change was statistically not significant (Sig. F change =0,183). Regarding the best-fitted model from the perspective of explained SII variation, Model 14 together with Model 15 suit the best (R²=0,985). However, based on the Sig. F change for Model 15 (0,974) and Model 14 (0,007) we would consider determinants of Model 14 as innovation drivers, as removing the indicator A.1.2 Percentage population aged 25-34 having completed tertiary education did not significantly improve the model prediction. Thereby we assume there are 12 indicators affecting innovation performance of moderate innovators, namely B.3.2 Employed ICT specialists, C.1.2 SMEs introducing business process innovations, D.2.3 Sales of new-to-market and new-to-firm innovations, B.1.2 Venture capital expenditures, C.3.1 PCT patent applications, A.1.2 Percentage population aged 25-34 having completed tertiary education, A.1.1 New doctorate graduates, D.2.1 Exports of medium and high technology products, A.3.2 Individuals with above basic overall digital skills, B.2.3 Innovation expenditures per person employed, A.2.1 International scientific co-publications, C.2.3 Job-to-job mobility of HRST.

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					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	,848 ^a	,720	,711	,03326	,720	84,788	1	33	<,001
2	,953 ^b	,909	,903	,01926	,189	66,452	1	32	<,001
3	,967°	,936	,929	,01646	,027	12,799	1	31	,001
4	,980 ^d	,961	,956	,01306	,025	19,275	1	30	<,001
5	,983 ^e	,967	,961	,01223	,006	5,201	1	29	,030
6	,987 ^f	,975	,970	,01079	,008	9,257	1	28	,005
7	,992 ^g	,984	,979	,00892	,009	13,956	1	27	<,001
8	,994 ^h	,987	,983	,00796	,004	7,922	1	26	,009
9	,995 ⁱ	,991	,987	,00692	,003	9,344	1	25	,005
10	,998 ^j	,996	,995	,00453	,005	34,441	1	24	<,001
11	,999 ^k	,997	,996	,00395	,001	8,483	1	23	,008
12	,999 ¹	,997	,996	,00387	,000	,024	1	23	,878,

Model Summary - Emerging Innovators

a. Predictors: (Constant), A.2.1

b. Predictors: (Constant), A.2.1, B.2.3

c. Predictors: (Constant), A.2.1, B.2.3, D.1.1

d. Predictors: (Constant), A.2.1, B.2.3, D.1.1, D.2.3

e. Predictors: (Constant), A.2.1, B.2.3, D.1.1, D.2.3, A.3.1

f. Predictors: (Constant), A.2.1, B.2.3, D.1.1, D.2.3, A.3.1, C.1.1

g. Predictors: (Constant), A.2.1, B.2.3, D.1.1, D.2.3, A.3.1, C.1.1, B.1.1

h. Predictors: (Constant), A.2.1, B.2.3, D.1.1, D.2.3, A.3.1, C.1.1, B.1.1, D.3.3

i. Predictors: (Constant), A.2.1, B.2.3, D.1.1, D.2.3, A.3.1, C.1.1, B.1.1, D.3.3, B.1.2

j. Predictors: (Constant), A.2.1, B.2.3, D.1.1, D.2.3, A.3.1, C.1.1, B.1.1, D.3.3, B.1.2, B.2.1

k. Predictors: (Constant), A.2.1, B.2.3, D.1.1, D.2.3, A.3.1, C.1.1, B.1.1, D.3.3, B.1.2, B.2.1, A.1.2

I. Predictors: (Constant), A.2.1, B.2.3, D.1.1, D.2.3, C.1.1, B.1.1, D.3.3, B.1.2, B.2.1, A.1.2

Figure 6. Results of the estimating model parameters – emerging innovators **Source:** own calculations based on European Commission, 2021a

Results for the last considered group of countries – emerging innovators – are presented in Figure 6. Thereof, statistically significant changes occurred in all resulting models except Model 12 (Sig. F change =0,878), which leads us to the assumption, there are 11 innovation indicators affecting innovation performance of emerging indicators, all together explaining 99,7% of the SII variation: A.2.1 International scientific co-publications, B.2.3 Innovation expenditures per person employed, D.1.1 Employment in knowledge-intensive activities, D.2.3 Sales of new-to-market and new-to-firm innovations, A.3.1 Broadband penetration, C.1.1 SMEs introducing product innovations, B.1.1 R&D expenditure in the public sector, D.3.3 Environment-related technologies, B.1.2 Venture capital expenditures, B.2.1 R&D expenditure in the business sector, A.1.2 Percentage population aged 25-34 having completed tertiary education.

5. Conclusions

The aim of this paper was to analyze the creation of a selected innovation index – the SII – and specify factors that determine the position of EU27 countries in terms of innovativeness in SII ranking. We have investigated the effects of 32 individual innovation indicators on the innovation performance measured by the SII over the period 2017-2021. The purpose of our study was also to test the hypothesis and to offer evidence with respect to the different impact of the innovation factors on the innovation performance, according to the affiliation to one of the performance groups – innovation leaders, strong innovators, moderate innovators, emerging innovators.

The empirical results obtained show there are in total 22 individual indicators which significantly influence the innovation performance of the EU27 countries. Speaking about the innovation dimensions, A.3 Digitalisation and C.1 Innovators determinate the innovation performance of countries from all 4 performance groups. Within the dimension C.2 Linkages, 2 individual indicators (C.2.1 Innovative SMEs collaborating with others and C.2.3 Job-

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to-job mobility of HRST) have an important influence on the SII score in a group of innovation leaders, strong and moderate innovators. For countries ranked as strong, moderate, and emerging innovators also indicators from dimensions A.1 Human Resources, and B.1 Finance and support are relevant when searching for innovation performance determinants. Surprisingly, there is also a dimension with indicators affecting innovation performance for both innovation leaders and emerging innovators, namely D.1 Employment impacts and indicator D.1.1 Employment in knowledge-intensive activities. From the obtained results, also similarities between innovation determinants of moderate and emerging innovators can be observed (dimensions B.2 Firm investments, A.2 Attractive research systems). Last but not least, from the dimension C.3 Intellectual assets, only the C.3.1 PCT patent applications indicator significantly contributes to the innovation performance of moderate innovators.

To sum it up, there are important differences with regard to the determinants of innovation performance, according to the level and affiliation to the SII performance group of the country. From all the considered indicators, only those from dimensions A.3 Digitalisation and C.1 Innovators have a significant impact on innovativeness, regardless on the affiliation to the performance group of the country.

Finally we want to address some limitations of our research, which can be related to the periods of observations and the sample of observed countries. We also need to take into consideration the limitations of the SII and its methodology for calculation. In future studies a deeper analysis considering individual indicators within each group would be helpful. Such analysis would be especially interesting for countries that have dramatically weakened or improved their competitiveness (also in the relation to the COVID-19 pandemic).

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Integration of sustainable reporting in companies¹

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Abstract

This paper deals with the integration of sustainable reporting in companies. First, the basic theoretical knowledge is defined on the basis of a literature search, which is supplemented by the author's comments. The space is dedicated to the concepts of sustainability, basic principles and organizations dealing with the integration of reporting into companies. Subsequently, the author conducts his own research, where he compares the use of sustainability standards and uses the Dow Jones Industrial Indices and the Yahoo Finance Sustainability Index to quantify results for individual industries. Last but not least, it also outlines the views of scientists and their arguments for and against sustainable reporting. The last chapters are devoted to findings based on previous studies on sustainable reporting. There are also limitations of the paper and possible suggestions for further research.

Keywords: sustainability, integrated reporting, corporate strategy

Jel Codes: Q01, Q56

1. Introduction

The end of the 20th century brought huge changes in the direction of corporate strategies towards sustainability and its integration into these strategies. Epstein (2008) mentions the need to integrate sustainability policy into business strategies to meet goals. At the same time, the company should achieve excellent economic results and achieve economic growth, both should be achieved by a combination of economical management of natural resources, responsible behaviour towards the environment and respect for the rights and needs of others. This approach is called the "triple bottom line" (Elkington, 1997). In promoting sustainability in an organization, it is necessary to convince major shareholders and owners of this step (Waddock et al., 2007). In today's globalized world, there is a growing interest from corporate shareholders in investing in companies that are accountable and transparent. Sustainable reporting comes to the fore, which includes the evaluation of not only economic performance, but also environmental and social aspects (Băndoi et al., 2021) compared to previous reporting, where these were only economic and financial indicators. Cintra (2012) says that sustainability is a new paradigm of the 21st century. Managers must think about new dilemmas, not only maximizing profits, but also social and environmental aspects. In recent years, public pressure has been growing on the global climate and declining space on Earth, and on companies' growing interest in sustainability (Freundlieb & Teuteberg, 2013). The number of organizations starting to publish information of their approaches to sustainability is growing every year (Kolk, 2004). The way to publish this information is through sustainability reports along with financial reports (Liew et al., 2014). These reports include the economic, environmental and social impacts of the organization caused by their behaviour (Global Reporting Initiative, 2021). Such reports provide shareholders with better opportunities to assess organizations in terms of reliability and long-term development. Organizations therefore need to find a compromise between shareholder expectations and the feasibility of the required reports (Băndoi et al., 2021). Christofi et al. (2012) argue that environmental policy has a positive effect on increasing the value of an organization. Therefore, sustainable reporting is becoming the main way to report environmental, social and economic results. Epstein (2008) points out that managers are beginning to ask more and more how companies can improve sustainability indicators, and more specifically, how they can identify, manage and measure these indicators and how to integrate them into systems and structures in a company to bring increase of performance indicators in the company.

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2. Methodology and goals of the paper

The main goal of this paper is to analyze companies applying sustainability policy in several dimensions, namely social, environmental, corporate policy and economics. The comparison will be made using point evaluation of individual criteria. Furthermore, companies applying sustainability policy will be compared with other companies that are comparable in the given sector. The author sets two hypotheses. The first hypothesis examines the use of GRI (Global Reporting Initiative) standards by industry. The second hypothesis will examine the amount of capitalization, the number of companies involved and the points achieved in 2019 and 2020. Data will be obtained from Dow Jones Sustainability Indices (DJSI) from RobecoSam Industry Leaders (2019 and 2020) and the Yahoo Finance Sustainability Index (YFSI) from Yahoo Finance (Yahoo, 2021), GRI standards, Standard Ethics Rating (SER) from the European Union (EU), Company ESG risk assessment from Morning Star Company. Comparison within the specified criteria in the time period 2015, 2017 and 2019 and in comparison with other companies in the industry. The main method used in the paper is the analysis of secondary data and information available from the literature, company reports and websites. Using a basic research method, the author clarifies whether companies that practice sustainability are perceived better by the majority society than companies that do not practice this policy.

3. Selection criteria

The author used three main sources of data for sustainability analysis. The first source is the Dow Jones Sustainability Indices, which was chosen as the basic source of information for reasons of complexity, transparency and credibility, according to RobecoSam (2021). This index was created in 1999 and has since analyzed and compared companies in three main areas. It compares the overall score from three areas, namely economic, social and environmental. Sets of questions are created for these areas, which are sent in the form of questionnaires. The questions are specified according to individual sectors and according to their importance for the given sector. They contain, for example, these areas, which are scored from 0 up to 100 points: product sustainability, climate protection strategies, sustainable operability and performance of environmental processes, human rights, etc. Data are available for 2017, 2019 and 2021. The selection for DJSI was made from 7,032 companies. Then, companies were selected that are in the TOP 15% in their industry, and at the same time meet the ESG score of 30 % of the most successful companies. A total of 61 industrial clusters were identified. For individual criteria, great emphasis was placed on creating long-term value for shareholders of selected companies.

31 companies were selected from DJSI. Information on sustainability and standards was sought for selected companies to help companies meet sustainability policy. For individual companies, emphasis was placed on recording all activities aimed at meeting goals. The fulfillment of objectives was recorded in the fulfilled / not fulfilled style. The information is based on the latest reports that companies have published on their websites. The companies come from several industries, so clusters (groups) have been created that aggregate individual companies into smaller units. This aggregation provides a more comprehensive view of the individual sectors and allows analysis to be carried out. Clusters are defined for the following areas: automotive, banking, chemical, food processing, industrial, software, oil processing and transportation services.

The last source of sustainability data is the YFSI. This index provides sustainability information for more than 2,000 companies. YFSI evaluates three main areas and the overall score from these three areas, which are the environment, social area and corporate policy. These three main areas are scored from 0 to 100 points. The lower the score, the lower the possible negative risk management associated with ESG. The level of controversy is scored from 1 to 5 points. The higher the score, the higher the possibility of negatively affecting shareholders due to poor management of ESG risks.

These main sources of information are used to compare individual companies across sectors using several criteria and in different years. DJSI and YFSI provide information on the average number of points for the industry relevant to the companies being compared. The point evaluation for selected companies was obtained as their average number of points achieved within their clusters. This information provides an opportunity to compare the situation in each sector with the best companies practicing sustainability policy.

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4. Basic terms and their definition

This chapter is devoted to the description of basic concepts related to sustainability.

4.1. Sustainability

In recent years, sustainability has been seen as the main communication channel between owners and the general public. The concept of sustainability and sustainable reporting does not have a well-defined definition. Aras & Crowther (2009) point out that many researchers are working to establish standards for sustainable reporting. One definition of sustainable policy may include the inclusion of economic and social assessments of economic performance, not just economic and financial ones. The inclusion of environmental and social aspects in the perception of companies is a huge step forward. Sustainable policy has never been more relevant than in recent years. Thanks to globalization, everything is accelerating. Sea, air and land transport are increasing their ability to transport almost everything almost anywhere. Industrial conglomerates are constantly increasing production and are disregarding social and environmental aspects in the pursuit of financial indicators. Sustainable reporting thus supports increasing the value of the brand, increasing competitiveness in recruiting employees on the market, better awareness of its employees about sustainable policies and, last but not least, the possibility of gaining capital from credit companies that provide more favorable conditions for such companies (Băndoi et al., 2021).

The first reports in which not only financial indicators began to appear are from the period around 1970, and this information was called the "social balance sheet" (Fifka, 2015). At first, it was information such as the payment of social benefits to employees, etc. (Fifka, 2015) Later, information on product quality and social balance began to be included. After a series of ecological cadastres in the 1980s, companies themselves began to proactively seek such reporting, which resulted in the first independent sustainability report in 1989 (Kolk, 2004). In the following years, companies began to use sustainable reporting on a regular basis in their annual reports and began to take advantage of these reports, which they used as marketing communication and gaining competitive advantage by improving the image of the general public (Kolk, 2004). Around the year 2000, companies still reported mainly environmental aspects (Liew et al., 2014). According to Kolk (2004), 98 % of the 250 largest companies that reported on sustainability in 1998 published only environmental aspects. In 2002, it was only 71 %. During this period, the reports were renamed from "corporate citizenship" reports to socially responsible reports (Fifka, 2015). The number of articles related to integrated reporting, which includes sustainability reports, is growing every year. Figure 1 shows the number of published articles from 1990 to 2019. The tendency to publish these articles has been growing for a long time, but in the last few years this trend has stopped.



Figure 1. Development of published articles on integrated reporting

Source: Beerbaum & Puaschunder (2019)

Freundlieb & Teuteberg (2013) states that the number of companies reporting on sustainability is constantly increasing and has reached the point where it becomes the new standard. Today, the Global Reporting Initiative is one of the main standards for monitoring compliance with sustainability policy. Freundlieb & Teuteberg (2013) argue that it is important to focus on the credibility and transparency of such reports. Companies often use aggregate figures, using only selected indicators, making it difficult to determine how goals are being achieved (Hedberg & von Malmborg, 2003). For industrial companies such as chemical, software, automotive, food, utilities and / or mining companies, the number of reported reports was higher than for other companies in other fields (Kolk, 2004).

Sustainable reporting helps organizations measure, understand and communicate economic, environmental and social indicators. Setting goals in reports helps you manage change. Specific sustainability statements mostly

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include non-financial statements, triple bottom line statements, corporate social responsibility (CSR) and integrated statements that combine financial and non-financial indicators (Beerbaum & Puaschunder, 2019). Following on from sustainable reporting, organizations take into account how they affect the planet, people and sustainability profits. This type of reporting helps companies be credible in areas of threats and opportunities. This helps in communicating with the owners to identify these threats and opportunities that affect society. This credibility allows companies to build trust in their business. Sustainable reporting is best described in the Global Reporting Initiative, the Organization for Economic Co-operation and Development (OECD), the UN Global Compact and the International Organization for Standardization (ISO), which describe international standards for social responsibility (Beerbaum & Puaschunder, 2019).

4.2. GRI

The Global Reporting Initiative oversees compliance with the appropriate sustainability policy reporting framework. Any large company can participate in complying with GRI standards, regardless of the field in which they operate (GRI, 2000-2006). Investors, employees, the public and other stakeholders work together on GRI standards. GRI was formed in 1997 in Boston, USA as a result of an environmental disaster caused by Exxon Valdez. Following this, a non-profit organization was set up to create a accountability mechanism to ensure that companies adhere to the principles of responsible environmental behavior, which was later extended to social, economic and governmental aspects (Global Reporting Initiative, 2021). Sustainability, like other fields, is evolving and, as a result of this development, standards are being created and updated. The first standard created in 2000 is called G1 and created the first framework for sustainable reporting. Subsequent generations of reports have ascending labeling. The last update took place in 2016, referred to as G4, and set the first global standards for sustainable reporting. The update continues with the setting of new thematic standards in the area of taxation (in 2019) and in the area of waste (2020) (Global Reporting Initiative, 2021).

Standards are gradually evolving thanks to the involvement of a wide range of contributors. ACCA (2013) points out, for example, that the G3 standard allowed companies to choose which levels of reporting to participate and which indicators to use. The companies then chose only indicators that suited them and were positive for reporting and served as good PR. This has improved with the new G4 standard, which sets out a set of indicators for companies to report. These indicators are divided into seven groups into general and specific indicators. General indicators publish general information about the company. Specific indicators show the economic, social and environmental aspects of society.

Basic categories of indicators (Global Reporting Initiative, 2021):

- publishing strategies,
- economic categories,
- categories of environmental and labor rights,
- human rights categories,
- social rights categories,
- category of responsible product.

G4 are connected both with the UN Global Compact principles and with the OECD guideline for multinational enterprises (Ministry of Industry and Trade of the Czech Republic, 2013). GRI reports can take various forms of publication, from printed reports to websites (GRI, 2000-2006). They can be published in financial reports, financial statements or as a separate report.

4.3. OSN Global Compact

It was set up in 2000 at the instigation of the UN Secretary-General's Global Compact, which aims to mobilize efforts at a global level to create sustainable societies. Businesses can join this initiative, regardless of their size or location. The UN Global Compact requires responsible behavior in the context of human rights, the labor, environmental and anti-corruption environments. It seeks to find new solutions to the 2030 agenda, which sets 17 sustainable development goals (United Nations Global Compact, 2020). After twenty years of operation, more than 10,000 companies in more than 160 countries have joined the UN Global Compact.

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Rules	Text
Human rights	Protection and respect for fundamental human rights
	Failure to participate in their violation
Labor standards	Respect for freedom of association and recognition of the right to collective bargaining
	Elimination of forced labor
	Prohibition of child labor
	Elimination of discrimination in employment
Environment	Promotion of environmental protection
	Support for initiatives promoting a responsible approach to the environment
	Support for the development and dissemination of environmentally sound technologies
Fighting corruption	Action against corruption in all its forms, including extortion or bribery

Table 1. 10 UN Global Compact Principles

Source: Prepared according to the Association of Social Responsibility (ACS-R), (2013)

4.4. OECD Guidelines for Multinational Enterprises

The OECD Guidelines for Multinational Enterprises are among the oldest tools dealing with business sustainability. This directive was created in 1976 and has been committed to 46 states. Compliance with the recommendations set out in the Directive is not legally enforceable from companies, it operates on a voluntary basis. The guidelines are addressed by governments to multinational companies that do business internationally. The guidelines were developed in collaboration with OECD members, employees and employers associations, and the non-governmental sector. Unlike other sustainability instruments, this directive differs in that countries have committed themselves to setting up national contact points to raise awareness of the directive. The last update took place in 2011, where a chapter on human rights was added, which draws on the UN Global Compact. The main objective of this Directive is to prevent and deter the negative effects of the activities of organizations involved in complying with them through minimum standards of conduct for multinational companies (OECD, 2011).

4.5. Principles of AccountAbility

In 1999, AccountAbility created AA1000 standards that address sustainability and the involvement of owners in sustainability processes. This standard is divided into four main principles. Figure 2 shows the principle of "impact" as the most important part of the link between "inclusivity", "responsiveness" and "materiality". These principles serve not only to guide internal company processes, but also to manage the value chain, including its suppliers, partners and customers (AccountAbility, 2018).

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Figure 2. Principles from AccountAbility

Source: AccountAbility (2018)

4.6. Sustainable development and ISO standards

Another of a number of standards to which companies can voluntarily join are ISO standards. There are many standards dealing only with sustainability, eg ISO 14000 deals with the environment, ISO 9000 deals with quality management ISO 8000 deals with data quality, ISO guide 64 deals with environmental aspects of products or ISO guide 82, which serves as a guide for sustainable standards (ISO, 2019). The ISO organization has a total of 164 members, more than 22,500 issued standards and 249 technical committees that work together to develop standards. In 2018, ISO standards focus on creating standards that meet SDG objectives (ISO, 2020).

4.7. SDG

In 1992, in Rio de Janeiro, the United Nations (UN) formulated Agenda 21, which aimed to develop a plan to improve sustainability, improve human life and protect the environment. In 2000, a new Millennium Development



Goals Action Plan was adopted, which included eight goals to reduce extreme poverty by 2015. In 2015, new and more comprehensive goals were created, which should be achieved by 2030. These goals are collectively called the 2030 Sustainable Development Knowledge Platform (SDG) (2021). This agenda consists of 17 main goals, which are further elaborated in detail into other sub-goals. Figure 3 shows the main SDG targets.

Figure 3. SDG targets

Source: Sustainable development knowledge platform (2021)

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The SDG objectives focus, for example, on reducing poverty, improving access to education, more responsible consumption, renewable energy, reducing water pollution, etc. The SDG objectives are taken as the main standard in sustainability policy-making. Many standards seek to incorporate these objectives into their curricula and meet them.

4.8. Integrated reporting

It is a periodic document designed to explain to financial capital providers how an organization creates, maintains or reduces value over time. Integrated reporting is beneficial for anyone interested in how an organization creates its added value over time. That is, employees, customers, suppliers, legislators, regulators or politicians. A principles-based approach is used, where the purpose is to find a balance between flexibility and regulation that recognizes the differences between circumstances between organizations and at the same time allows a sufficient degree of comparability between them to meet the information needs of individual organizations. The advantage is that no specific performance indicators, measurement methods or reporting are prescribed, but a number of conditions are specified that the organization must meet in order to fulfill the essence of integrated reporting. This type of reporting focuses on providing information about the resources and relationships that affect the organization. It tries to explain how the organization communicates with the external environment and how it creates capital in the short, medium and long term. Reporting records activities that increase, decrease, or transform through the activities and outputs of the organization (IIRC, 2021). For many investors, only financial reporting may be insufficient, which is why organizations are beginning to move to integrated reporting (S&P Dow Jones, 2021). In 2010, the International Council on Integrated Reporting prepared global standards for integrated reporting. Sustainable reporting is part of the preparations for setting up integrated reporting in the future through the implementation of procedures aimed at sustainability (Ernst & Young, 2013).

4.9. Other organizations

Worldwide, there are a lot of organizations dealing with sustainability and setting standards and norms. The main organizations were mentioned in this chapter. Other organizations working with sustainability include the World Business Council for Sustainable Development (WBCSD), the Sustainability Accounting Standards Board (SASB), Carbon Disclosure (CDP), Project 5, and many others (RobecoSAM, 2019).

5.Evaluation

Table 2 summarizes industry compliance. The comparison is best based on the oil industry, which adheres to 15 standards. Other industries that are committed to and seek to support sustainability policy by mostly participating on a voluntary basis in selected standards include the automotive and chemical industries. There are generally high demands on these industries and the public focuses on them, which is why it is important for these industries to adhere to and report to these standards. Among the worst are the logistics and IT industries, where the general requirements for sustainable policy are less pronounced.

Industry	SDG	CDP	IFC	OECD	UNGC	Total points
Automotive	3	4	0	3	3	13
Banking industry	3	2	1	1	2	9
Chemical industry	3	3	0	2	2	10
Food industry	2	1	0	1	2	6
Engineering industry	3	2	0	2	2	9
IT	1	2	0	0	1	4
Oil industry	4	3	2	2	4	15
Logistics industry	1	1	0	0	0	2

Table 2. Industry by GRI

Source: Own processing (2021)

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The rating from Morning Star shows in Table 3 the overall achieved ESG risk score, where the worst results are achieved by the engineering and oil industry with values exceeding 30. In contrast, the best score is achieved by the IT and logistics industry with values attacking 10.

Table 3. Industry according to Morning Star

Industry	ESG risk assessment
Automotive	26,2
Banking industry	26,2
Chemical industry	21,6
Food industry	24,2
Engineering industry	37,6
IT	11,9
Oil industry	32,2
Logistics industry	17,4

Source: Own processing (2021)

The following graphs show the results for individual industries and criteria according to DJSI. Figure 4 compares the industry average values achieved with the companies in the DJSI selection during 2019 and 2020. This comparison is made for the overall score (based on social, economic and environmental criteria). Most indicators suggest an increasing trend for sustainability policy. Only in the automotive and banking industries did there be a decrease in the companies belonging to the DJSI selection.



Figure 4. DJSI industry

Source: Own processing (2021)

A total of 1,537 companies with a total market capitalization of \$22,521 billion were used for the analysis by S&P Global.

From Yahoo Finance, Table 4 shows the average values from the monitored companies by industry. The best results are achieved by the IT and logistics industries. The worst results in the overall evaluation are achieved by the oil and automotive industries. According to the level of controversy, the engineering and automotive industries are the worst off.

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Industry	Total ESG risk score	Environmental risk	Social risk	Governmen t risk	Level of controversy
Automotive industry	28,7	7,9	11,0	9,7	4,0
Banking industry	25,7	1,2	12,5	12,0	2,7
Chemical industry	28,0	13,3	5,8	8,6	2,5
Food industry	22,7	8,0	9,5	5,2	2,7
Engineering industry	23,0	0,7	8,2	14,1	4,0
IT	12,0	0,6	6,3	5,0	2,0
Oil industry	34,3	14,7	9,1	10,5	2,7
Logistics industry	18,0	5,1	8,1	4,6	2,3

Table 4. Industry by Yahoo Finance

Source: Own processing (2021)

6. Discussion

The direct link between sustainability and increasing the value of a company or improving its results is still debatable. Naveh et al. (2006) point out that the introduction of sustainable reporting in companies increases costs, but does not increase performance. This was also supported by Murray et al. (2006), who examined the relationship between social, environmental and financial performance of companies in the UK and found no significant relationship between sustainable reporting and market valuation. Makori & Jagongo (2013) investigated in Indian companies whether there is a relationship between the environmental approach and the profitability of selected companies. Using multiple regression analysis, they found that there was a significant negative relationship between the environmental approach and return on capital employed (ROCE) and earnings per share (EPS) and a significant positive relationship between the environmental approach and net profit margin and dividend per share. Using regression analysis, Aggarwal (2013) sought to determine whether sustainable companies are more profitable than others. He found that sustainability made sense, but the financial implications varied. Robins (2011) conducted a survey of executives and found that most of them think that social responsibility and sustainability affect the company's profitability. And that this policy, which enhances the company's reputation, can attract new and better employees, increase the loyalty of existing employees, and can lead to lower costs, increased sales and greater efficiency. Munasinghe & Kumara (2013) examined the relationship between corporate social responsibility (CSR) and financial performance using Spearman's correlation. They found that return on capital and return on assets were positively correlated and significant. Iheduru & Okoro (2019) found using a fuzzy logistics model that the integration of sustainability into society has a significant impact on increasing business indicators, especially ROA. Further research using regression analysis conducted by Duke II & Kankpang (2013) found that the integration of sustainability policies in companies in Nigeria that have a high environmental impact are associated with a significant and positive impact on their performance. Esty & Cort (2017) note that environmental responsibility is good for business. The direct link between sustainability policy and business performance is still debatable. Many authors have tried to demonstrate a link between performance and sustainability, but the results are ambiguous and more studies are needed on more samples, more industries analyzed, and also it is important to count with geographical differences.

7. Limitations and incentives for further research

The author sees some shortcomings in sustainability reporting that reduce the explanatory power of these types of reports. It is mainly a non-uniform interpretation of basic concepts, unclear methodology of compiling reports and especially voluntary registration and selection of indicators and standards that are best for the company. In the theoretical part, it was mentioned that various organizations use a continuous improvement process to create better standards that would meet the current requirements for sustainable reporting and sustainable policy better, which forces companies to comply with these standards.

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This article aimed to analyze the current situation within the framework of sustainability policy across selected industries and selected representatives from individual industries. The limitation of this article is mainly the scope of the examined industries and the number of companies involved in this analysis. The continuation of this article could be the involvement of other industrial areas and the involvement of more companies. The limitation of this article lies mainly in the use of sources, where electronic sources used mainly articles from the Web of Science, Scopus databases and websites providing information on sustainability indicators and standards. An interesting aspect would be to continue to monitor the development of sustainability indicators in the coming years. This research could be further developed and carried out for specific industries in individual countries on the basis of a coordinated international project. The result would be a comprehensive view of compliance with standards and their benefits for society itself and also for the public. There would be an increase in awareness of the need to constantly create and work with company reports and to support their efforts in their activities aimed at sustainable business.

8. Conclusion

The article described the basic standards and principles of sustainable reporting. There are many organizations that are working to create standards for better and more reliable reporting. Over the years, all of these organizations have improved their conditions for companies so that the reporting of the required information takes place within the set rules. In the past, only standards and indicators were circumvented or chosen to improve the company's image and did not show real efforts by companies to provide a holistic view of how their company approaches sustainability. Most sustainable reporting organizations operate as government-sponsored non-profit organizations. Most of the standards required of companies are on a voluntary basis and cannot be enforced by law. As the article said, sustainable reporting is very important in today's globalized world, and it is crucial that more companies want to act responsibly in these activities. The article compares selected industries and companies that have been actively involved in sustainable reporting. The comparison was made according to the GRI, where it was evaluated what standards individual companies use in sustainable reporting, where the oil industry is most initiative and the IT industry is the least active. The Morning Star rating compared overall adherence to sustainable reporting, with the IT industry performing best and the engineering industry performing worst with the oil industry. Another index analyzed was the Dow Jones Sustainability Index, which assessed individual areas of sustainability, as well as the overall score compared to the industry average. The results show an increasing trend of companies' involvement in sustainable reporting. S&P Global calculated how many companies are actively involved in sustainable reporting according to their methodology, and for the industries analyzed in this article, it was 1,537 companies with a total market capitalization of \$ 22,521 billion. The latest analysis was based on data from Yahoo Finance, where the IT industry performed best and the oil industry performed worst. An important benefit of all these companies and non-profit organizations involved in raising and maintaining awareness of sustainability policy and adherence to sustainable reporting standards is that there is increasing public pressure for more companies to engage in these activities.

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Considerations on Digital Financial Ecosystem

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Abstract

The digital financial ecosystem depends on digital liquidity and has the role of supporting the business environment in terms of maintaining financial stability, integrating financial systems, and reshaping the concept of economic benefits per unit of time. Business models developed by interconnected partners are required in response to user needs. Suppliers, banks, insurers, investment or pension funds, licensed or unlicensed institutions should convey their products and services in digital format. For the products and services to reach the beneficiaries, specific infrastructures, regulations, and policies are necessary to ensure accessibility at reasonable prices. A digital ecosystem must facilitate interaction in high security environment. The aims of this paper are in the first stage to present the components of a digital financial ecosystem, in the second stage to present certain business models and services, and in the third stage to discuss evolution factors and risks. Therefore, our study attempts to identify areas for improvement of the existing legislation and formulate proposals for adapting to new technologies. The research tool is a complex questionnaire used precisely to reflect the opinions of the respondents with regard to the research topic.

Keywords: FinTech, ecosystem, risk analysis, security, impact, responsibility, future directions

Jel Codes: G28, G41, H55, H73, O33, O44

1. Introduction

The scope of digital financial ecosystems is relatively new and partially covered in the literature. Kumaraswamy A. et. all (2018) states that the theory does not adequately address the dynamics of many innovations, such as technology and services such as Apple or Uber's ride. Many of these innovations are systemic, serving as platforms over which others can build or disrupt traditional relationships and actors by developing new separate ecosystems of products or services offered by individual firms. The concept of ecosystem emerged in the 1990s, more as a correlation between biology and economics. Moore J.F (1996). defines the ecosystem as an economic community supported by a basis for the interaction between organizations and people - the actors of the business world. This economic community produces valuable goods and services for customers, who are themselves members of the ecosystem. Member bodies also include suppliers, main producers, competitors and other stakeholders. In the 2000s, Adner R. (2006) proposes an expansion of ecosystems through their coherent customer orientation. Jacobides M.G. et. all (2018) reorients the discussion of ecosystems towards innovation and the change of the value-added paradigm by them, the ecosystems being characterized by complementarities in production and / or consumption which the members of the ecosystem can coordinate without a hierarchical government. Iansiti, M., & Levien, R. (2004) consider that the well-being of each individual member depends largely on the fate of the ecosystem. Christensen C.M. et. all (2018) presents a reasoning that confirms the intersection of emerging innovation with ecosystems, because technological innovations can generate a much greater development potential. If this development does not belong to an individual company, but to an ecosystem, the effect is much stronger. Blajer-Gołębiewska. A. et. all (2018) points out that many established industries such as the financialbanking system, healthcare, insurance, tourism, and transport face the risk of being disrupted by emerging digital technologies. Lee, S. M., & Trimi, S. (2018) appreciate that the FinTech ecosystem together with stakeholders has grown significantly in recent years due to substantial investments.

Globally, according to McKinsey (Atluri V. et. All, 2017), it is estimated that ecosystems will generate revenues of over \$ 60 trillion by 2025. In the first quarter of 2021, only Israeli investment in Fintech increased by 260% compared to the first quarter of 2020, investing \$ 2.33 billion in the first six months, and demand for new payment systems increased by 28% (Cision, 2021). For this reason, the emphasis on improving the consumer experience is growing exponentially. Decisions of major platforms (Apple, Google, Amazon), new non-bank financial actors

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such as B2B, B2C (financial or various service marketplaces, such as Alibaba, eBay, Amazon), the emergence of telecom players or retailers, strategies around digital mobility, everything is converging towards the definition of new, complex financial ecosystems in progress at the moment.

Moseson H. & Muqtadar A. (2020) consider that banks reach ecosystems with some strong built-in benefits, including strong customer relationships and the existence of trusted brands. Financial ecosystems can be integrated into other global ecosystems, or they themselves integrate ecosystems of other industries. Rutten T. (2021) mentions that consumer expectations drive digital innovation in every industry and sector. Financial services are no exception, and banking consumers are now much more demanding and selective because they have an unprecedented choice. Backbase researchers (2021) present a financial well-being report that presents the perspectives of over 1,000 business decision makers, along with the opinions of retail banking consumers. Outdated technology is the major challenge facing financial services companies in implementing or developing digital money management tools (67%). Consumers will seek management of their financial well-being using asset, investment and digital currency management applications.

According to ITU-T (Telecommunication Standardization Sector of International Telecommunication Union, 2019), the digital financial ecosystem is defined by the roles and actors involved in it and is based on a new concept - **digital liquidity**. One of the goals of a digital financial ecosystem is to support citizens and businesses to ensure economic and time benefits, financial inclusion, economic health, stability and integrity of financial systems.

An ecosystem is generated by certain needs of users and the interoperability of its products and services. but especially, according to Accenture (Gera P. et. All, 2019), the existence of a new business model of interconnected business partners, customer-centric model, to deliver the best added value to it. Gera P (2019). points out that the success of an ecosystem requires three types of measures: a system of ecosystem partners to create and manage external relations, a business architecture to ensure the success of the approach and finally the technology that must enhance business ideas.

Firstly, we are talking about the users / beneficiaries of this ecosystem, made up of consumers, companies, public administrations and civil society / NGOs (Non-Governmental Organizations). They play a central role in the construction and maintenance of the ecosystem, and their needs and requirements are the ones that shape changes and adjustments within the ecosystem.

This article analyzes the challenges related to the digital financial ecosystem, the advantages and dangers that may arise, the novelty of the research project being the approach from several angles of a current issue. As can be seen from figure no. 1, resulting from our research performed through a questionnaire, the respondent base is heterogeneous, ensuring, among other things, a high-quality level of eloquence of the results. The risk analysis also takes into account the current state of development of digital financial ecosystems, both in terms of research into existing studies on this topic and the vision of the respondents to the questionnaire.

The focus is on two aspects that are increasingly needed within the ecosystem and whose use leads to risks from the perspective of data confidentiality. The first situation is the transfer of customer data within the ecosystem. This is necessary for the interconnection of various ecosystem services and it adds value to ecosystem partners from a business perspective. The second situation is represented by the need to remotely access the services and the implications from the perspective of customer identification and authentication (both at the beginning of the contractual relationship with the service provider and during this relationship).

Regarding the risks, the level of development of the countries promoting the financial ecosystems and the level of income of the users must be considered. According to Achim M.V. et. all (2020), for high-income countries, evidence of a positive coefficient of impact on economic and financial crime has been obtained, which means that the intelligence capabilities of the people in these countries, including knowledge and skills, have increased for the use of technology in obtaining illegal benefits.

Even though we summarized the results in Chapter 6 of Results, we included some of the results in each of the chapters. The components of a digital financial ecosystem - chapter 3. Business models and services - chapter 4. Evolution versus risk factors, together with the literature review, which is specific to each chapter. The theme of the study is particularly challenging, and it was necessary for the authors to approach the construction of the work in a way that unitarily integrates the different concepts that mark a field in a continuous expansion, little documented. at present.



Figure 1. Distribution of sample based on professional, Age and Educational field

Source: Authors' processing

The first component of the ecosystem is the partners who interact either to build products and services together, or to compete in the market with products / services that cover customer needs. To drive products and services in digital format we need their suppliers, banks, insurers, investment, or pension funds, licensed or unlicensed institutions, for example non-banks. Banks use products and distribution channels, each of which can be digitized and can use digital banking or non-banking partners.

To get products from suppliers to beneficiaries, specific infrastructures are needed based on laws, regulations, policies that make them possible, ensuring their trust and accessibility at reasonable prices. This reflects part of the second component of the ecosystem, namely technology. Open-banking, imposed by Payment Services (PSD 2) - Directive (EU) 2015/2366 (European Commission, 2015) is a facilitator of these developments, new participants, third parties being involved. We hope that PSD 3 will clarify many of the issues that remained under discussion at European level on the issues addressed. Duggal Y. (2021) mentions that PSD2 and Open Banking have been around for several years, aiming to reshape and create a new future for the financial services market, and will see in the future an integration with Fin Tech trends and technology developments. mobility.

Digital assets are reflected in products and services, used by their beneficiaries, transported through digital infrastructures. These assets provide digital liquidity consisting of users' financial funds, funds held and used in digital format. The way of managing them and addressing the needs of customers in a new way is the third component of the ecosystem, namely the business architecture.

A digital ecosystem must be an inclusive system, containing a wide range of digital financial services and products, which provide opportunities to hold, access and move funds, develop equity, and reduce risk.

Digital ecosystems, according to the ITU-T Technical Report, are important for financial inclusion because they:

- provide another type of security (no longer requiring physical protection of these assets),
- are fast and transparent (traceability through implemented procedures, elimination of intermediaries, access, and immediate transfers)
- ensure increased flexibility (receiving and using funds faster, in variable amounts, including very small, with low costs and high coverage)
- promote saving (faster interfacing with savings products, automatic warehouses signaling moments of life, developing the desire to save through behavioral algorithms)
- support equal opportunities (through faster access to funds and ensuring the confidentiality of payments, especially for households)

CFA Nathan J. (2017), presents an approach from the perspective of human behaviors in decision making using technology, starting from the idea that financial markets are governed more by the laws of biology than the laws of physics, analyzing financial markets as an ecosystem allows us to understand the relationship between investment performance and the interactions of different types of investors, there is a logic of crises. "It's not necessarily mathematically accurate, but it's biologically accurate."

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2. Data & Methodology

The research was aimed at identifying as many elements, angles and aspects that characterize the existing digital financial ecosystem, as well as the needs of users and the interoperability of its products and services. In this sense, starting with the understanding the public opinion (with the assistance of responses to a tailored questionnaire) concerning the concept of digital financial ecosystem, we aimed to find out from a significant number of people the opinions on this concept. The study was anonymous and was based on a questionnaire applied online with the following structure:

a) 16 questions related to the digital financial ecosystem

b) respondent identification data (Field of activity; Country; Age; Education)

In carrying out the research, we proceeded methodically to establish the objectives, define the sample to be investigated, prepare the questionnaire, collect the data, process them, analyze the results.

Respondents' responses were quantified, using the SPSS data processing software in specific statistical indicators for:

- descriptive (quantitative) analysis: the share of value judgments on each grouping variable (Field of activity; Country; Age; Studies)

- factorial (qualitative) analysis of factual judgments: scores calculated with converted values according to Rensis Likert's scaling, standard deviation, modulus and median in the statistical sequence of scores corresponding to those questions that signify a certain type of utility of digital financial ecosystem products and services.

These statistical indicators form a complex and rigorous scientific basis for substantiating the conclusions and achieving the objectives:

- identifying the needs and characteristics of consumers in the digital financial ecosystem.

- analysis of consumer perception of the digital financial ecosystem.

The methodological aspects of our cross-sectional research were supported by the survey method, and for discussions and outlining the conclusions we referred to relevant similar research, as well as to the relevant literature.

Sample

Sample size: 823 people

(Target population: 800 people, 95% confidence level and 3% margin of error)

Sampling method: multi-stage sampling (because no information is known about the researched population)

Data collection

The questionnaire was built through https://www.questionpro.com/ and distributed online on various communication platforms. Participation was voluntary and no personal data was collected. Data collection took place between March 10 and July 10, 2021. The average duration of completing the questionnaire was 10 minutes.

Description of the general population

The distribution of the respondents on social variables of grouping is presented as follows:

- by education: 151 (18.71%) persons with secondary education, 619 (76.71%) with higher education and 37 (4.58%) persons with other education.

- depending on age: 6 people under 18 years (0.74%), 250 people aged between 18 - 30 years (30.94%), 449 people aged between 30 - 45 years (55. 57%), 65 people aged between 45 and 55 years (8.04%), 28 people aged between 55 and 65 years (3.47%) and 10 people over the age of 65 (1.24%).

- depending on the field of activity: 67 people in the field of Information Technology (8.22%), 48 people Engineering (5.89%), 34 people Legal (4.17%), 111 people Economic (13.62%), 60 people Medical (7.36%), 35 people Banking (4.29%), 58 people in the field of retail trade (7.12%), 7 people in the real estate area (0.86%), 31 people in Academic environment (3.80%) and 364 people from Other fields of activity (44.66%);

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The closed (pre-coded) questions only allow the choice between the answers suggested by the researcher, and the degree of freedom of the respondent is reduced, but this aspect was assumed precisely to focus the answers to the objective of the study.

The respondents should be knowledgeable of the researched topic. Otherwise, there is a risk of not understanding the questions and the impossibility of obtaining additional information. Nevertheless, this risk is mitigated by the level of training declared by the respondents, which is quite high.

3. Business models and services

Business models are the starting point. They are based on customer needs and involve the aggregation of several types of needs in a single application / website. This reflects the expectations of customers to have at hand and easy to compare / understand the services of interest. Another basic principle is that of timely timing, generated by the area of data analysis and online marketing. Thus, the need for customers to receive services at the right time (e.g., financing for purchasing a product - household item). This need has led to the adjustment of ecosystems to be able to anticipate customer needs according to their behavior within the ecosystem.

This section first presents the elements that have generated changes in ecosystems with the implementation of customer needs. Then the types of digital services currently offered to customers are highlighted, followed by a breakdown of banking and insurance services. For banking and insurance services, business models are detailed, with an emphasis on ecosystem development through partnerships and the provision of complementary services.

It is interesting to note that, at European level, the needs of customers in general have transformed the law over time, so that the legislation sets the main rules for ensuring an appropriate level of digital customer service, both from the perspective of consumer law, competition law, information security law, as well as that of the unitary regulation at the level of financial-banking industry.

The September 2021 editorial in The Economist (2021) signals the emergence of a new financial services ecosystem, known as decentralized finance or "DeFi", which has the potential to reconnect the way the financial system works, with all the promises and dangers it entails. "The proliferation of innovation in DeFi is like the frenzy of invention in the early stages of the Internet. At a time when people are living more and more of their lives online, the crypto-revolution could even reshape the architecture of the digital economy." DeFi has an alternative role of distributing the power to the participants, not concentrating it. Compared to the need for a large infrastructure in the traditional banking system, blockchain transactions should be reliable, cheap, transparent, and fast. According to the authors, the basic activities that take place through DeFi are the usual ones. "These include trading on the stock exchange, issuing loans and taking over deposits through self-execution agreements called smart contracts. An indicator of the activity is the value of digital instruments used as collateral: from almost nothing at the beginning of 2018, which reached 90 billion dollars." In order to be functional, many aspects need to be further clarified in the field of risks and integration in the social structure, inf the way of interaction with the real, physical world and in establishing an external anchor of value. "Cryptocurrencies do not differ from the dollar in that they are based on people who have a common expectation of their usefulness. However, conventional money is backed by states and central banks that are lenders of last resort. Without them, DeFi would be vulnerable to panic. Enforcing contracts outside the virtual world is also a concern. A blockchain contract can say you own a house, but only the police can enforce through eviction. DeFi governance and accountability are rudimentary. A succession of large irrevocable transactions that people cannot overwrite could be dangerous, especially since coding errors are inevitable. Money laundering has thrived in the ungovernable gray area of services located between Bitcoin or Etherium cryptocurrencies and the banking system. Despite claims of decentralization, some programmers and application owners have a disproportionate influence on the DeFi system. And a malicious actor could even gain control of most computers running a blockchain."

Globally, McKesey (Atluri V. et. All, 2017) identified three major developments that generate ecosystem-type models:

• The emergence and development of marketplaces, which have reshaped retail (e.g. Amazon, Alibaba, eBay, etc.);

• B2B services - outsourced management of support services (e.g. financial, human resources, accounting), which support the development of the digital ecosystem, lower prices, increase transparency, development of new partnerships, introducing innovative products generated by the financial system (e.g.: online factoring, electronic invoicing, crowdfunding or digital loyalty programs developed by banks).

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• Personal mobility - supporting the inclusion of mobility in services and products (e.g.: independent vehicles, carpooling, traffic management, etc.).

Top preferences are, at the time of construction of this article, marketplaces (e.g. Amazon, Alibaba, eBay,), 41.17% expressing their desire to use such a digital ecosystem, 61.60 expressing the preference in this sense, at the opposite pole being placed with 29.57% B2C services (e.g. retail portals,) embedded in a digital ecosystem. When asked what kind of digital ecosystems they want to use, 35.85% voted for open-banking services, 33.19% for B2B service providers (e.g. financial, banking, insurance, resources human resources, accounting) and 24.79% for mobility services (e.g. car-pooling), in the area of intent or preference being 59.04% for open-banking services, 55.21% for providers B2B services and 42.55% for mobility services.

Digital services can be of several types:

• Trading accounts, both classic (e.g. bank accounts) and electronic money.

• Payment services (e.g.: trading solutions integrated or not with the banking system, payment solutions through innovative solutions based on new technologies, especially blockchain and AI, various electronic terminals, etc.).

• Savings accounts.

• Investment services (e.g. different investment opportunities, digital portfolio management solutions, digital trading venues, robotic investment guidance tools, etc.).

• Lending services (e.g. structuring, planning and managing finances through digital means, both for individuals and companies)

• Insurance (e.g. digitization of the entire value chain, from bidding / profiling and electronic intermediation to contract management - intelligent contracting, debt settlement, etc.)

In the study we conducted, we analyzed, among other things, how the level of utility of online services is perceived in everyday life and in this regard, 70.61% of respondents consider it very useful and 85.48% at least useful time gained / saved, least useful is perceived the identification by the financial-banking institution of moments in personal life (e.g.: marriage, birthday, birth of a child in the family, job change, travel abroad etc.) and the offering of personalized services / products at this time. Access to new services and products is seen as very useful for 55.74% and at least useful for 78.45%, lower costs are very important for 48.50% and at least important for 78.45%, confidentiality is a mandatory condition for 49.53% and required for 68.15%. The presentation in the digital application of a history of transactions interactively through evolution charts is very useful for 43.79% and at least useful 66.28%, the analysis of the payment model in order to be able to offer suggestions for new products and services for the client is important for 34.43% and at least important for 57.26%, the analysis of the investment model in order to be able to offer suggestions for increasing revenue for the client is particularly attractive for 35. 60% and at least attractive for 58.20%, while notifications of potential fraud in online transactions are mandatory for 57.03% and required for 75.88%.

All business models tend to integrate into a system without borders and can involve development through partnerships. An example of this is the inclusion of a store in the internet banking application. Within this store there are products / services of some partners at advantageous prices for the customers of the credit / payment institution. This creation of partnerships is also highlighted in studies, such as that of Accenture mentioned below.

In the banking field, Accenture identifies five bank-specific models:

- 1. orchestrating the moments of life, by building a digital financial ecosystem specific to the moments of life of a client (e.g.: birth, school, marriage, moments of adult life, pension, death).
- 2. orchestration of centralized markets for goods and services (marketplaces), by joining suppliers of nonbanking products, by including the services and products provided by others.
- 3. participation in third party ecosystems, on digital payment platforms or commercial services, or start-ups.
- 4. open-banking integration by providing and accessing IT application interfaces (APIs), for the integration of products and services.
- 5. cooperation as a platform of recommendations for rejected clients, but who may find openness to other partners, non-financial institutions, etc.

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These models add value because they extend the primary relationship with that customer, generate new revenue streams / cross-sales, reduce the rate of customer loss, etc. There is an accelerated shift from the classic approach to managing maturity differences between deposits and loans, to providing super-relevant customer experiences, whether the service is banking or not. Accenture identifies six types of actions, according to Fig. 1, along three areas: ecosystem partners, business architecture and technology architecture.

All these models involve partnerships in various forms.

In an ecosystem you must have at least two users (e.g. a customer and a merchant) using the services mentioned. By combining the needs of users and services, several digital products appear (e.g. payments for purchases of goods and services, payment of invoices, sending and receiving funds, loans and repayments of funds, investments on different terms, insurance of assets or life, platforms. trading etc.).

For this reason, PcW (Jugansen H. & Niebudek M., 2019) has identified four models, depending on what the banks want to become in the near or distant future:

• Utility & balance sheet bank - the sale of traditional services, in addition to IT and connectivity. These providers have a banking license, provide their own utility services, at low prices and make a profit through operational excellence and economies of scale



Figure 2. Types of actions for the banking model of the future

Source: Gera P. et. all, (2019)

• Platform-type banking - uses the banking system of another bank, but has its own banking license, having a differentiating transformative function, because they open to third parties through APIs, both as suppliers and as integrators of APIs.

• Ecosystem for a better customer / user experience - is based on the customer experience, which is at the heart of their business and the relationship with it. They do not have a banking license and connect to partner services, including traditional banks. In general, it acts as aggregators and is based on robotics / artificial intelligence, etc..

• Bank seen as a system of customer experiences - maintains the primary connection with the customer, as in the previous model and offers partner services in the context of banking products for which they are licensed

Thus, a vertical integration is noticed, which transforms into a multi-level ecosystem, starting from the banking network, the core-banking system (with the main banking products, the digital transformation components, the provision of APIs), up to external levels where aggregators and third-party service and consultancy providers are found (e.g. e-money wallets, alternative financing providers, crowdfunding / crowd investments platforms, chatbots / robots, P2P credit or peer-to-peer insurance, payment services, loyalty services, personal finance management, P2P social payments, etc.).

New technologies (Artificial Intelligence, Big Data, blockchain, cloud-computing, robotics / chat-notes, use of APIs, open-source software) completely reshape the banking system, creating a new digital financial ecosystem, accelerating the fragmentation of the traditional value chain, causing implicitly new value chains. Regulations

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have prepared this process (e.g. PSD 2 in the banking field, or Insurance Distribution Directive IDD (The European Parliament and The Council, 2016) in insurance). The European Insurance and Occupational Pensions Authority (EIOPA) has published a report (European Insurance and Occupational Pensions Authority, 2020) on the impact of new technologies on the insurance value chain.



Figure 3. The new value chain in insurance

Source: European Insurance and Occupational Pensions Authority (2020)

Thus, in insurance we can now discuss about ecosystems and insurance platforms, insurance on demand, instant insurance, preventive services attached to insurance, etc.

If we analyze the digital ecosystem of travel insurance, we can identify its components according to Fig. 3, which go beyond their own industry, beyond the financial system, ensuring an integrated experience for the consumer, interconnecting several services, covering several different needs of customers.



Figure 4. The digital ecosystem of travel insurance

Source: European Insurance and Occupational Pensions Authority (2020)

Under the stated conditions, the natural question arises regarding liability and possible guilt if problems arise, including cyber security issues, and we understand that the software manufacturer of the digitized service / product is considered categorically responsible or responsible by 52.39%, it is considered possibly responsible by 76.36% and the user is considered not responsible by 36.79%. The cyber security solution installed by the institution / company providing digitized services / products is accepted as being responsible by 46.73% and possibly responsible by 73.91%; the financial service provider, insurance bank (etc.) is considered responsible by 38.15%

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and possibly responsible by 64.33%, while the authority supervising a digital financial, banking (etc.) ecosystem is considered very responsible by 48.08% and relatively responsible by 71.33%.

4. Specific technical requirements in a digital financial ecosystem

A digital ecosystem needs an environment that facilitates interaction and a solid infrastructure that supports new digital products, which is the technology component of the ecosystem. Technology, in turn, can be divided into infrastructure (hardware, virtualization, operating systems, etc.) and software (effective applications developed to address customer needs). The financial system also involves the interaction between financial service providers for the operation of services. Thus, for example, to be able to transfer a sum of money from one person to another, the services must be integrated into the settlement systems (Sent, etc.) according to the legislation and standards in force.

Consequently, if we refer to infrastructure, it must be prepared to facilitate transfers / payments between ecosystem participants, privately or publicly, in an interoperable way. In addition to the above, this implies the existence of a high-performance data transmission system, aside from providing the electricity needed for uninterrupted operation. The same infrastructure must ensure a level of user identification at national or sectoral level (bank account number, mobile phone number, social network account, etc.).

The way to access a mobile application for digital financial, banking, insurance applications (etc.) is very useful for 71.41% of users and useful for 87.15% of them; the most useless being considered, paradoxically, perhaps due to the non-human / unfriendly manner of interaction existing at this early stage of development, call-centers with chat-bots. The applications that can be accessed both web and mobile are particularly important for 59.49%, compared to 25.93% that consider the only web option important; both the web and mobile versions are considered useful by 76.27%, compared to 48.26 % for only web / browser.

In the same context, 48.02% of consumers consider when accessing financial information, insurance banking (etc.) as particularly useful to aggregate information in the digital application of internet banking of the bank, or financial institution and useful for 70.18% among them. It would have been totally inappropriate, paradoxically, perhaps due to the totally different way of presentation and different products / services, the aggregation of information in a digital application of a third party, including all information on financial services, insurance banking (etc.) from several financial institutions, insurance banks (etc.). We consider at least this option of end customers, who opt for simplicity and accuracy in exchange for the ability to navigate a dynamic platform based on Machine Learning, which allows them to compare several products / services and which records / processes visitor preferences to improve its functionality. The desire to obtain information directly from the financial institution providing the services (e.g. bank, IFN, insurance company, pension fund, etc.) is on an average level, with 38.20% clearly speaking in favor of this option, 55.57% also preferring the presented method.

That is why 45.91% consider it imperative that data on the services provided by financial institutions, insurance banks (etc.) be kept on the servers of the respective financial / banking institution, 65.38% considering in turn as this condition to be at least necessary and 31.37% are categorically against the idea that the information be stored on the servers of an IT provider of the financial institution, insurance bank (etc.),, not within its premises. On the other hand, 35.34% totally agree with a cloud solution, while 53.61% do not reject this alternative.

The facilitating environment for the digital transformation of the financial ecosystem into a digital financial ecosystem is determined by the relevant laws and regulations, the entities that set standards and standards issued by them (e.g. EMV, ISO, ITU, etc.), industry-specific groups (e.g. of mobile operators), international organizations and NGOs (e.g. World Bank, OECD - Organization for Economic Co-operation and Development, etc.).

This environment and these infrastructures are put at the service of users of the digital ecosystem, citizens, traders, companies, public administrations, all consumers and customers of these services and products provided by traditional digital providers (banks, insurers, investment firms, private pensions, etc.), or non-traditional (operators of electronic money or electronic assets, postal services, technological platforms, other traders). Vendors also purchase services from other vendors, such as processors, technology platforms, hardware and software vendors (e.g. ATM vendors). Roles may be interchangeable between these providers.

In these circumstances, we measured the level of interest related to the usefulness of including certain products / services in the digital environment. The result obtained was not at all surprising: transfers and payments being

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appreciated as particularly useful for 72.47% and useful for 88.13%, while real estate loans were considered by 19.70% as unimportant.

Products / Services	Very useful	Useful
Transfers and payments	72.47%	88.13%
Bank or non-bank current accounts	59.68%	79.03%
Assets, bonds and / or other investment portfolios	32.83%	54.03%
Consumer loans	41.24%	59.91%
Real estate loans	40.44%	57.83%
Financial investments	44.01%	66.13%
Life insurance	48.96%	68.89%
Auto insurance	54.84%	75.00%
Health insurance	56.45%	76.27%
Private pension	49.31%	69.93%
Management of contributions for state pensions	50.58%	70.85%

Source: Authors' processing

In terms of what has been presented so far, Artificial Intelligence is considered the most successful digital technology for the future, for 49.35% of respondents and at least very successful for 70.40% of them. The most unsuccessful is considered, paradoxically, perhaps due to insufficient information and, implicitly, insufficient understanding, technology based on Block-chain / DLT. This aspect should not be considered positive or negative, but only seen as a possible barometer of the technical level of training of the ordinary population and the perception of the phenomenon. 26.72% believe that Big Data analytics solutions will be very successful and 53.56% at least successful, while 32.11% see a very successful future for cloud computing and 60.02% support this idea. Despite a trend of rejecting technology based on Chat-bots, robotics is seen as a particularly viable solution of 44.83% and at least successful by 71.34%.

Opinions are different and we believe that a heterogeneous development will provide the opportunity to cover most areas of interest for technological developments soon.

From the perspective of the architecture of IT solutions in the context of financial ecosystems, there is an emphasis on microservices and interconnection through APIs. Thus, the rapidity of changing customer needs generates the need to create new applications / new functionalities in a short time. This involves building a modular application, which allows multiple software developers to work in parallel to build the application in a short time. It also offers the possibility to modify in a simple way a part of the application without having an impact on other functionalities. The use of APIs for interconnection allows flexibility for choosing partners and a short time to integrate with their IT systems.

In this context, customer identification and authentication are important. Several methods can be used to identify a new customer from a technical point of view, which must be correlated with the applicable legislation. In general, in order to get to know the clientele remotely, specific measures must be taken which involve identifying the authenticity of the identity document presented, establishing that the person requesting the service is indeed the person whose identity document has been presented. This involves, from a technical point of view, solutions for verifying the existence of a human person in front of the camera, technologies for verifying the authenticity of identity documents, biometric data analysis technology, integration with an electronic signature solution.

Several aspects need to be considered for the authentication area, depending on how the services are distributed, as well as the data security principles. For example, for web and mobile applications, authentication may involve distinct aspects, from single sign-on solutions, federated authentication, to session timeout, resuming an interrupted stream before completion, requesting authentication for certain types of activities within the application
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(e.g. transfers larger than x RON). All these aspects must be considered when drawing up the application and must be continuously updated according to the new technologies that appear, the risks of new types of cyber-attacks.

5. Evolution factors versus risks

Bechara M. et. all (2021) identifies unprecedented new challenges facing central banks: distributed registry technology, new methods of data analysis (artificial intelligence and machine learning) and cloud computing, along with a wider spread of mobile access and increased internet speed.

Palmié M. et. all (2020) identifies three waves of emerging technology innovations, namely electronic payments, the first wave by developing the use of the Internet and mobile technologies, blockchain and crypto assets as the second wave along with P2P and microcredit platforms. The third wave is supported by artificial intelligence in the financial sector, which focuses on systems that can interpret and understand tasks and act to complete those financial tasks.

One of the main factors in the rapid evolution of digital financial ecosystems is the increase in performance and use of mobile terminals, possible performance due to the unimaginable increase (so far) in the processing power of microchips and lower costs. Basically, the rich and the poor, in large or small businesses, can communicate and trade digitally, if the necessary skills and competencies in use are cultivated.

However, from the study we conducted, we understand that human interaction, in person, with financial institutions, banking, insurance (etc.) is still very important, being in the top preferences of 38.35% of customers and desired by 54, 85%. Aat the opposite pole are the interfaces (e.g. Chatbot etc.) on social media agreed with the institution or company providing services / products (e.g. FB, Instagram, WApp etc.), 33.86% opting for interfaces (e.g. Chatbot etc.) on the website of the financial institution (e.g. bank, IFN, insurance company, pension fund, etc.), 53.88% also expressing their preference in this regard, while 29.25% opt for the interfaces (e.g. Chatbot etc.) integrated in the application of the institution or the company providing services / products, 53.16% also expressing their preference in percentages demonstrates an at least intuitive, if not in-depth, understanding of the functional differences. In support of the statement related to human interaction or similar processes to human interaction, human interaction in any variant of chat (website, social media, financial institution application (etc.) is appreciated mainly 38.11% and preferred by 60.68%, the interaction by mail is appreciated mainly by 37.01% and preferred by 59.22%, while, the verbal interaction by telephone, is appreciated especially by 31.92% and preferred by 55.34%.

A second factor is the special capacity of analytical and predictive data processing to identify consumer needs and characteristics, new Artificial Intelligence and Big Data algorithms, new processing capabilities, including quantum, etc. The main idea in this regard comprises two aspects. At the macro level, financial institutions can observe certain customer trends and adjust their products according to their needs, while also ensuring compliance with prudential rules (e.g. degree of indebtedness). At the micro level, certain customer preferences can be observed, and certain needs can be anticipated. From a commercial point of view, it helps the financial institution in promoting products to certain customers at certain points in time, but it also helps the customer to make an informed decision about the options he/she has in terms of financial products. Of course, these types of analysis can generate certain risks in competition, consumer law, security of data collected / analyzed / shared between ecosystem partners, as well as in the area of personal data protection regarding the intrusiveness of data processing.

In addition to these two factors, a third one can be added: the phenomenon of consolidating a network-type society in which everyone becomes interconnected with everyone regardless of industry, and to which consumers connect digitally.

The CV 19 pandemic has had and still has a major enhancing role in the development of the network-type society and in the virtualization of relations between partners.

Analyzing what type of expansion of the financial, banking, insurance (etc.) ecosystem is useful for personalized financial services, banking insurance (etc.), it is very important for 47.68% as digital banking applications (e.g. loans with or without a mortgage, etc.) to include integrated solutions with all the necessary documentation, with direct access for all parties (e.g. notary, seller, appraiser, buyer, etc.), as well as the management of the procedural flow throughout it until completion (e.g. reimbursement total, including restructuring, refinancing, foreclosure, etc.). This is at least important for 68.49%, and in the case of insurance, it is very important for 44.35% that the digital application includes an integrated solution on the acquisition, settlement of damages and alternative dispute

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resolution and at least important for 68.01%, considered by the consumer as much less or not at all important as the financial, banking institution, insurance companies (etc.) to receive information from traders on the operations performed on them by customers. Of course, the analysis in this case is truncated, incomplete, it captures only the point of view of beneficiaries and not suppliers, in a future article the authors intend to present a comparison in which to capture on the same levels or the same levels both positions.

According to the same ITU-T report, the phenomenon of mobile top-ups (the ability to convert money into minutes of use) was and is one of the determining reasons in the explosion of the eMoney concept. Mobile operators can create closed systems related to digital financial operations, not only for keeping funds in customer accounts, but also for the field of micro insurance. As they have evolved, the rigidity of closed system interoperability has forced them to take the next step, open networks, or create specialized networks outside the financial system. Depending on the regulators in each country, such systems have been developed at the level of banks, or connected providers, interconnected with banks.

If we analyze the phenomenon from the perspective of trading, the disadvantage is generated by the desire not to keep, but to transform digital assets into physical or monetary assets.

Thus came the idea of the state after cash, the state of digital liquidity, with the preservation of funds in digital format and non-transfer in cash. This step was determined by the emergence of digital wallets, either for digital currencies (e.g. eMoney) or for crypto assets (e.g. Bitcoin).

These developments have raised many questions regarding:

• The way of regulation, at the border between traditional players and the new digital infrastructure operator, whether the regulations should be on a functional basis or on types of providers, etc.

• The business models of the new digital financial service providers, which determine the fragmentation of the current/ traditional ones, with challenges regarding their scalability, transaction costs, etc.

• Digital identification, which requires an operational combination between current customer knowledge and digital identification systems (e.g. video), etc.

• Ensuring the protection of consumers against abuses, incorrect, misleading practices, protection of personal data, etc.

• Risk management by all actors involved (e.g. how we create good practices and how we transpose them into regulations)

• Defining quality standards in the application of regulations.

• General definition of interoperability standards between countries.

• Technological changes following the current technological changes, the way of management and ensuring a healthy development, etc.

• Digital education, necessary along with financial education, in the operation of digital financial services, etc.

In order to develop digital liquidity, answers to the above questions / challenges must be identified. In addition, a critical number of these transactions must be ensured, consumers must accept digital assets, must keep them in this form - have a market to use them, have both enough digitally connected traders and a sufficient number of consumers who agree to operate with these currencies or assets.

In the field of insurance and not only, according to EIOPA, the determining factors could be:

• Technology companies (outside the traditional insurance landscape) demonstrating that certain processes in the value chain of insurance can be performed cheaper and more efficiently by using new technologies.

• Customers, who are increasingly purchasing electronic products and interacting with companies through digital ecosystems / platforms (increased digitization of consumer interactions), where insurance can only be an accessory that is offered alongside a wider service or a purchase of other products.

• The offer of insurance policies is complemented by the provision of other ancillary services for consumers (e.g.: various risk prevention / supplementary services such as geo-location in case of a stolen car, or assistance in health insurance contracts). In some cases, if we refer to insurance, the policy may be part of a complex package of products and services, in which the actual insurance could be a minor component.

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Fragmentation poses new risks that need to be considered:

• The sale of product bundles, improved with services, may dilute the responsibilities and the information of the consignors may be more deficient (e.g. in the particular field of insurance, there may be the risk of purchasing a product that has imperceptible exclusions when a risk damage)

• There is a risk that critical activities will exceed the scope of regulation, compliance, legal exposure and affecting the interests of consumers.

- The risk of changing the market structure and power factors.
- Concentration risk, competition issues, including the "blocking" effect at a single supplier.

• Strategic, operational / IT, cyber risk, operational resilience, outsourcing, legal, compliance and reputation risks and other operational risks (which may not be noticeable in the first instance).

• The need to develop comprehension and use skills.

On the part of the consumer, certain risks could be mentioned, which are not new, but which can be amplified by digitization:

- confidentiality and portability of data.
- new sources and conflicts of interest.
- inadequate recommendations.
- difficulty for consumers to understand who incurs risk.
- increased risk of over-insurance or under-insurance.
- financial exclusion.
- ethical issues.

Determining the main triggers of the development of digital ecosystems and naturally has been taken into account in the research. According to the questionnaire responses, consumers are considered very important by 51.28% and at least important by 75.69%, mobile operators being seen as far too important by 14, 87%. The national legal framework, specific to European nations, is very important according to the median of results for 38.07% and at least important for 64.93%. The European integrated market is very important for 42.11% and at least important for 71.44%, technology companies (e.g. research companies, innovation hubs, etc.) are very important for 44.73% and at least important for 72.14%, offers of services and digital products are very important for 44.44% and at least important for 74.67%, European and governmental policies are very important for 35.41% and at least important for 60.49%, while regulatory and supervisory authorities are considered very important for 38.07% and at least important for 63.37%.

Thus, as a commercial purpose, the needs of customers and the simplification of flows and applications through which customers communicate with suppliers within the financial ecosystem must be considered. Given the differences in customer perception of technology, there is a need to develop several types of communication channels with them. This involves correlating risk management across all these channels. Thus, an important risk to be considered in the context of many microservices used by service providers is their proper governance in terms of data appearance, approach and security.

In the area of data security, authentication is important, as mentioned in the previous section that it had to be adjusted according to the device used by the customer and the multitude of computer systems that interconnect and require proper authentication of the customer in each of them.

Moreover, phishing attacks also pose a high risk. Thus, the type of authentication must also take this risk into account. One solution proposed by PSD2 is SCA (strong customer authentication). This type of authentication can be implemented in practice in several ways, allowing the use of newly developed or existing technologies, but not used extensively for this purpose (e.g. biometric solutions on behavior, profiling solutions of the device used by the customer, profiling of customer behavior in the context of using the services, federated authentication, single sign-on).

In addition, the transfer of data to the IT systems of several ecosystem partners must have security measures in place for data in transit. The basis for the processing of personal data for this transfer (the need to provide the

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service, the legitimate interest, consent) as well as the steps to be followed for the possibility of the transfer (e.g. informing customers about the processing of personal data, appropriate contracts regarding the transfer of personal data and the liability of each of the parties in this regard).

From the point of view of the supply chain, these aspects of data security and personal data protection for the whole supply chain involved in the provision of services must be considered.

As a pre-conclusion, the determining factor of evolution is the progress made on the graph of maturation of technologies (e.g. cloud computing, APIs, BDA, etc.), with the effect of reducing, among other things, coordination costs and the exchange of information. But probably the most important factor is and will be the one generated by consumer expectations, the need for simplification, the idea of customer-centric products, to avoid problems of use, to build and maintain positive experiences, etc.

6. Results

As mentioned in the introductory chapter, the article analyzes the challenges related to the digital financial ecosystem, the advantages and dangers that may arise, the novelty of the research project being to approach from a different angle a topical issue.

In this context, evaluating the answers of the 823 interviewees aged mainly between 18 and 45 years, with a majority of high school, university and postgraduate training, who work mainly in other fields of activity than those usually nominated, on the benefits of using a digital financial ecosystem, 43.39% consider very important, and 68.84% at least important the improvement of the customer experience. Regarding the integration with other ecosystems (with other services) the weights are 39.86% and 68.39%, and for those regarding the economic and time benefits, 58.53% consider them very important and 79.58% at least important.

The use of a digital financial ecosystem can ensure high security compared to the alternative options, 35.48% of those interviewed being totally in agreement, and 58.71% at least agree with this aspect, offering at the same time, on the one hand, speed and transparency, aspect considered very important in proportion of 54.67% and at least important in proportion of 78.60% of respondents, and on the other hand high flexibility for customers in choosing and using services, very important feature for 49.18% and at least important for 74.45% of respondents.

A digital financial ecosystem can help shape the social behavior of users by promoting the idea of saving and supporting equal opportunities. Thus, 37.11% and 61.07% of the respondents, respectively, consider it very possible and at least possible to promote saving behavior, and 35.12% and 54.41% of the respondents consider it very important and at least important to ensure equal opportunities.

Overall, out of the eight aspects analyzed regarding the benefits of using a digital financial ecosystem, the economic and time benefits have the highest score (58.53%, very important and 79.58% at least important), followed by speed corroborated with transparency (54.67%, very important and 78.60% at least important) and flexibility (49.18%, very important and 74.45% at least important).

Viewed through the prism of skepticism, the highest (negative) percentages are aimed at equal opportunities and promoting the idea of saving. Thus, 22.02% of respondents consider that the use of a digital financial ecosystem does not contribute to ensuring equal opportunities, and 16.97% consider that the effects on saving behavior are insignificant.

7. Conclusions

From what is presented and analyzed in the article, we conclude that the digitization of the financial ecosystem will lead to economic growth in general and an improvement in various activities with a particular effect on consumer experiences. This conclusion is also supported by the results recorded after completing the questionnaire, 52.63% of respondents being confident and 73.26% being almost certain that the trend of improving activities will be recorded from the perspective of efficiency, 69.11% mentioning clearly against the idea that the digitalization of the financial ecosystem will not contribute, determine, or force an improvement in activities.

At the same time, however, the use of a digital financial ecosystem can induce a risk of concentration, 15.99% considering this risk to be certain, and 34.93% with a high probability of occurring also competitive problems or more precisely problems related to unfair competition, 17.05% considering them inevitable and 34.93% as

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imminent. In addition to the above, there are several questions to which end users or consumers are waiting answers, taking into account the fact that 27.83% are sure that online / mobile applications do not have a sufficient degree of information security, and 46, 63% strongly express doubt about this aspect. On the question about errors / bugs existing in the financial application, insurance (etc.) in operation, 39.15% are totally in agreement and 64.38% are at least agreeing with this statement, especially since 34.68% consider that it is not known exactly who is responsible for any problems and 57.42% that it is difficult to establish the responsible entity in a timely manner. Moreover, 35.20% state that a complex application is be technically difficult, and 60.64% that a complex application can be technically difficult for users to understand. For this reason, 36.86% consider that it can be difficult to understand, the steps in the financial application, insurance banking (etc.) if they are not explained very clearly, 60.12% also would prefer the elimination of the interpretable elements or those that are insufficiently explicit.

In this context, as an equally clear conclusion, we believe that there should be cyber security and cyber management solutions capable of quickly identifying risk situations, including cyber-attacks on digitized services / products, and warning the user on the potential imminent danger. In terms of digital service flow, the importance of this aspect begins with the area of customer authentication in different types of customer communication flows (e.g. web applications, mobile applications, chatbots, communication channels using OTT providers, such as WhatsApp). Then, the area of data transfer to other IT systems belonging to the same financial service provider or to its partners in the financial ecosystem is also important. The authors' opinion is also supported by 62.83% of the respondents who consider this aspect very important and 81.76% who consider it at least important. A security mechanism, allowing the transfer to an alternative platform for providing the service / product digitized is not being perceived as important for 7.98% of consumers, end users. In contrast, as evidence of the growing awareness of the population, 58.27% support the idea of conducting periodic audits of the software to identify possible vulnerabilities and 79.25% are in favor of it. Also, 58.15% perceive it as essential to maintain a continuous line of communication with institutions competent in preventing and combating cybercrime and 78.45% as being particularly important.

The field of financial ecosystems is in its infancy, and further research will identify new trajectories generated by the expectations and needs of beneficiaries, but also facilitated by new emerging technologies that will enter a plateau of productivity in the coming years.

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The analysis of economic benefit from waste water management on national strategic project of Jakarta Sewerage System (JSS): A case study of zone o JSS of Setiabudi Reservoir in 2014, 2016 and 2017¹

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Abstract

One of the National Mid-Term Development Plan agendas discusses the sixth Sustainable Development Goals (SDGs): Clean *Water and Sanitation*. This program aims to build clean water and good sanitation by ensuring the availability of them for everyone. However, the problem of access to good water and proper restroom in cities and villages has become an unresolved homework. Other than resulting in a negative effect on public health, the problem results in an economic disadvantage. One of them is Setiabudi Reservoir, Jakarta, which becomes the source of raw water, irrigation, flood control, and tourist attraction. The primary purpose of this study is to analyze and conduct the value of economic benefits from the use of the Setiabudi reservoir in Central Jakarta in 2014, 2016, and 2017. The method used is the quantitative and descriptive qualitative approach through value for money calculations using three indicators: economy, efficiency, and effectiveness. The economic indicators in 2014, 2016, and 2017 were efficient but turned back to effectiveness indicators which were not effective when the investors got the direct and indirect benefits, the community got indirect benefits, and the economic doers got indirect benefits.

Keywords: waste water management, national strategic project of jakarta sewerage system of Setiabudi Reservoir, value for money, economic benefits

Jel Codes: 013, Q25, Q28

1. Introduction

Clean water and good sanitation are the basic needs of human life. In the Sustainable Development Goals/SDGs, the environment is one of the goals to support sustainable development to ensure that the community has universal access to clean water and proper sanitation. The purpose of the sixth SDGs is to make access to fulfill the availability of good water and restroom to society. One of the SDGs' targets is to improve water quality by reducing pollution, eliminating landfills, minimizing the disposal of hazardous chemicals, and halving the portion of wastewater that is not appropriately handled (Indonesian National Development Planning, 2020).

According to *World Health Organization* (WHO), Indonesia was in third place as the country with the worst and improper sanitation access in 2017. Meanwhile, the first place was India, and the second place was China, with the country's title with inadequate and inappropriate sanitation. Indonesia was a country that had 6% of the water source in the world. It shows that the government has abundant water resources. However, most areas in Indonesia experience a shortage of good water supply. Based on the report of 160 national FMIPA seminars at the Open University in 2018, the Directorate General of Pollution Control and Environmental Damage of the Ministry of Environment and Forestry in 2015 quoted by Indonesian National Geographic (2016) stated that almost 65% of Indonesian rivers were in a heavily polluted condition. It was very worrying considering that poor quality water sources would impact the health conditions of the people who use the water.

In 2014, Indonesia's access to drinking water and sanitation as impoverished compared to the other countries due to the lack of access to wastewater treatment restrooms. But in reality, there are still many people who do not have

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access to clean water/drinking water and proper sanitation. Statistics Indonesia (2014) showed that drinking water achievement was about 67.73%, while the accepted sanitation level was 60.91%.

Due to the statement above, the government is optimistic that it can achieve the 100% target in fulfilling and equitable distribution of basic needs for drinking water/clean water and access to proper sanitation for all people in Indonesia, both in urban and rural areas. Therefore, the government will target the medium-term development plan in 2005-2025 that by 2020 all communities must have access to drinking water/clean water and proper sanitation.

At the end of 2016, sanitation conditions in Indonesia began to look good. Showing by the data, the percentage of household residents who had access to sanitation could reach 62.14% (40.76 million residents). Regarding the ratio of good sanitation data in 2014, there was a significant improvement in 2016. In 2017, data recorded that sanitation access in Indonesian households increased from the previous year, namely 67.89% (45.60 million households) that had proper sanitation access. Based on the data, it can be concluded that the number of households that access proper sanitation are improved from year-to-year. In Jakarta, several households have had good access to it. Most of them use the adequate facilities properly. More than 90% of residents in Jakarta have used the facility of a waste tank/final disposal channel as a place for human waste disposal.

Table 1. The Households with Proper Sanitation Access in Jakarta During 2014-2017

Year	Percentage
2014	87,05%
2016	91,13%
2017	91,13%

Source: Statistics Indonesia (2021)

The data above shows that the percentage of households with access to proper sanitation in Jakarta has increased every year. In 2014 the ratio of residents who already had it was 87.05%, which could be pretty good. In 2016, the rate of families who had good sanitation was 91.13%, which can have increased from the previous year. In 2017, the percentage was at 91.13%, which meant no significant increase of the prior time, but it could be said to be feasible. However, some families throw the waste disposal to rivers, gardens, earthen holes, etc. Those actions will negatively impact because they can cause environmental contamination and health problems such as stunting, diarrhea, and other health problems (Statistics Indonesia, 2017).

A data showed that most residents in Jakarta throw the waste/disposal to ponds/rice fields/ rivers/lakes/seas. We all know that by disposing of waste or garbage, there will be water and air pollution, which will impact health. DKI Jakarta is one of the cities that is the center of government and still has population problems related to access to sanitation, especially in liquid waste management. The impact of a lack of services can hinder Indonesia's growth potential. The World Bank report stated that Indonesia's economic losses related to health and the environment due to inadequate sanitation reached 2.3% of the annual Gross Domestic Product (GDP) (Herry, 2017). It can be seen in the following data table 2.

Area	Population	Total Population to Access Sanitation	Percentage
Central Jakarta	899,391	450,094	50.04%
North Jakarta	1,781,316	1,335,401	74.97%
South Jakarta	2,805,337	1,051,358	47.21%
East Jakarta	2,805,337	1,875,085	66.84%
Seribu Islands	25,250	19,955	79%

Table 2. Total Population in Jakarta With Sanitation Access in 2017

Source: Jakarta Health Data (2017)

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Based on the above table data, we can determine the percentage of households in DKI Jakarta that access sewage disposal. The total population who had the highest access in North Jakarta got 74.97%, in the second rank was East Jakarta at 66.84%, in the third-place was Central Jakarta at 50.04%, South Jakarta was in the fourth rank with 47.21% from the total population, Seribu island was in the last position at 79%.

Because the percentage of the population of South Jakarta who accessed sanitation was relatively low, it was necessary to increase the capacity of waste treatment. The Jakarta city government had made efforts to overcome waste, one of which was through the PSN JSS. In the first step of PSN JSS, the local government maximized the utilization of the Setiabudi Reservoir as a communal waste in the JSS Zone 0. It is expected that the construction of this facility will help the community in the waste treatment system to produce clean water that is suitable for the surrounding environment.

With the construction of the Setiabudi Reservoir, there will be tremendous economic benefits for the surrounding community. As we know, that reservoir is multifunctional in various dimensions of people's daily lives. First, it functions as a waste controller, so it is expected that the city will be free from waste that pollutes the environment. Second, wastewater treatment facilities are for clean water (not ready for consumption, but they meet the standards to be discharged into the accessible environment). Therefore, we are interested in further analyzing and studying the economic values of the reservoir that lies in Central Jakarta.

2. Literature Review

2.1. Economic Values

According to Istiarni (2014), the benefits measure users' confidence in a product offered and getting the benefits derived from the product. Chaabane and Pierre (2010) said that the value of pleasure and enjoyment of benefits in the form of feelings, twists, and turns of life, and individually climax benefit for shopping through media could foster one's loyalty. Choliq et al. (1999) stated that there are two kinds of benefit: direct or accurate benefit and indirect or abstract benefit. The direct benefit is a benefit obtained from an action, such as changing shape, color, increasing cost, etc. While indirect benefit is a benefit arising from a process of an activity, for example, road construction influences the existence of two-, three-wheeled vehicles, etc. Likewise, the flow of mobility of goods and services results in the turning of the economy.

Reservoir, in general, is a place in the form of a lowland with a large enough space to accommodate or store water naturally or deliberately made with a specific purpose. It can be in natural or artificial lakes, storage ponds, or river dams that function during the rainy season. Then, the excess water can be used during the dry season. On the other hand, the river that flows through it does not stop flowing water into the reservoir (Apridayanti, 2008). According to Setyantiningtyas (2010), there are some benefits of the reservoir, namely:

1. Irrigation

We often encounter in rural areas, especially rice fields, but it cannot be denied that urban areas also have irrigation. During the rainy season in urban areas, stagnant water is often found along the roads due to the lack of water catchment areas. Therefore, the excessive water due to the flow of water from residents can be temporarily stored in reservoirs and used for various purposes such as irrigation of agricultural lands.

2. Hydroelectric power plant

As an energy alternative, a hydroelectric power plant requires a lot of water discharge to drive the power plant to meet the community's electrical capacity. The power plant is a system integrated into a dam by using the mechanical energy of the flow of water in its utilization to turn a turbine which makes a generator convert it into electric power.

3. Clean water supply

Water is an essential thing for human beings. Clean water is used to fulfill the drinking water needs and daily needs. Apart from being the irrigation source, water stored in a reservoir is a source of drinking water and household water.

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4. Fishery

Many people use the reservoir as a source of livelihood due to the higher demand. People who live around the dam take advantage of the place by building floating houses to breed freshwater fish ponds.

5. Tourism place

As the fishery, the dam with discipline and integrated management will build a place of public interest. The reservoir has its characteristics for the community in starting and completing their respective activities.

2.2. Waste Water

Wastewater is a result of an activity and business. At the same time, domestic wastewater is water that comes from people's daily activities due to the fulfilment of human water needs (Minister of Environment Regulation No.68 of 2016). Sugiharto (2008) said that the disposal is a dirty spot for individuals and households due to economic activities such as the industrial process that needs ground and surface water to manage these activities.

Natural resources whose ecosystems are disturbed to harm the comfort and beauty of the environment are referred to as waste (Scundaria, 2000). Artiningsih (2008) argued that waste comes from 2 (two) things, namely organic and inorganic wastes. According to Tjokrokusumo (1999), inorganic waste means that it cannot be depreciated because it cannot decompose, instead of organic waste. Notoatmodjo (2003) in Angreni (2009) said that wastewater is disposal from people's residences. As a result of the decomposition process of organic waste will result in wastewater which is called *leachate*. Joko and Sri (2008) said that leachate has chemical components, both organically and inorganically, each of which can cause pollution of groundwater and the environment and pathogenic bacteria that cause itching the skin.

Due to the presence of waste, in addition to environmental damage, some things are dangerous because of the presence of domestic waste, namely pathogenic bacteria found in human feces, so that they can infect various kinds of diseases when they enter the human body (Fachrizal, 2004). Therefore, it is necessary to treat an integrated wastewater system and wastewater quality standards. It is a maximum measurement and standard of the number of pollutant indicators whose existence is considered in the disposal that will be released to the water source used by an activity. In agreement with Minister of Environment and Forestry Regulation No.68/2016, the quality standards of wastewater have been regulated in such a way, namely:

Parameter	Unit	Maximum Rate
Ph	-	6-9
BOD	mg/L	30
COD	mg/L	100
TSS	mg/L	30
Oil & Fat	mg/L	5
Amoniac	mg/L5	10
Total Coliform	Amount/100mL	3000
Debit	L/person/day	100

Tabel 3. Wastewater Quality Standards

Source: Minister of Environment Regulation No.68 (2016)

2.3. National Strategic Project (Jakarta Sewerage System)

Presidential Regulation of the Republic of Indonesia No.3 of 2016 concerning the acceleration of the national strategic projects' implementation stated that the project is conducted by the Government, Local Government, and institutions that have a strategy to develop the welfare of the people and regional development. It is written on Presidential Regulation of Republic of Indonesia No.109 of 2020 regarding the third change of Presidential Regulation of Republic of Indonesia No.3 of 2016. It is also specified by the Government Regulation of the Republic of Indonesia No.42 of 2021. It is concerning the ease of national strategic projects implemented by the Central Government, Regional Governments, or Institutions that have a strategic nature for growth and equitable development in the context of efforts to job creation and improving the welfare of society.

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It also composed in Chapter 1 Article 1 No.2 PP No.42 of 202 that the government will give all licensing or nonlicensing facilities to fastening the National Strategic Project. The ministry of Economic Coordinator broke down 89 proposed National Strategic Project into four classifications based on the status. It consists of 56 projects/programs with new proposals, 15 projects that could be grouped into one new program, eight electricity projects, and ten existing PSN that required changes to improve coverage. For example, the Setiabudi Reservoir Wastewater Treatment Plant is included in the 15 zones of the Jakarta Sewerage System and is included in the 10 Existing PSN recommended at the press conference.

Jakarta Sewerage System (JSS) is a project that aims to address clean water and sanitation problems from domestic wastewater treatment located in 15 zones (including zones 0). Zone 0 or the existing zone is located in Setiabudi Reservoir. The government built the dam 39 years ago (1982) to accommodate rain into the reservoir and reduce the intensity of flooding. The waste management service supported by the Ministry of Public Works for Water Management and the Jakarta Sanitation Service conducted one of the projects from the Jakarta Sewerage System. The reservoir is divided into 2, namely East Setiabudy Reservoir and West Setiabudi Reservoir, which are designated for domestic wastewater treatment plants. It can accommodate as much as 30,154 m3/day of liquid waste. Moreover, the dam is holding wastewater from 2 districts and two regions in South Jakarta, namely Tebet District, Setiabudi District, Senayan Area, and SCBD.

Zone 1 to 15 is in the planning and building stages. As Zone 1 at Pluit Dam, WWTP is still in the tender preparation stage. Zone 2 in Muara Angke Reservoir is still in the planning stage. Zone 5, which is located in North Sunter Reservoir, is also still in the planning stage. Zone 6 is still in the planning stage as well, where the WWTP is located in Duri Kosambi. Zone 8 is in the preparation stage for the PPP process in the Marunda Reservoir. Zones 3, 4, 7, 9, 10, 11, 12, 13, and 14 are long-termed target development.

2.4. Value for Money

Value for money means the information standard regarding a certain value for individuals or groups of a fund consumed (Nordiawan and Hertianti, 2010). Meanwhile, Mariasmo (2002) said that value for money means the design of public organization control that has three main points as its fundamental reference, namely economy, efficiency, and effectiveness.

The three main points for the value for money are:

- 1. Economy: accepting inputs with certain advantages through the lowest rates. The economic point is the comparison between the input and the input value shown in financial units.
- 2. Efficiency: obtaining the maximum output by applying the lowest input to get a specific result. The point of efficiency is the comparison between 2 things, namely the output/input connected through the achievements that have been promoted.
- 3. Effectiveness: explaining the level of acquisition of the results of activities through achievements that have been aimed. The effectiveness item is the comparison between outcome and output.

After determining the values of inputs, outputs, and outcomes, the following action will be measuring the values of economy, efficiency, and effectiveness (Mardiasmo, 2002). The calculation also goes through several ways, formulas, and specific indicators for calculating the value for money.

Mahmudi (2013) stated that *value for money* is the performance appraisal to assess the economy, efficiency, and effectiveness of an event, program, and organization. Economics means being efficient and critical in distributing and utilizing resources; efficiency means using resources to produce maximum results, and effectiveness means achieving a goal and target. Haryanto (2007) suggests that the benefits of applying the concept of value for money to the government are:

- 1. To improve the effectiveness of public service, right direction;
- 2. To enhance the quality of public service;
- 3. To lower the tariff of public service for no waste and efficient use of inputs;
- 4. To allocate spending that focuses on public priorities;
- 5. To understand the public fund for implementing public accountability.

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3. Method of the study

The method used is quantitative descriptive, while the data used in this research problem is secondary data. It was obtained indirectly through the intermediary of other parties; the data came from Statistics Jakarta, Statistics Management Unit, and Waste Management Service of Jakarta. The location of this research was in Jakarta, specifically at Zone 0 PSN JSS of Setiabudi Reservoir.

After determining the input, output, and outcome values, the next step will be to measure the economic value, efficiency, and effectiveness (Mardiasmo, 2002). The calculation went through several ways, formulas, and specific indicators for calculating a value for money. The variables and measurements used in this research are:

a. Economic Ratio

Measuring the economic ratio uses a comparison between income and expenditure. It can be said that bigger ratio will be higher the economic ratio obtained. Here is the formula of economic calculation:

Economy= Input/Input Value x 100 %

Notes :

Input = Budget Realization in 2014, 2016, and 2017

Input Value = Budget Realization in 2014, 2016, and 2017

Mahsun (2009) stated that economy criterias are:

- If the value of comparison obtained is less than 100% (X < 100%), then it is economical.
- If the value of comparison obtained equals to 100% (X = 100%), then it is balanced.
- If the value of comparison obtained is more than 100% (X > 100%), then it is not economical.
- b. Efficiency Ratio

Measuring the value of efficiency can use a comparison between income and expenditure, it can be said the smaller the ratio, the more efficient it is. The formula for calculating efficiency, namely:

Efficiency = Output/Input x 100%

Notes :

Output = Rate of Service Pipe Connection and Building Area of Waste Management Service Household Pipe Customers in 2014,2016, and 2017

Input = Budget Realization in 2014,2016, and 2017

Mahsun (2009) stated the efficiency criteria, namely:

- If the value of comparison obtained is less than 100% (X < 100%), then it is efficient
- If the value of comparison obtained equals to 100% (X = 100%), then it is balanced.
- If the value of comparison obtained is more than 100% (X > 100%), then it is inefficient.
- c. Effectiveness Ratio

Measuring the value of effectiveness can use a comparison between results/impacts and expenditures, it can be said that the greater the ratio, the more effective it is. The formula for calculating the effectiveness, namely:

Notes :

Outcome = Wastewater Generation Standars, Total Population in Jakarta, and Amount of Distributed Water and Rupiah Value Obtained by Municipal Waterworks in 2014, 2016, and 2017

Output = Rate of Service Pipe Connection and Building Area of Waste Managemnet Service a Household Pipe Customers in 2014, 2016, and 2017

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Mahsun (2009) stated the effectiveness criteria as follows:

- If the comparison value obtained is less than 100% (X < 100%), then it is not effective
- If the comparison value obtained equals to 100% (X = 100%), then it is balanced.
- If the comparison value obtained is more than 100% (X > 100%), then it is effective.

4. Result and discussion

4.1. Economic Ratio Test

The economic ratio describes the government's ability to realize the Setiabudi Dam project budget compared to the initial budget given. A business or activity carried out by a company can be called economical if the company can minimize to eliminate unnecessary costs. The measurements can be compared using primary input data (used money) with secondary inputs.

Provision:

a. If x <100% means Economical

b. If x >100% means Not Economical

c. If x =100% means Balanced Economy

Table 4. Economics Ratio Jakarta Waste Management Service Budget Expenditure and Budget Realization Datafor 2014, 2016, and 2017

No	Year	Expenditure Actual	Expenditure Budget	Economics Rate (X)
		(Input) (Y)	(Input Value) (Z)	
1.	2014	7,398,241,842	6,007,600,000	123%
2.	2016	13,666,126,111	13,666,126,111	100%
3.	2017	14,328,088,334	14,328,088,334	100%

Source : Data Processed (2021)

The results of the economic ratio in 2014 indicate that it is economical. In 2016 and 2017, it shows a balanced economy. In 2016 and 2017, the Setiabudi Reservoir project was implemented quite optimally and economically because X = 100%, while in 2014, the Setiabudi Reservoir project was not maximized and not economical because X > 100%. Economic indicators indicate that the smaller the value of the economic ratio, the better the performance of a project. In 2014, the budget realization was more significant than the budget budgeted, while in 2016 and 2017, the budget realization and balanced budget.

4.2. Efficiency Ratio Test

The efficiency ratio describes the comparison between expenditure and income. For example, a business or activity determined can be efficient if the amount of money used is small but can maximally create expenses under the work program or the money used is following the expected costs.

Provision:

a. If x < 100% means efficiency

- b. If x > 100% means inefficiency
- c. If x = 100% means balanced efficiency

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Table 5. Efficiency Ratio Data on Service Pipe Connection Rates and Building Areas for Household Pipe Customers and Waste Management Service Budget Realizations for 2014, 2016, and 2017

No	Year	Service Pipe	Budget Realization	Efficiency Rate (X)
		Connection Rates and	(Input) (Z)	
		Building Area of		
		Household Pipe		
		Customers		
		(Output) (Y)		
1.	2014	5,780,215,000	7,398,241,842	78.1%
2.	2016	6,331,290,000	13,666,126,111	46.3%
3.	2017	6.331,570,000	14,328,088,334	44.2%

Source : Data processed (2021)

The results of the efficiency ratio in 2014, 2016, and 2017 showed that the reservoir project was carried out optimally and efficiently because X < 100%. The efficiency indicator indicates that the smaller the efficiency ratio, the better the performance of a project. The efficiency ratio discusses how to maximize the lowest input to produce a particular output. Due to the tariff for connecting the official pipes that deliver wastewater to a centralized wastewater treatment system at the Setiabudi Reservoir.

4.3. Effectiveness Ratio Test

The effectiveness ratio describes the outcomes in the construction of the Setiabudi Reservoir that the waste management service has built. The effectiveness ratio does not calculate the total costs incurred for the program. Still, the effectiveness ratio looks at the impact of the construction of the Setiabudi Reservoir from the standard indicators of wastewater generation that DKI Jakarta residents get to achieve the wastewater treatment program in the Jakarta Sewerage System project, namely managing domestic wastewater from gray and black water into wastewater per the standards of the Minister of Environment and Forestry No.68 of 2016.

The provision:

a. If x <100% means ineffective

b. If x >100% means effektive

c. If x = 100% means balanced effectiveness

Table 6. Effectiveness Measurement Standard Data for Wastewater Generation, Population, and The Amount of Distributed Water Along With Rupiah Value Obtained as well as Clean Water Tariffs and Building Areas for Household Pipe Customers at Jakarta in 2014, 2016, and 2017

No	Year	Wastewater Generation Standards, Number of Population of DKI Jakarta, and Amount of Distributed Water and Rupiah Value Obtained (<i>Outcome</i>) (Y)	ServicePipeConnectionRates andBuildingAreaHouseholdPipeCustomers(Output)(Z)	Effectiveness Rate (X)
1.	2014	2,702,751,836	5,780,215,000	46.76%
2.	2016	2,843,353,810	6,331,290,000	44.91%
3.	2017	2,920,471,892	6,331,570,000	46.13%

Source : Data Processed (2021)

The effectiveness ratio in 2014, 2016, and 2017 show that the project has not been implemented optimally and effectively because X < 100%. The effectiveness indicators indicate that the smaller the value of the effectiveness

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ratio, the less good the project's performance. The impact of the construction of the Setiabudi Reservoir as a wastewater treatment plant causes the price of clean water offered by PAM Jaya to become high.

The research results conducted by Choliq et al. (1999) showed the alignment of wastewater treatment programs in the national strategic project by waste management service in creating several benefits from various perspectives. As well as research conducted by A Setyantiningtyas (2010) has some conformity in the program. There are two benefits from 3 points of view in this study, namely direct and indirect benefits.

For the government, the existence of reservoirs contributes to the economy, and they are direct benefits (Brown, C. & Upmanu, 2006; Barbier, 2004; Acaravci, A. & Ozturk, 2010; Soytas, U. & Sari, R, 2003; Mozumder, P. & Marathe, 2007; Kabede et al., 2010). For instance, both the regional and central governments benefit from a multiplication in local revenue, income from the land and building tax, and the growth in the gross regional domestic product value. The economic benefits come from the function of the reservoir, which is the center of raw water, irrigation, fisheries, and tourism.

Investors get direct and indirect benefits. These benefits are obtained from debt payments and additional interest charged to companies or the government, and investors can also evaluate each year by looking at the value of the investment provided and the income generated. In addition, investors can also take part in the development and maintenance of reservoirs. Investors will also collaborate with local and central governments to become a good goodwill investment for these investors, enabling joint multipurpose projects (Cascão, A. E. & Nicol, A, 2016).

In addition, from the customer or community point of view, the benefits obtained by the community are in the form of indirect benefits. First, with the community buying the piping system built by waste management service, the environment around the house does not smell or have black anymore, meaning waste (Scundaria, 2000). In Artiningsih (2008), Gilbert et al., the results are by the Minister of Environment and Forestry Regulation No. 68 of 2016. Second, people do not have to work extra to use groundwater. Third, with the use of water in line with health standards, people no longer need to fear the emergence of diseases that interfere with daily activities and improve public health to increase their productivities. Fourth, and the last is the point of view of economic actors in the Setiabudi Reservoir area. Finally, two direct benefits are obtained: good irrigation in minimizing inundation that can cause flooding and providing raw water that can meet daily needs (Setyantiningtyas, 2010).

5. Conclusion

Based on the results of analysis by using a value for money approach at waste management service with PSN JASS of Zone 0 Setiabudi Reservoir in Central Jakarta in 2014, 2016, and 2017, the researchers conclude the ratios of economic, efficiency, and effectiveness as follows:

- 1. The economic indicators in developing the National Strategi Project of Zone 0 Jakarta Sewerage System of Setiabudi Reservoir were good and economical. In 2014, it was not economical, while in 2016 and 2017, it was balanced. Waste management service showed progress in using its budget well and wisely.
- 2. The efficiency indicators in developing the National Strategi Project of Zone 0 Jakarta Sewerage System of Setiabudi Reservoir were excellent and efficient. WASTE MANAGEMENT SERVICEPal Jaya was able to utilize the resources required minimally to have the maximum output.
- 3. The effectiveness indicators in developing the National Strategi Project of Zone 0 Jakarta Sewerage System of Setiabudi Reservoir were not good and less effective. The waste management service did not use the resources maximally to reach the goal planned.
- 4. The government had direct benefits from the income improvement from many sectors such as regional income, land and building tax, etc. At the same time, the investors have direct and indirect benefits from the paid debts plus the determined interests. For the community, they get indirect benefits such as health services. The economic actors in the Setiabudi Dam region get direct benefits such as health care and comfort.

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Suggestions

Based on the conclusion above, the researchers give some suggestions, namely:

- 1. The waste management service should control its budget suitable with the determined amount. It requires cutting the unimportant or unproductive expenditures, particularly budget that does not benefit the public.
- 2. The waste management service requires more promotions to the society surrounding Setiabudi Reservoir to use the pipe connection supplied. It needs to socialize its service and the benefits of using the piping system for managing the wastewater into an integrated approach.
- 3. The waste management service should make further evaluation and coordination about the clean water tariff with PAM JAYA as the excellent water supplier for Jakarta and the region's surroundings. The surcharge is still high for the community; therefore, it requires a subsidy from the regional government.
- 4. The researchers expect further research about the same study individually, in groups, or the other parties who use various analysis methods and many variables as analogic materials to enhance the evaluation to the government, investors, and the community.

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The life insurance market development in Bulgaria after the country's accession to the European Union

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Abstract

On 01 January 2007 Bulgaria become a full member of the European Union. This fact has generated enthusiasm and expectations in Bulgarian society for the rapid development of the economy, in particular life insurance, and to overcome the negative consequences of the chaotic development of the country so far. At some extent, these expectations were not met due to the effect of the last global financial crisis, which was felt in Bulgaria in 2009. The health crisis caused by the spread of Covid-19 in 2020 also had a negative impact on the development of this section of insurance. The paper traces the dynamics of gross written premiums realised by the life insurers in the period 2007 - 2020 and the market share of life insurance in Bulgaria has been established. As a result of the research, it is concluded that the imbalance in the development of insurance have not been overcome. The reasons for this are not only the global financial and health crises, but also the low insurance culture and the changed value system of the population after the democratic processes in the country since 1989. Life insurance companies need to be more flexible in offering adequate life insurance products to Bulgarian citizens.

Keywords: insurance market, life insurance, life insurance product structure, structural changes

JEL codes: G22, G52

1. Introduction

In the years of transition to a market economy, insurance in Bulgaria has undergone many changes. Initially, the state monopoly on insurance business was abolished. Some private Bulgarian insurance companies appeared on the market. In addition, foreign insurance companies entered the market and radically changed relations in it.

The changes that took place in Bulgaria after 1989 reflected on the value system of the people, including the need and benefit of insurance. It seems that the car has become the most valuable thing. The life, health and population's work ability have remained in the background. This had an impact on the insurance market, and insurance companies reoriented their activities, mainly in non-life insurance, with an emphasis on car insurance. The share of life insurance fell sharply. Inflationary processes also play a role in this respect, especially in the period 1996 – 1997, which until the demographic changes were not typical for the Bulgarian economy.

The insurance legislation lagged far behind. At the beginning of the transition, it was not adequate to the changes and there was a spontaneous development of insurance activity, without the necessary regulation by the state. The problems that have accumulated over the years led to the adoption of the Insurance Act in 1997 (eight years after the beginning of the transition), which regulates the industry in our post-communist society.

Bulgaria's aspiration for full membership in the European Union was a prerequisite for more detailed regulation of the insurance business. The Insurance Code, adopted at the end of 2005, clearly outlined the scope of insurance companies, the products they offer and the state's supervisory function. The admission of our country as a full member of the European Union on 01.01.2007 was met with expectations for rapid development of the economy, including life insurance activity.

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The main purpose of the study is to determine whether Bulgaria's full membership in the European Union has led to the normal development of the insurance market and to overcoming the imbalance that has arisen between non-life insurance and life insurance since the democratic changes of 1989.

2. Literature Review

The process of development of the insurance markets in the countries of Eastern Europe after their accession to the European Union is considered in a number of studies.

In their study, Born, P. and Bujakowski, D. (Born & Bujakowski, 2019) on the basis of data for twenty-one countries in Central, Eastern and South-Eastern Europe have identified the factors related to the variations in the insurance density. Four main categories of factors have been studied: affordability of insurance coverage; knowledge of insurance products; trust in the insurance business; need for insurance. The role of new factors, including consumer access to technologies also been explored.

Ertl, M. (Ertl, 2017, pp. 323-347) examines the relationship between economic growth and insurance activity, analysing the development of life and property insurance for Central and Eastern Europe for the period 1994 - 2014.

The paper of Brokešová, Z. and Vachálková, I. (Brokešová & Vachálková, 2016, pp. 63-72) focuses on the role of a macroeconomic environment in the insurance sector's development in four central European countries: the Czech Republic, Hungary, Poland and Slovakia. The authors conclude that the macroeconomic environment has a strong impact on the development of the insurance industry in these countries. The results also show that the development of the non-life insurance industry is more sensitive to the macroeconomic environment.

In the article of Dina (Manolache), A. E. (Dina (Manolache), 2018), the Romanian insurance industry is analysed, after ten-years country's membership to the European Union. In terms of the globalization process and competition, the results reveal that the Romanian insurance market is characterised by a high concentration and competition level and in spite of the present risks, it is still attractive for foreign investors.

The analysis of Hungary's insurance sector as an important part of the country's economic transition from a centrally planned economy to a market economy is made in the article of Venard, B. et al. (Venard, Halek, & Dorfman, 2008, pp. 377-396). It details the historic economic development of the Hungarian insurance market from a state monopoly to a competitive insurance market where foreign-owned insurance companies have a dominant market share.

The insurance activity has played a significant role in the development of the Bulgarian economy over the last thirty years. It is the focus of numerous studies related to theoretical formulations in insurance, the legislative framework, the organization of insurance activities, participants and products in the insurance market. Draganov, Hr. et al. (Драганов, Близнаков, & Димитрова, 2001) consider the place of insurance in the development of Bulgarian economy for the period 1997 – 1999, in terms of GDP, gross written premiums, number of population, insurance penetration and insurance density.

Misheva's I. book "Insurance marketing" (Мишева, 2005) defines the marketing segmentation of the insurance market as a strategy of the insurance company for research and study of the behaviour of the participants in the insurance market – partners, competitors and clients. The same book outlines the more significant criteria for segmentation: territorial; demographic; socio-economic; physical; technical etc.

The book of Iliev, B. and Misheva I. "Insurance market" (Илиев & Мишева, 2005) is dedicated to the general model of the insurance market, the role of the state in the field of insurance and the forms of competition on the insurance market. At the same time, the insurance markets in the countries of the Balkan Peninsula and the opportunities for mutual penetration into neighbouring markets are considered there.

The book of Paneva, A. "Insurance market" (Панева, Застрахователен пазар, 2017) considers three main groups of indicators that allow for analysis of the state of the insurance market and the competitive environment: indicators of state of insurance and its place in the national economy; indicators for market structures; indicators for assessing the competitive environment.

The structure of the product portfolio of insurers operating in the insurance market is indicative of customer preferences for specific insurance products. In the research of Paneva, A. (Панева, Структурни изменения ..., 2018), the dynamics in the distribution of gross written premiums by sections and classes of insurance is monitored.

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Through calculating integral coefficients of structural changes, the author assesses the strength of structural changes in the product portfolio of Bulgarian insurance companies in the period 2012 - 2017.

In the paper of Erusalimov, R. (Ерусалимов, Застрахователният пазар в България ..., 2016), through the prism of gross written premiums and preliminary expectations in the years after Bulgaria's membership in the European Union, the processes are traced and the problems of the insurance market are analysed. The paper of the same author is dedicated to the place of insurance in the economies of Bulgaria and Romania after the crisis period (Erusalimov, 2020).

3. Research Methodology

The analysis of the Bulgarian life insurance market covers the period 2007 - 2020 and is carried out on the basis of the official statistics on annual gross written premiums, published by the Financial Supervision Commission's website (Financial Supervision Commission, 2007-2020). The data are shown in the official currency of Bulgaria, the Bulgarian lev (BGN)¹.

To assess the state of the life insurance market and the dynamics of its development, traditional research methods have been used – historical method, graphical method, methods of deduction and induction, methods of analysis and synthesis, descriptive analysis, comparative analysis, structural analysis and analysis of development.

The main indicator, which is taken into account when assessing the market of life insurance services in Bulgaria, is **gross written premiums (GWP)**. On its basis the state of the life insurance is assessed, the dynamics in its development is traced, its significance as an economic sector is outlined, market structures are determined.

To establish the state and trends of the insurance market, it is important to analyse **the market structure** in different sections. **The structure of the insurance market by insurance sections** is formed by the market shares of non-life insurance and life insurance, calculated on the basis of the gross written premiums. **The product structure of life insurance** is formed on the basis of the relative shares of the different class of insurance in this insurance section. In the present study, the classes (types) of life insurance are presented according to the classification used by the Financial Supervision Commission in collecting and presenting statistical data on the Bulgarian insurance market. The degree of change in the structure of life insurance portfolio during the analysed period is performed on the basis of the integral coefficient of structural changes (Гатев, 2007). It can take values in the range from 0 to 1. As the structural changes increase, the value of the indicator tends to one (Петров, Тодоров, & Иванов, 2009, p. 370). For greater completeness of the analysis, the integral coefficient of structural changes is calculated in two variants - on fixed base and chain variants.

4. Findings and Discussion

The main indicator reflecting the development of insurance is gross written premiums of insurers. Expectations that the accession of Bulgaria as a full member of the European Union will lead to rapid development of the economy and insurance, respectively, did not materialize. The favourable trend that emerged at the beginning quickly changed direction, and the main reason for this is the recent global financial crisis.

¹ Bulgaria has been on the currency board since 1997, and the exchange rate of the Bulgarian Lev (BGN) is fixed against the exchange rate of Euro. 1 BGN is exchanged for $0.511292 \in$.

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	Non life			Share of	Share of	
Year	insurance	Life insurance	Total GWP	Non-life insurance	Life insurance	
	BGN	BGN	BGN	%	%	
2007	1 268 582 389	251 775 647	1 520 358 036	83.44	16.56	
2008	1 532 438 440	278 409 175	1 810 847 615	84.63	15.37	
2009	1 456 839 769	224 664 623	1 681 504 392	86.64	13.36	
2010	1 374 768 758	248 677 553	1 623 446 311	84.68	15.32	
2011	1 362 056 138	251 704 094	1 613 760 232	84.40	15.60	
2012	1 336 061 605	268 082 885	1 604 144 490	83.29	16.71	
2013	1 423 472 145	305 942 403	1 729 414 548	82.31	17.69	
2014	1 434 333 080	340 642 819	1 774 975 899	80.81	19.19	
2015	1 573 050 981	391 268 175	1 964 319 156	80.08	19.92	
2016	1 619 653 994	428 085 887	2 047 739 881	79.09	20.91	
2017	1 748 778 218	428 664 272	2 177 442 490	80.31	19.69	
2018	2 082 822 176	444 465 077	2 527 287 253	82.41	17.59	
2019	2 413 209 562	498 901 008	2 912 110 570	82.87	17.13	
2020	2 438 730 350	441 523 264	2 880 253 614	84.67	15.33	

Table 1. Gross written premiums of insurance companies in Bulgaria for the period 2007 - 2020

Source: Financial Supervision Commission and authors' calculations

The data in Table 1 reveal a serious decline in gross written premiums realized by insurance companies in 2009, when the crisis first affected the Bulgarian economy. The decline in gross written premiums lasted until 2012, and the levels of 2008 were reached in 2015.

All this, as well as the turmoil in the banking sector, have led to the need for new regulation of the insurance market. With the Insurance Code adopted at the end of 2015, the state strengthened its requirements for the solvency of insurance companies. This was imposed by the European Union Solvency II Directive, the main purpose of which is to avoid the bankruptcy of insurance companies (Directive 2009/138/EC of The European Parliament and of The Council of 25 November 2009 on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II), 2009). Stress tests were conducted to check the financial condition of the insurance companies operating on the Bulgarian market. As a result, customer confidence in insurance services increased and insurers reported an increase in their gross written premiums in the following years. Thus, in 2020 gross written premiums reached BGN 2 880 253 614, which is an increase of 46.63% compared to 2015 and 89.44% compared to the base year 2007. In the last year of the observed period (2020), however, there was a decrease of 1.09% in the gross written premium income realised by insurers, which is due to the decline registered in the life insurance section. The main reason for this is the global health crisis related to the spread of Covid-19.

The share of gross written premiums realized in life insurance is one of the indicators that reflect the level of development of the insurance market in the respective country. The main problem of Bulgarian insurance, after the democratic changes of 1989, is the state of life insurance. The figures in Table 1 show a serious imbalance between non-life insurance and life insurance. While in the old member states of the European Union the share of life insurance exceeds 50% (and in some of them it reaches 80%), in our country, after 1989, this share has significantly decreased. In the year of Bulgaria's accession as a full member of the European Union, the share of life insurance is only 16.56%.

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Graph 1. Market share of the main insurance sections in Bulgaria

Source: Authors calculations based on the Financial Supervision Commission data

The expectations that with the full membership of our country in the European Union the insurance market will be balanced and life insurance will take its rightful place did not come true. Unfortunately, even the trend reversed and this share decreased by 1.19% in 2008 to reach its minimum in 2009, when it was only 13.36%. At the beginning of the period, the global financial crisis had a significant impact on life insurance and made the imbalance even greater. However, the reason for this is not only in the crisis. The problems of the Bulgarian life insurance are also related to the changed value system of the Bulgarian citizens, after the changes from 1989, including regarding the necessity and benefits of the insurance. The car has become the most valuable item that needs insurance protection and people's lives, health and ability to work have been left in the background. Insurance in particular. The reasons for the lagging development of life insurance are many. The most important of them are:

- Continuously deteriorating demographics. The population of Bulgaria is one of the oldest in the world and is constantly decreasing.
- The low size of the average income of the population, compared to other countries of the European Union.
- ▶ Declined customer confidence after the hyperinflation of the period 1996 1997.
- ➤ The latest global financial crisis.

The problems listed are complex, but most analysts seem to be focusing mainly on the global financial crisis. To some extent, the data in Table 1 justify such an opinion. Figure 1 shows that after 2009 the share of life insurance began to grow again, reaching 20.91% in 2016, which is the largest share of life insurance since 2007. However, it can be seen that against the background of the overall growth of gross written premiums in 2017, 2018 and 2019, life insurance again lost its position and the market share decreased by 3.78% to take share of 17.13%.

In the last year of the observed period (2020) there is a clear decline in both gross written premiums for life insurance and a significant decrease in its market share. The registered value of 15.33% is even lower than the share of life insurance in 2007, when Bulgaria was accepted as a full member of the European Union. Obviously, it is not only financial crises that affect this major section of insurance. The health crisis, which should make more people try to protect their lives and health by taking out life insurance, has had the opposite effect.

Of course, the global crises are having an impact on life insurance, but this is more true for developed economic countries, where the share of life insurance is greater or approximately equal to that of non-life insurance. In Bulgaria, however, this is not the case, and the problems of the life insurance industry should be sought mainly in

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the culture of demand and supply of life insurance, low life insurance awareness and the specifics of the Bulgarian public social security system.

According to the Insurance Code and the provisions of the Financial Supervision Commission, during the period under review (2007 - 2020) life insurance companies in Bulgaria report gross written premiums for eight classes of insurance: life insurance and annuities; marriage and birth insurance; unit linked life insurance; capital redemption; permanent health insurance; supplementary insurance; accident insurance; sickness insurance.

Class of insurance	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Endowment assurance	61.31	60.89	58.77	51.34	49.49	49.42	42.78	43.95	38.69	36.22	32.48	28.70	25.07	26.80
Term	4.97	6.83	8.67	13.60	14.39	14.40	14.22	14.63	16.36	17.46	21.10	21.01	18.92	16.05
Pension	6.92	7.33	8.02	11.95	10.73	10.49	17.84	15.41	17.23	13.17	8.02	5.73	5.08	4.73
insurance or annuities														
Marriage and birth insurance	3.21	3.46	3.85	2.78	2.99	3.30	3.04	2.88	2.69	2.38	2.18	2.21	1.58	1.64
Unit linked life insurance	10.57	6.61	4.75	5.10	7.80	7.30	5.83	4.86	6.90	13.62	16.29	17.35	18.30	24.56
Capital redemption	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Permanent health insurance	0.96	0.91	1.05	1.00	0.87	0.89	0.19	0.12	0.09	0.08	0.00	0.00	0.00	0.00
Supplementary insurance	3.54	3.77	4.87	4.98	5.79	6.06	5.72	4.96	4.81	4.27	4.87	5.11	5.46	7.64
Accident insurance	8.52	10.20	10.02	9.25	7.94	8.13	6.41	6.32	5.99	4.28	4.39	4.48	3.66	3.13
Sickness insurance	-	-	-	-	-	0.01	3.97	6.87	7.24	8.52	10.67	15.41	21.93	15.45

Table 2. Product structure of life insurance (in %) for the period 2007 – 2020

Source: Authors' calculations based on the Financial Supervision Commission data

Life insurance and annuities stands out with its high share, which exceeds the share of the other seven types of insurance. It is represented by:

- Life insurance;
- Annuities.

Life insurance is available in two main types:

- Endowment assurance;
- Term assurance (with coverage only for the risk of death).

This is the insurance on which insurance companies focus their efforts to the greatest extent. The data presented in Table 2 show that, with the exception of the last 3 years, the share of insurance exceeds 50% of total gross written premiums of life insurers.

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The imbalance in the offered life insurance is also large in the ratio between Endowment assurance and Term assurance.

	Life	Endowment	Term	Share of	Share of
Year	GWP	GWP	GWP	Endowment	Term assurance
	BGN	BGN	BGN	%	%
2007	166 876 400	154 361 047	12 515 353	92.50	7.50
2008	188 526 911	169 513 821	19 013 090	89.91	10.09
2009	151 515 479	132 035 141	19 480 338	87.14	12.86
2010	161 509 098	127 677 749	33 831 349	79.05	20.95
2011	160 783 297	124 558 984	36 224 313	77.47	22.53
2012	171 080 181	132 483 885	38 596 296	77.44	22.56
2013	174 410 934	130 892 023	43 518 911	75.05	24.95
2014	199 519 837	149 701 065	49 818 772	75.03	24.97
2015	215 393 701	151 393 182	64 000 519	70.29	29.71
2016	229 807 777	155 054 930	74 752 847	67.47	32.53
2017	229 688 826	139 235 742	90 453 084	60.62	39.38
2018	220 957 817	127 565 592	93 392 225	57.73	42.27
2019	219 458 335	125 062 255	94 396 080	56.99	43.01
2020	189 219 666	118 340 497	70 879 169	62.54	37.46

Table 3. Gross written premiums in Life insurance

Source: Financial Supervision Commission and authors' calculations

The main function of insurance is to compensate the losses incurred by the insured persons as a result of accidental events. Referred to the field of life insurance, this is expressed through financial assistance to citizens in difficult times for them, related to loss of income due to events such as: death, disability, illness, etc. (Epycaлимов & Панева, Лично застраховане [Erusalimov, R. & Paneva, A. Lichno zastrahovane [Personal insurance], 2019). However, the data in Table 3 show a significantly higher share of endowment insurance. It is often advertised on the market as savings insurance. In fact, it is an insurance combination of at least two insurance policies: insurance policy in case of survival and term insurance in case of death. When the period of the insurance policy expires, the payment of the insure during the period specified in the contract does not mean that the saved amount accumulated from the contributions of the insured person is paid. These insurer's payments are at the expense of those insured persons who have not survived this period. Saving in life insurance should not be seen as an individual but as a collective action. The mathematical reserve for the individual insured person or for the single insurance policy makes sense only on average.

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Graph 2. Share of insurances included in Life insurance

Source: Authors calculations based on the Financial Supervision Commission data

Insurance companies prefer endowment insurance because they form large mathematical reserves that they use as capital to add value. On the other hand, it is extremely suitable and profitable for insurance intermediaries. Intermediaries offer this insurance with priority due to the higher insurance premium and the higher commission. However, the coverage of two opposite events (death and survival) leads to the atypical for insurance equivalent equality between the "insurer-insured person" relationships. This largely renders meaningless this type of insurance, and the insured persons intuitively realize this fact.

The imposition of the endowment life insurance in the years after the changes, in our opinion, is the main reason why the share of life insurance in Bulgaria is so low. It seems that insurance companies are also aware of this fact and, as the figures in Figure 2 show, the share of term insurance for the period under review is constantly growing compared to the share of endowment insurance. From only 7.50% in 2007, it reached 43.01% in 2019. It is also interesting that even in 2009, when the global financial crisis had the greatest impact on the Bulgarian insurance market, gross written premiums of term insurance increases by more than seven times. This is the main reason why the share of life insurance during the period under review increased from 13.36% in the crisis year of 2009 to 20.91% in 2016. The decline, which was registered in the remaining three years, is due more to the good performance of non-life insurance and its higher growth.

In 2020, there is a serious decrease in the gross written premiums under Life insurance and the return of the ratio between the shares of the Endowment assurance and the Term assurance to their level from 2017. The main reason for this is the reorientation of citizens to a specific life insurance product – unit linked life insurance, which until the accession of Bulgaria as a full member of the European Union in 2007, is the most dynamically developing insurance product of the Bulgarian insurance market after the changes of 1989. However, the global financial crisis has had the greatest impact on the demand for this insurance product. The data presented in Table 2 show two opposite trends in the development of unit linked life insurance. Unlike other types of insurance, where a decline in gross written premiums was reported in 2009, in the case of unit linked life insurance, this decline was registered in 2008. In recent years, however, there has been a return of customer confidence in this insurance, and for the period (2020) compared to the previous 2019 is by over 34%. The reasons for this are the low interest rates on bank deposits and the poorly developed capital market in Bulgaria. In 2020, commercial banks in Bulgaria announced zero interest rates, and the trend is to move to negative interest rates on bank deposits. Thus, customers have recognized this insurance product as an alternative to bank deposits, where they have the opportunity to determine the type and structure of investment instruments in which to invest their mathematical reserves.

During the period under review, the development of two more classes' life insurances deserves special attention – sickness insurance and pension insurance or annuities.

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The Sickness Insurance has been offered as an independent insurance on the Bulgarian insurance market since the end of 2012. At that time, legal changes forced the proposed specific for Bulgaria health insurance to flow into the field of insurance. Thus, in just 7 years, the sickness insurance in 2019 managed to take the second place in terms of gross written premiums in the Life insurance section. In the last year of the period under review, however, there has been a decline in demand for this life insurance product. It is primarily due to the specifics of offering the insurance product on the Bulgarian insurance market. The Insurance Code allows "Sickness" insurance to be offered also by insurers working in the "General Insurance" section. As already noted, the market share of non-life insurance is significantly ahead of the share of life insurance. It is the practice of insurance companies to offer discounts on the insurance premium when taking out two or more insurance policies. In addition to the most frequently concluded car insurance policies in Bulgaria, non-life insurers also offer additional ones, including the Sickness insurance.

At the beginning of the period, pension insurance or annuities is among the most sought after life insurance in Bulgaria with a share that reached its maximum of 17.84% in 2013. However, the trend is reversed and after 2015 there is a serious decline in demand for insurance. This is due to the specifics of the organization of pension insurance. In Bulgaria there is a 3-pillar system of pension insurance, and in addition to the government some private pension funds, offer a similar product. Every person born after 31.12.1959 must pay his social security contributions to specialized private fund. Insurance companies participate in pension insurance entirely on a voluntary basis, in addition to the mandatory pension insurance, which is the main prerequisite for the declining interest in the insurance product offered by them.

The other insurances (marriage and birth insurance, permanent health insurance, supplementary insurance, capital redemption and accident insurance) make up a very small part of life insurance in Bulgaria, and their share (with some exceptions) is constantly decreasing.

The outlined changes in the market shares of the insurance policies from the section "Life insurance" are grounds for studying the degree of change of its product structure. For this purpose, the integral coefficient of structural change is computed as fixed base (2007) and chain variants.

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Coefficients on fixed base	0.053	0.088	0.180	0.192	0.193	0.302	0.291	0.362	0.389	0.457	0.524	0.594	0.550
Coefficients on chain	0.053	0.041	0.119	0.050	0.009	0.149	0.059	0.090	0.131	0.127	0.106	0.129	0.161

Table 4. Coefficients of structural changes of the Bulgarian life insurance

variants

Source: Authors' calculations based on the Financial Supervision Commission data

The data presented for the analysed period show a tendency of almost constant and significant distance of the product structure of life insurance in the years from the basic product structure. In 2008 and 2009 the structural changes occurred are assessed as weak. The next three years are characterised by moderate structural changes. For the period 2013 - 2016 there are significant structural changes, and during the next four years strong changes in the product structure of life insurance compared to the base year 2007 exist.

The intensity of structural changes in life insurance, monitored for each of the years selected for analysis compared to previous year, varies from very weak to moderate. The calculated chain values of the integral coefficient of structural changes show that the most noticeable are the changes in the product structure in 2010, 2013, 2016, 2017, 2019 and 2020, compared to their previous years. This is due to the change in the market positions of many life insurance policies, the reasons for which have already been commented on above.

It can be concluded that for the period 2007 - 2020 there is a significant change in consumer preferences regarding the different types of life insurance and their role in the formation of gross written premiums of life insurance companies has changed significantly.

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5. Conclusions

The enthusiasm in the Bulgarian society for the rapid development of the economy, including insurance, with the accession of the country in 2007 as a full member of the European Union was overshadowed by the recent global financial crisis. Its negative impact on the Bulgarian life insurance market was felt in 2009 with a decline in insurers' gross written premiums and growing distrust in the insurance sector, which lasted until 2012.

The expectations that with the accession of Bulgaria to the European Union the insurance market will be balanced and life insurance will significantly increase its market share did not come true. The continuing aging of the population, low incomes and the recent global financial crisis have not made it possible to overcome the imbalance after 1989.

In our opinion, the endowment insurance imposed by the leading life insurance companies on the market is the main reason for the decline in customer demand for life insurance. Although in recent years life insurers have reoriented their product policy, especially with regard to term insurance, the subsequent increase in gross written premiums still cannot overcome the identified imbalance.

The Pan-European actions regarding the legal regulation of the insurance activity have gradually led to the improvement of the environment in which the life insurers work. In Bulgaria in 2015 a new Insurance Code was adopted and stress tests were imposed on insurers. This has significantly improved confidence in the sector, and gross written premiums have risen. However, the imbalance between non-life insurance and life insurance has not yet been overcome. Life insurance companies must be active in offering adequate life insurance products that meet the attitudes of Bulgarian citizens.

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The impact of education on money laundering¹

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Abstract

Purpose - The purpose of this article is to present the impact of education on money laundering

Design / Methodology / Approach - Starting from the premise of a correlation between education and money laundering, it was analyzed on a sample of 185 countries, in the period 2012-2020, what is the meaning of the dependencies between these variables and how strong is the correlation between them. The research was further developed by classify the countries and split those 185 countries in 128 low-income countries (the low- and middle-income economies) and 57 high-income countries. Using econometric methods, our research provides empirical evidence for the existence of a significant impact of education on money laundering.

Findings - The results obtained confirm that in developed countries the increase in the level of education leads to a decrease in the risk of money laundering, while for developing countries additional research is needed to issue a conclusion on the impact of education on money laundering. Our study may have important implications for the policymakers who must acknowledge that the role of education in the field of combating money laundering.

Keywords: Money laundering, education, AML index, intelligence, developed countries

Jelcodes: I25, E26; K42

1. Introduction

The money laundering process has a long history, but has evolved and adapted to modern society, globalization and digital transformation, becoming a catalyst for many other illegal activities such as terrorism, fraud and corruption. All these lead to decline integrity and transparency and the creation of a widespread lack of trust in markets, causing major damage to citizens, companies and states (Dobrowolski and Sulkowski, 2019). The money laundering operation reflect the illegal act of hiding money from illicit activities and their transformation into legitimate money (Le-Khac et al., 2016; Syed et al., 2019), thus changing the clandestine nature of money (Qureshi, 2017). This phenomenon is also seen in the literature as a process, namely the process of transformation through which dirty, illegal money seems to be white and clean (Hetemi et al., 2018) or a complex process, which gives an apparent legality to some sums of money which come from illegal activities (Achim and Borlea, 2020).

Despite the fight against this scourge by the world's states and international organizations, money-laundering continues to be a growing phenomenon. United Nations Office on Drug and Crime (UNODC) estimates the amount of money laundered globally in one year around 2 - 5% of global GDP, or \$800 billion - \$2 trillion in current US dollars (United Nations Office on Drug and Crime, 2018).

In this context, in the fight against money laundering it is more than necessary to research the phenomenon from various perspectives, to identify the factors that enhance or diminish it and the action of the competent authorities depending on the results obtained. The research literature have highlighted various determinants of money laundering such as: *tax evasion* (Schwarz 2011) considering that money laundering is often done by resorting to tax heavens, the efficiency of *legal system* (Chong et al 2007, Ardizzi et al. (2014), *business sophistication* (Bajrang et al. 2012), *soundness of bank* (Vaithilingam and Nair, 2009; Nikoloska and Simonovski, 2012),

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possibility of detecting *suspicious transactions* (Drezewski et al. 2012, Vaithilingam and Nair, 2009; Nikoloska and Simonovski, 2012).

Starting to the aforementioned studies, in this paper, we focus to empirically explore the effect of education money laundering. There are a number of reasons why education may reduce the money laundering risk.

The first reason is related to ability to identify the "suspicious transactions". Business and financial sophistication make it difficult to identify suspicious transactions and employees find it increasingly difficult to cope with the increasing degree of financial sophistication to identify suspicious transactions (McKenna, 2017). For this purpose, banks should develop criteria capable of identifying deviant dealings or 'suspicious transactions' related to money laundering (Favarel-Garrigues et al., 2007). In this view, Nikoloska and Simonovski (2012) evidence the role of education of the bank employees in order to apply the proper indicators for recognized suspicious transactions in the system for prevention of money laundering. The same idea is followed by Isa et al. (2015) who conclude about the need of human expertise in order to deal with false alarm and to really assess whether the cases flagged out by the system are truly bearing money laundering risk. In addition, Lowe (2017) dedicates a large descriptive study in order to highlight the need for predictive intelligence to support anti-money laundering programs in the financial sector.

The second reason regards the connection of money laundering risk with institutions. Thus, in order to counteract the money laundering phenomenon, a country must have a legal, financial and law enforcement infrastructure (Peterson, 2001, p.15). In this regards Glaeser, et al. (2004), found that human capital enhances institutional environment in the short run and later the studies of Potrafke 2012, Kanyama 2014, Lv(2017) found that higher IQ level of a nation enjoy better quality of institution in that country. Thus, because a higher level of IQ determine a higher level of understanding and respecting the law.

Thirdly, money laundering is a criminal activity (together with shadow economy, corruption, organized crime etc.) and, as criminal activity, it is directly related with cognitive skills (Salahodjaev (2015). For instance, Hirschi and Hindelang (1977) and later Mõttus et al., 2012 found that IQ is a statistically significant determinant for criminal behavior and negatively influence the antisocial behavior. Moreover, cognitive skills positively influence the risk aversion (Frederick, 2005) and moral behavior (Oesterdiekhoff, 2014).

The proposed relationship between education and money laundering is empirical tested on a sample of 185 countries, for the period 2012-2020, separately for developed and developing countries.

The results show that in developed countries, the increase in the level of education leads to a decrease in the risk of money laundering, and for developing countries additional research is needed to issue a conclusion on the impact of education on money laundering.

The rest of the paper is organized as follows. The next section 2 designs the literature review made by using both VosViewer soft and a critical analysis. Section 3 highlights the results and discussions of the main empirical findings. The paper ends with the conclusions including a summary and a brief discussions of policy implications, limitations and the avenues for future research.

2. Literature Review the relationship between money laundering and education

2.1 Bibliometric mapping with VosViewer

Money laundering is a relatively recent defined and incriminating global activity, in a continuous dynamic development, the research on this subject not being very extensive yet. To investigate the current money laundering literature, we used a systematic approach using the WOS (Web of Science) database. Following the search for the phrase "money laundering", 1989 works were identified, published between 1986 and August 2021.

In order to meet the objectives of this paper namely to investigate the correlation between education and money laundering, we refined the research using this combination of terms. The search for works containing the phrase "money laundering" and the word "education" resulted in 107 articles over a period between 1993-2021 sorted by year of publication, the first 10 years in the order of the number of publications as in the Figure 1.

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Figure 1. Number of publications on money laundering and education - top 10 years

Source: own processing

From the processing with the VosViewer program of the articles, according to the number of occurrences of the connected words in these articles (at least 10 occurrences) resulted 76 commonly used terms, grouped in clusters, according to the links between them. Of these, the top 10 most used are: crime, corruption, case, impact, money, law, education, use, technology, effect. In addition, the most relevant terms according to the score calculated by the same software are: effect, shadow economy, impact, corruption demand, crime, international law, AML (Anti Money Laundering), blockchain, suspicious transactions (Figure 2).



Figure. 2 Map of terms used in articles on money laundering and education Source: own processing

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From the point of view of the distribution of words used over time, the map from Figure 2 shows that in the recent years we find the most common uses for the terms blockchain, Ukraine, investigations, shadow economy (Figure 3).





Source: own processing

Analyzing the links between the terms, it is supported the hypothesis of the existence of a link between education and economic and financial crime, one hand but also between education and money laundering or education and preventing and combating money laundering, on the other hand. Regarding the latest research from the perspective of money laundering and education, it turns out that they target modern technology, the shadow economy as a whole, but also the geographical area of investigations. We also may note, that there is a double number of articles on money laundering and intelligence, compared to money laundering and education, as well as a greater variety of terms used.

Analyzing comparatively from the same database the articles containing the phrase "money laundering" and the word "intelligence", have resulted 210 articles, over a period between 1995-2021, distributed by country as in the figure 4.



Figure 4. Distribution by country of the number of articles published on money laundering and intelligence. **Source:** own processing

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2.2. Critical analysis

Regarding the relationship between education and money laundering, two main strands are found in literature.

On one hand, we had the findings which document a negative relationship between education and money laundering. The level of education is considered by the authors who approached this issue as having an important role in committing economic and financial crimes. Mõttus et al. (2012) consider that the level of intelligence (IQ) is a statistically significant factor for criminal behavior and negatively influences antisocial behavior.

At the same time, a higher level of intelligence determines a higher level of understanding and compliance of the law (Potrafke, 2012: Kanyama, 2014; Lv, 2017 and Kanyama, 2014). This is because intelligent and informed people are more likely to solve problems through institutions, through the regulated route than through illegal behavior (Salahodjaev, 2015). Similarly, Glaeser et al. (2004) find that human capital improves the institutional environment in the short term and later, studies by Potrafke (2012), Kanyama (2014) and Lv (2017) find that higher levels of a nation's IQ are linked to improved quality of institutional quality by reducing the level of corruption. He explains this relationship by the fact that smarter people have longer time horizons and are not concerned with reaping immediate benefits by bribing officials. Kanyama (2014) also finds that countries with higher IQ levels enjoy improved institutional quality than countries with lower IQ levels in terms of the size of corruption, government efficiency, quality of regulation and the rule of law.

In the same view, the study conducted by Jiménez et al. (2015) highlight that both secondary and tertiary education have a very different effect on employment in formal or informal entrepreneurial activities. Thus, in particular, formal entrepreneurship is positively associated with secondary and tertiary education, while informal entrepreneurship is negatively affected only by tertiary education. In connection with education, certain studies (Chan et al., 2000 and Kasipillai et al., 2003) found that the decisions of American respondents to comply with tax laws were determined primarily by their age and education. However, McGee's (2008) study did not identify the level of education as a factor for tax compliance in the countries analyzed.

On the other hand, there is another category of studies (Achim & Borlea, 2020 p.2), (Leția, 2014, p. 14), (Aniței & Lazăr 2016, p. 16) identifies another particularity of economic crimes and namely that they require a high level of professional knowledge and skills from those who commit such offenses. In such circumstances, economic and financial crime is closely linked to economic and social change and the development of society and it may appear as innovations made by individuals so as to adapt to changes in society (Merton, 1968). In the age of the Internet and artificial intelligence, such innovations are closely linked to cybercrime on financial transfers, requiring "special skills, work and a lot of perseverance" (Scheau, 2018, p.17). The high level of digital fraud committed in the context of the growth of IT technologies can be explained by the pace of technical changes that go beyond the law enforcement capacity to deal with, investigate and prosecute these crimes (Gogolin, 2010). To keep up, investigating digital crime requires high investment in training, equipment, laboratory standards, infrastructure licenses and support software (Gogolin, 2010) and high investment in digital skills that are highly perishable (Bink et al., 2011). These criminal offences require the need of a fast and permanent specialization of the control and criminal prosecution bodies, because these facts generate high patrimonial prejudices , they lead to a luck of viabilities of companies and implicitly to the job loss, they affect the general quality of life.

As offenses in the field of economic crime require high knowledge and professionalism from those who commit them but also for those who may identified the and counteract them, we intend to test the following working hypothesis:

Hypothesis: Increasing the level of education reduces the risk of money laundering

In addition, it is reasonable to investigate the extent to which the relationship between education and money laundering may depend on the level of country development. Therefore, we state the following research question.

Research Question. *How does the impact of education upon money laundering differ between high-income and low-income countries?*

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3. Data & Methodology

For the purpose of our study, we use a sample of 185 countries, for the period 2012-2020. As there are no data on the volume of money laundering, the dependent variable used in the research was the Basel AML index, an index calculated annually since 2012 by the Basel Institute. The index is largely based on perception-based indicators and unlike financial risk models based exclusively on statistical calculations, the Basel AML Index assesses structural factors by quantifying regulatory, legal, political and financial indicators that influence countries' vulnerability to ML / TF. A panel data is conducted using the Eviews statistical software. The presentation of the rest of variables is made in the table 1.

Table 1. Describing variable	es
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Variables	Way of calculation	Source
Dependent variabl	es	
Money laundering	Money laundering is determined as the risk of money laundering and terrorist financing according to AML_Index (Antimoney laundering index). The score is provided by Basel AML Index determined for the world countries. The score ranges from 0 (low risk level) to 10 (high risk level) in money laundering (terrorist financing	Basel Institute on Governance (2021)
Independent varia	bles	
School enrollment, tertiary	The level of education is measured used Education. School enrollment, tertiary (% gross). Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. Tertiary education, whether or not to an advanced research qualification, normally requires, as a minimum condition of admission, the successful completion of education at the secondary level.	World Bank Group (2021)
Education Index	It is an indicator - a component part of the Human Development Index	Human Development Index (2021)
Human capital Index	The Human Capital Index measuring human capital is grounded on the following three pillars: Survival , as measured by under-5 mortality rates; Expected years of Quality-Adjusted School which combines information on the quantity and quality of education and Health environment	World Bank Group (2021)
Control variables		
Economic development	The level of economic development is measured used GDP per capita (GDP). GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars.	World Bank Group (2021)
Cybersecurity	The level of Cybersecurity is measured by Global Cybersecurity Index (GCI). This is a composite index of indicators, which monitors the level of cyber security and takes values between 0 and 1.	International Telecommunication Union (ITU) (2021)

Source: own processing

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The general form of our model is:

$$Money \ laundering_{it} = \beta_0 + \beta_1 Education_{it} + \beta_{(j)2} Controls(j)_{it} + C_i + \varepsilon_{it}$$

where,

- Money laundering_{it} is the dependent variable for the country i and period t;
- Education_{it} is the independent variable, namely Education of the country i for the period t;
- *Controls(j)* is the jth control variable for the country i in year t;
- β0 denotes intercept;
- β1 is the regression coefficient that will indicate the extent to which the independent variable Educationi is associated with the dependent variable Money launderingit, if β1 is found to be statistically significant;
- $\beta_{(j)2}$ s the regression coefficient for the jth variable in the vector of controls; j denotes the ranges, for the vector of control variables;
- ε_{it} is the residual or prediction error for country i at year t.

4. Results and discussions

4.1. Descriptive statistics

The descriptive statistics are presented in Table 2. This research is further developed to classify the countries by their level of economic development, in high-income and low-income countries. This classification is based on the data provided by World Bank Group (2021) where the countries are classified as high-income, upper-middle-income, lower-middle-income and low-income countries. We follow the classification made by World Bank Group (2021) and split our 185 countries in 128 low-income countries (the low- and middle-income economies) and 57 high-income countries.

Table 2 contains the main descriptive statistics for the two equations mentioned above. In our sample for the 185 countries, the Basel AML Index (the index that measures the risk of money laundering registers a variation between a minimum of 1.7786 (Finland 2017) and 8.6000 (Iran 2017).

Regarding tertiary education, the lowest value for developing countries is 1,5931 find it in Niger 2012 and for developed countries 1,3353 find it in Seychelles 2012, and the highest values, 113.2171 for developing countries we find it in Turkey 2018 and 142.8520 for developed countries, we find it in Greece 2018.
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Table 2. Descriptive Statistics

Developed co	ountries					
	AML_Index	Education tertiary	GDP	GII	HCI	GCI
Mean	4.375049	63.64126	39385.97	48.30677	0.723221	0.703923
Median	4.340424	68.62010	38685.26	49.85000	0.755960	0.729000
Maximum	7.016208	142.8520	116597.3	68.40000	0.814484	0.931000
Minimum	1.778681	4.999120	10484.91	22.58000	0.393321	0.343000
Std. Dev.	0.963257	30.80166	24104.71	10.21062	0.089181	0.160059
Jarque-Bera	5.405982	0.448116	12.78250	1.539670	88.34428	4.330762
Probability	0.067005	0.799269	0.001676	0.463089	0.000000	0.114706
Developing c	ountries		I			
	AML_Index	Education tertiary	Education_Ind x	e GII	НСІ	GDP
Mean	6.013998	43.50986	0.631338	30.36014	0.545040	4479.273
Median	5.872615	40.02510	0.665000	30.48500	0.538636	3912.392
Maximum	8.600000	113.2171	0.851000	42.84000	0.777060	14613.04
Minimum	3.529025	3.732900	0.298000	18.95000	0.342000	461.4151
Std. Dev.	1.068534	23.64120	0.148271	5.582775	0.108443	3213.280
Jarque-Bera	0.602590	3.253302	4.206569	2.215903	1.028605	9.586269
Probability	0.739859	0.196587	0.122055	0.330235	0.597917	0.008286

Source: own processing

Table 3. Correlation between A	AML, Education	tertiary and	GDP per c	capita
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Probability	AML_Index	Education tertiary	GDP per capita
AML_Index	1.000000		
Education tertiary	-0.345114	1.000000	
GDP per capita	0.008229	0.350024	1.000000

Source: own processing

The table 3 shows that the highest correlation is between GDP per capita and Education tertiary, followed by the correlation between AML Index and Education tertiary. The correlation between AML Index and education tertiary is also confirmed by figure 5.

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Figure 5. The correlation between money laundering risk and education

Source: own processing

4.2. Empirical results

Tables 4 and 5 present the main econometric results for the estimation of money laundering (measures with AML_Index) as a function of Education and additional control variables for the subsample of 57 high-income countries (developed countries) (Table 4) and the subsample of 128 low-income countries (Table 5), respectively.

In the table 4, the Panel Least Squared between AML_index and Education is conducted for developed countries. The econometric model reveals that the values of the significance threshold are lower than the value of 10% (table 4). It can be stated that the parameters of the model are significantly different from zero. The coefficient R^2 has the value of 0.4641, which shows that 46.41% of the AML_Index variation is due to the variables considered. It can be stated that there is a statistically significant negative relationship between the dependent variable AML and the level of Education measured by Education tertiary and Human capital index (HCI). The higher the level of education is, the lower the level of risk of money laundering. In addition, a positive influence of GDP and Global security index (GCI) is found in relation with risk of money laundering, for the developed countries. From an economic point of view, the model highlights unambiguous dependencies between variables related to money laundering, variables of a financial nature, GDP per capita, but also education and the cyber security indicator. Therefore, the AML model in developed countries creates a true picture of the influences of important indicators in increasing the risk of money laundering. Analysing the coefficients of all significant variables, it results that in developed countries, increasing the level of education reduces the risk of money laundering while economic development (measured by GDP) and increasing cybersecurity increases the risk of money laundering.

For developed countries (table 4)

 $AML_Index_{it} = -0.0076 \times Education_{i,t} + 1.0986 \times GDP_{i,t} + 1.0601 \times GCI_{i,t} + 8.2226_i + \epsilon_{it}$

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Table 4. Panel Least Squared AML-Education- developed countries

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Education tertiary	-0.007664	0.003583	-2.138697	0.0363
Human capital index (HCI)	-6.263950	0.947428	-6.611531	0.0000
GDP	1.098651	4.87E-06	2.254311	0.0276
Global security index (GCI)	1.060123	0.400000	2.650305	0.0101
С	8.222617	0.686659	11.97483	0.0000

R-squared = 0.4641

Source: own processing

Table 5 reveals the Panel Least Squared between AML and Education for developing countries. The coefficients of all significant variables reveal that increasing the level of education (measured by Education tertiary, Education Index and Human capital index (HCI)) leads to an increase in the risk of money laundering. However, these relationship are not statistically significant. The coefficient R^2 has the value 0.17, which shows that 17.66% of the money laundering risk is influenced by the variables taken into account, however with reservation regarding the significance in term of statistics. In addition, the economic development (measured by GDP) and increasing the level of cybersecurity reduce the risk of money laundering.

For developing countries (table 5)

 $AML_Index_{it} = 0.0097 \times Education_{i,t} - 0.0516 \times GCI_{i,t} - 0.0001 \times GDP_{i,t} + 7.4772_i + \varepsilon_{it}$

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Education_tertiary	0.009778	0.006029	1.621793	0.1095
Education_Index	0.146522	1.947857	0.075222	0.9403
Human capital index (HCI)	0.337004	2.197797	0.153337	0.8786
Global security index (GCI)	-0.051699	0.028993	-1.783165	0.0790
GDP	-0.000115	5.75E-05	-1.999805	0.0495
С	7.477295	0.902622	8.283972	0.0000
R-squared = 0.176613				

Table 5. Panel Least Squared AML-Education-for developing countries

Source: own processing

Concluding, our research confirms the hypothesis that Increasing the level of education reduces the risk of money laundering, but only for developed countries, resulting in countries with a higher number of people with higher education, the risk of money laundering is lower. A similar result shows that people with a higher level of intelligence are less prone to money laundering (Lowe, 2017). The role of educating bank employees to identify suspicious transactions is found by Nikolaska and Simonovski (2012) but also by Isa et al. (2015) which established that human experience and expertise is what can distinguish between a real threat of money laundering risk and a forced threat. Similar study of Achim et al. (2021) conducted for 182 countries over the period 2012-2017 find that intelligent people are more prone to comply with the law and thus increase the efficiency of implementing government policies to reduce economic and financial crimes.

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Regarding our research question, we may find different results obtained among the two subgroups of developed and developing countries while our results conducted for the developing countries' subsample do not support education as being a determining factor for money laundering, in these countries, other determinants are more important for engaging in such activities.

5. Conclusions

The purpose of this article is to present the impact of education on money laundering. Starting from the premise of a correlation between education and money laundering, it was analyzed on a sample of 185 countries, in the period 2012-2020, what is the meaning of the dependencies between these variables and how strong is the correlation between them. The research was further developed by classify the countries and split those 185 countries in 128 low-income countries (the low- and middle-income economies) and 57 high-income countries. Using econometric methods, our research provides empirical evidence for the existence of a significant impact of education on money laundering.

Our study achieved its intended purpose of determining the impact of education on money laundering, thus confirming that at least in developed countries increasing the level of education reduces the risk of money laundering.

The results obtained confirm that in developed countries the increase in the level of education leads to a decrease in the risk of money laundering, while for developing countries additional research is needed to issue a conclusion on the impact of education on money laundering. Our study may have important implications for the policymakers who must acknowledge that the role of education in the field of combating money laundering.

The research is limited primarily by the lack of studies in this field and secondly by the number and weight of identified variables. But it is a start that can be developed by using several proxies and independent and control variables to determine the impact of education on money laundering with a greater degree of statistical significance.

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Preventive cybersecurity steps to enhance drone usage

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Abstract

Cyber threats regarding drones have increased in the previous years due to the extended use and to the lack of proper preventive measures, not necessarily in the military domain, but in various civil sectors. The legal requirements in place and the best practices in the IoT or drone specific field emphasize specific cybersecurity requirements, however, currently do not view the need for cybersecurity in an integrated matter throughout the drone's life, but rather only for specific parts of the drone life cycle. This research focuses on the entire ecosystem related to drone usage and the need for a correlated and holistic approach to preventive measures against cyberattacks and exploitation of vulnerabilities, given the position of each stakeholder to contribute to the security of the drone hardware, software, communication mechanisms and not only. In addition, this research also applies this approach for the entire lifecycle of the drone, from creation to decommissioning, (given the changing of cyber threats and cybersecurity landscape). This leads to an increased trust in drone usage in various economic and commercial purposes from both drone users and their customers. The conclusions drawn in the research are validated with a quantitative assessment by way of a questionnaire outlining reactions towards cybersecurity and the main needs of drone users. The questionnaire was chosen as methodology because this type of research method on this particular topic was not approached by the existing literature of the field. Thus, the research includes a multi-disciplinary approach encompassing legal, economic and technical angles of the topic that aims to pave the way for integrated research in terms of all involved stakeholders.

Keywords: security by design, cybersecurity management, cost-benefit analysis, cyber-attack prevention, sustainability, certification, accountability, responsibility

Jel Codes: O14, O33, L15, K24

1. Introduction

In the recent decades, the digital transformation is going on a parallel road with the passing of time. The general orientation is towards efficiency and minimum cost, but also the comfort of the client who is requesting for a product or service. Drones represent an important means in the process of digitalizing several areas. In particular, they are very often used in the military field, but also other civil sectors. The unmanned vehicles industry has grown exponentially in the last 10 years, finding its utility in multiple industries. Precisely for this reason, the forecasts for the use of these devices are on an upward trend.

Being an innovation, it attracts both advantages and disadvantages. In terms of the benefits that these innovations bring, drones represent very useful ways to facilitate many processes, but unfortunately there are a number of downsides. These are due to the increasingly frequent cyber threats of recent years. As the use of these new technologies increases, so does the risk of unwanted events and damages caused to property or to individuals. The main reason for these situations is the lack of a set of preventive measures in order to anticipate possible problems and meet them with immediate solutions.

Cybersecurity is a key element for this topic. It is imperative to develop a legislative framework targeting drones, with all processes, from production and covering the period throughout the use of the drone. Based on the existence of a legislative basis, certain conditions of use can be imposed. These could very effectively prevent the aspects that we previously called inadvertent. Our research supports the development of the best practices and practical

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approaches concerning preventive security measures in this regard, trying to capture the opinion of users about the most common threats and vulnerabilities in the use of drones and identifying measures to prevent their occurrence in the future.

2. Overview of the existent literature

The specialized literature comes to support these ideas. In most of the studied bibliographic references, we can observe that the authors mentioning and analyzing the use of unmanned vehicles in several fields of activity, but, on the other hand, they also detect shortcomings that those attract. Some authors present case studies of cyberattacks, others detect hacking methods, and others propose solutions. In the following, we will try to synthesize some of the most interesting sources read in order to inform on the approached topic.

In a 2015 material, Dulo classifies vulnerabilities into several categories: safety, security, privacy, payload, administrative, 2nd amendment. The study also identifies where attacks can occur, namely: embedded UAS Systems, Soft / Hardware or combinations between them.

In 2015, Yağdereli et al. talk in their study about the dependence of today's world on technology in all the fields of activity. In the same sense, they notice the tendency of vulnerability and exposure to errors due to cyber-attacks. Unmanned vehicles face such technical errors and hacker attacks. The authors propose that these limitations and vulnerabilities be identified and classified in order to create a mitigation strategy.

These two studies contribute to the taxonomy of cyber-attacks and types of vulnerabilities.

In 2017, Chang et al. address the issue of commercial and personal regulations regarding security, respectively privacy in the use of drones. The authors raise some problems, in this regard, in the United States. The case study of this paper describes the experience of 20 drone users. They had to evaluate the activity of the devices and report the identified issues. The results of this experiment led to the formulation of recommendations for improving safety regulations in the use of drones. This shows the user perspective and user requirements.

In 2018, Lagkas et al. emphasize the multiple utility of drones and expose the new technologies under development that will work within them. On the other hand, it also detects the disadvantages that appear in connection with cybersecurity, but also with the management. The paper aims to list and detail new areas in which UAV devices will be active, but also reviews the general requirements to be met in order to prevent security or privacy issues. The paper proposes a protection of drones within an IoT architectural network.

In 2019, Zhi et al. address the issue of security and privacy issues of UAVs. In this paper, the authors report that a drone is guided by certain sensors during flight. Small changes in these sensors can completely compromise such a device. First of all, the sensors can receive wrong information, and as a result, the drone will act wrongly. Second, these sensors can be damaged. The flow of information between the drone and the ground control station is based on a type of communication that is very easy to compromise. In terms of privacy, there are aerial photos that can capture private information (location, time).

In 2020, Yaccoub et al. talk about the ability of drones to successfully meet human needs, but also about malicious use, respectively cybercrime. The paper presents a realistic cyber-attack scenario to highlight the ways of hacking. This simulation represents more than a bibliographic reference for the review of the specialized literature. It allows the adoption of new techniques for detecting and protecting unmanned vehicles.

Also in 2020, Raja et al. approach the drone safety issues. The authors believe that intervention is needed in advance. Raising security standards will also have disadvantages. Among the most common enforcement measures is unauthorized reinforcement, a unique time-based password. The simulation results proposed by the authors show that the LTOTP (Logistic map-based Time-dependent One Time) algorithm enhances the reinforcement.

In 2021, Yahya et al. address the issue of increased use of drones in various fields of activity, such as: military, journalism, filming, photography, transportation, delivery, etc. In particular, the role of drones in the Malaysian construction industry is highlighted. In this case, the drones encountered privacy and security issues. The authors suggest that government support is useful in promoting the use of unmanned vehicles, as well as in informing the population about the aid those devices bring, but also about the existing risks.

The above set of articles underline the important role of drones for successfully and efficiently performing certain activities, together with specific use cases of cyber-attacks or vulnerabilities identified in their case studies (both at the source code level and the software architecture level).

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Also in 2021, Iqbal addresses the issue of cybersecurity and the challenges that will exist over time. The author emphasizes the importance of drones in several fields of activity, as we find in Yahya's study. Despite the opportunities that the use of drones creates for the industry in which they operate, there are also many threats related to security and privacy. This study also suggests the help of the government in regulating the use of drones.

In 2021, Yahuza et al. are writing a very interesting article about the Internet of Drones (IoD) which is a decentralized network that connects drone access to controlled airspace and guides devices from one location to another. This type of network is what Lagkas had thought in 2018 that it would be very helpful if it were implemented. This IoD is a network vulnerable to security and privacy challenges. This paper captures the need for methods of defense against these situations. The authors believe that an examination of the secure IoD architecture is needed to identify what compromises the security and privacy of drones. The purpose of their article is a list of performance evaluation methods used by these techniques.

In another study from 2021, Abdelmaboud emphasizes the idea that drones are a very smart technique for managing problems in many areas of activity. With the existence of IoD, certain aspects related to security, privacy and communication related to IoD remain to be resolved. The paper summarizes the main security and privacy requirements and presents an IoD taxonomy. Also, the paper is based on commercial case studies, proposing solutions for each problem detected.

Also in 2021, Al-dhaqm et al. address another niche of drone vulnerabilities, namely crime, which is closely linked to security issues. The authors propose the detailing of forensic models using the Design Science Research method. The results of this study highlighted both topics for future research and challenges in the circle of drone incidents. The authors also propose a generic model of investigation. Following the results obtained, the study represents a background for a future international standardization in drone crime.

This set of articles focuses on identifying frameworks, standardization point and methodologies to be followed in order to provide governance of the drone lifecycle and, to this end, focus on particular aspects that were identified in the respective research and which should be included in drone governance or the economic impact of cybercrime (Achim & Borlea, 2020).

The studies we have considered to create an overview of the chosen topic led to some common issues. The presence of the risks of cyber-attacks in the use of drones is widely identified. Some authors look for solutions to identify them, others to characterize them, others to solve them, and still others to prevent them. The reviewed literature analyses the issue in silos, without analyzing the entire ecosystem that involved unmanned vehicles such as drones. The topic offers a generous research horizon because the approaches can be diverse. This article brings a holistic view on the topic, by outlining the role of each stakeholder in the ecosystem and in preventing cyber-attacks. In addition, the article analysis the main types of preventive security measures that can be implemented and the opportunity of various types of implementations of the preventive security measures. Our approach is includes as well in the form of a questionnaire to help us identify which are the main vulnerabilities that users accuse and which are the prevention methods that seem relevant to each case.

In the following sections of our study we will address, as follows: Section 2 - Existing vulnerabilities and prevention methods (describes all problems identified in terms of cybersecurity or privacy and proposes a series of solutions to prevent these problems or at least to act in time to stop existing problems), Section 3 - Respondents view (includes processing of the answers obtained in the questionnaire) and in Section 4 - Conclusions and future research directions.

3. Proposals concerning prevention of threats and vulnerabilities

According to Zeng et al. (2016), drones are prone to a variety of attacks that can compromise the data, as well as the physical state of the UAV itself. Since most of the available drones in the consumer sector are not always designed with information security in mind, the threats that drones face are diverse.

Each of the parties involved in building, programming and operating the drone can introduce vulnerabilities that can range from the physical flaws introduced by the manufacturer of the drone to a wrong exploitation of the aircraft by the end-user.

During this section, we are trying to capture all categories of existing threats or vulnerabilities that we have mentioned above and synthesize how are these can be done and what implications can have.

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3.1. Design vulnerabilities

Potential vulnerabilities of an unmanned aircraft can be found in the design of the device itself. Intentionally or not, drone manufacturers can introduce design vulnerabilities to their products, such as rootkits, kill-switches or backdoors.

A rootkit is a piece of software that allows privileged access to a device by subverting the operating system, while remaining undetected from the administrators. It uses an existing system vulnerability to install itself on the device to gain root-level access to the operating system. After gaining privileged access, it can run unauthorized software, intercept data or even modify the functionalities of the infected system. This way, attackers can steal confidential information processed by the drone or even take control of the aircraft.

Rootkits can even take advantage of some dangerous, but legitimate functionalities of the aircraft. For example, most consumer drones have a built-in kill-switch that instantly cuts the power of the propellers to prevent a potential disastrous scenario while in the air. A possible usage of a rootkit is to exploit such functionalities, with the intended purpose of crashing the drone.

Manufacturers can also introduce vulnerabilities voluntarily by creating backdoors. The backdoors are implemented at design-time and lets the manufacturer access the system without the users' consent. Unlike kill-switches, backdoors are rarely noticed, since they do not affect the functioning of the drone itself. Also, they are much harder to detect since most of the times these backdoors are implemented at hardware level.

3.2. Data vulnerabilities

At the data connection level, the drone itself can present some design and security flaws. Since most of the data transmitted between the drone and ground station must be done fast and with a minimal loss, often the exchange channel is not encrypted, since this kind of operation would involve heavier computing and, implicitly, a slower data exchange speed. A variety of encryption techniques were tested, but their own flaws are making this problem even harder.

By using symmetric encryption, the probability of an attacker to decipher the encrypted data is extremely small. Algorithms such as AES are very powerful. Since its minimum key length is 128 bits, brute-forcing a total number of 2128 possible key combinations is not feasible (at least not in a limited amount of time). Also, there is no known mathematical property that can compromise the S-box substitution mechanism used internally by the AES algorithm. The only known vulnerability of the algorithm is related to timing attacks, but the implementation of such systems is costly and not very time efficient. Still, AES encryption comes with a downside: the exchange of the encryption key itself. This poses a problem, since the key must be sent as plain text to the other party, thus in a non-secure way. (Al Hasib et al, 2008)

Asymmetric encryption is not a viable option either. Even though the problem of securely exchanging the encryption key is solved, the high computational power required by asymmetric encryption is very high. Since it relies heavily on randomly generated very large prime numbers, the computational power required to perform such operation is big. As well as AES, an asymmetric algorithm like RSA is very strong against brute-force attacks, provided that the encryption key is of a reasonable size. Usually, a 2048-bit key is used for RSA encryption. However, the longer the key is, the greater the computational power that is required to encrypt/decrypt data. The mathematical properties of RSA make the algorithm vulnerable to attacks, if the chosen encryption key is not big enough. Since the algorithm relies on multiplying prime numbers, a poorly chosen encryption key will facilitate the factorization of the cipher-text, although this operation is also computationally expensive.

A possible way of encrypting data in a secure and fast way can be done using a combination of both symmetric and asymmetric algorithms. Since the symmetric algorithms, although fast, pose the problem of not being able to securely exchange the encryption key, while the asymmetric algorithms rely on public keys, but are very slow, it can prove beneficial to use algorithms such as RSA only to securely exchange the encryption key of a symmetric algorithm, such as AES, then using the exchanged encryption key to send secure messages using only the symmetric algorithm. Figure 1 describes how this process could be implemented.

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Figure 1. Hybrid symmetric/asymmetric encryption in UAV communication

Source: Author's processing

3.3. Authentication vulnerabilities

Many times, the user itself is responsible for a variety of security issues, by either unwillingly exposing valuable information to a potential attacker or by not protecting its own data strongly enough.

Weak authentication is one of the most exploited types of attacks. According to Data Insider, in 2017 an extensive study related to users' habits related to password management revealed that most of the consumers have risky behavior. In the United States alone, each e-mail address is associated with 130 password protected accounts, while 72% of the respondents admitted storing their passwords in a non-secure environment (paper, a file on their computer etc.) or even reusing the same password for multiple accounts. This can lead to a potential security issue, since hacking a single platform can expose passwords that some users may reuse for different authentication processes, including the ones that are related to drones' usage. This way, attackers can try to authenticate using passwords that the users might reuse. Rainbow tables attacks are also very common when attackers exploit a weak authentication scenario.

However, the same study showed that nearly 65% of the respondents are considering security more important than convenience and they choose complex passwords that are not reused across multiple platforms. Also, more than 93% of the respondents admitted using somewhat complex or very complex passwords, while 48% of the respondents also use a multi-factor authentication scheme for their accounts.

Another common way used by attackers to exploit users' negligence is social engineering. By addressing the right questions or using data that users share on different environments, attackers can deduce what is the password that protects a certain account. A study conducted by the British National Cyber Security Centre revealed that 15% of the British people use their pet's name as a password for online accounts, 14% use a family member's name, while 13% include an important date in their life in their passwords. This kind of information enables attackers to deduce possible passwords that protect an account.

To counter possible breaches due to weak authentication, the drone manufacturer, as well as 3rd party providers can enforce a stronger password policy, as well as providing the users the possibility to use multifactor authentication. From a user's point of view, it is recommended to avoid reusing the same password for more than one service, as well as protecting their accounts with a second mean of authentication (for example, one-time passwords, physical tokens or biometric authentication) (Yildirim et al. 2019). Also, it is imperative to store the passwords in a secure location, like password vaults.

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3.4. Operational vulnerabilities

Users are also responsible for a variety of operational mistakes that can lead to potential security issues. A common mistake is not paying enough attention to the atmospheric conditions. Flying in very low temperatures has a direct effect on the drone's battery life, reducing the flying time, as well as inducing malfunctioning in the aircraft's sensors. Most manufacturers recommend avoiding flying when the air temperature drops below -10°C, while the battery's internal temperature should never drop under 20°C. Also, flying in temperatures greater than 40°C can have an effect on the internal components of the drone, increasing the risk of plastic components melting. Also, high temperatures are often associated with a high humidity, which can damage the electronic components of the aircraft. Wind speed is also often disregarded, especially the higher altitude winds. Since the air currents find less resistance as the altitude increases, their speed also increases, even though at ground level the wind is not perceived to be too strong. Air currents that exceed 40km/h are considered too dangerous for safely operating a UAV.

Also, a poorly maintained battery can lead to unwanted situations. Lithium-polymer (LiPo) batteries are sensitive to temperature changes and can easily be a fire hazard when handled improperly. The usage of LiPo batteries while still being warm from charging or charging a LiPo battery right after its usage might affect the internal structure of the battery, due to the longer amount of time that the battery is kept at a high temperature. In the case of multicell batteries, charging or discharging a LiPo battery with improper equipment that do not balance the amount of charge available in each cell might lead to dangerous situations, making the battery unstable and prone to internal short-circuiting.

To avoid most of the operational issues, a pre-flight checklist is always necessary. This way, the users can make sure that all the required conditions in order to safely operate the UAV are met. 3rd party software that can provide information about weather in a particular location or the applicable flight restrictions in the area are also very helpful. Some drone manufacturers include in their software features that can help the user identify a restricted or no-fly area that can also decide whether the drone should take off or not.

4. Methodology and data

For this paper, we have elaborated and used a questionnaire, using the online platform QuestionPro, in order to identify the views of drone stakeholders in terms of prevention mechanisms. The questionnaire was distributed via internet, using e-mail addresses and social media platforms, such as Facebook, Twitter and LinkedIn. The survey was distributed both to specialists in the field and to non-specialists. The survey was conducted from May to July 2021. We considered useful for interpretation the field of activity of the respondents and did not consider useful demographic information such as age group, education level or gender.

The questionnaire contains 17 questions, 15 of them refer to the topic we study and the other 2 questions were added in order to detect and categorize our sample. The survey was designed and distributed in both English and Romanian. For this reason, some of the following interpretations can be interpreted separately for each language category and then concluded for total responses.

The questionnaire was completed by a total of 233 respondents, 37 for the English version and 196 for the Romanian version. For the English version, the distribution of answers is explained in Figure 3. The vast majority of respondents came from Romania (44.12%), followed by answers from the Netherlands (10.29%), Italy (8.82%), Portugal (5.88%), Belgium (4.41%), the United States and Bangladesh (2.94% each), but also India, Bulgaria, Serbia, Canada, Luxembourg, Turkey, Germany, Latvia, Greece, Malta, Croatia, Hungary, Poland and Israel (1.47% each of them). For the Romanian version, 93% were answers completed by Romanian citizens, and the remaining 7% were answers from Spain, Greece, Romania, Great Britain and other countries where there are Romanian speakers or maybe Romanian citizens working in those countries.

The main purpose of the questionnaire was to see the manner in which respondents view the need for measures to prevent cyber-attacks on drones and drone users, together with the stakeholder they view responsible for implementing and monitoring such preventive measures.

5. Results and discussions

Therefore, this section concentrates on the business, operational and legal role of the entities in the drone ecosystem in order to identify the best approach in terms of operativity of the production/distribution/maintenance process

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and of balance between profit and investment of such entities. This analysis assists with views on implementing the preventive measures proposed in the previous section and the effectiveness verification for such preventive measures.

Question 6 of the questionnaire was "Which of the following do you consider useful preventive measures to prevent damage / hacker attacks in cases of modifications made by the user to drone software? (1 to 5 scale, 1 representing total disagreement and 5 total agreement). The answer options for this question can be found in the legend of the table below.

Table 1. Question 6 responses - preventive measures, software changed by user

Answer/Scale	1	2	3	4	5	Average score
Any change to the drone software should be approved by the drone software producer	34	10	26	35	158	4.04
A certification mechanism should be in place to perform a cyber security review of any change in the drone software	23	11	33	59	137	4.05
Users should not be able to change the drone software	36	27	41	23	136	3.75

Source: Author's processing

One reason for multiplication of vulnerabilities is the mixing of existing software with new software not created by the same entity. In these questions we analyzed the case of software created by the user of the drone. As in the case of other devices (either internet of things devices, laptop or mobile telephones), there are various manners of ensuring that no cyber-attacks take place (European Commission, 2017), out of which we have explored three in this question.

The question we are posing goes beyond the identification of cyber-attacks and emphasizes the need for preventive measures. If for most laptops and mobile telephones, the identification of cyber-attacks may be sufficient as it does not generally hinder the using of the device, in case of internet of things devices (and, especially, drones) the identification of cyber-attacks may lead to damages to both the device and the environment/people around it. For this reason, in case of the latter (and, especially, drones) supplementary mechanisms have to be implemented.

It is interesting to see that respondents generally prefer to have mechanism of verification in place (either by the producer or a specialized independent entity) rather than no verification mechanism. This is in line with existing legislation in other sector that include a certification of quality. Further, the respondents consider the governance of changes brought by users as a better approach than the prohibition of change. Nevertheless, in the rating of the responses, the prohibition of changes is classified as third (with an average score of 3.75).

The first option chosen by the respondents is the verification to be performed by the drone software producer. This can be considered a good option in terms of entity that knows best knows the structure of the software and the potential vulnerabilities that new software can generate. From an operation perspective, a mechanism can be design in the form of an app store whereby proposed application are submitted for review before they can be safely deployed on the drone of the user (or, even, place in the app store for other users to deploy). From an operational perspective, this can be cumbersome on the drone software producer, as it will require significant resources to analyze all the requests coming from all over the world. Of course, a fee can be implemented in order to finance the review process. Nevertheless, having a single entity (who is also the producer) review changes can generate subjective reviews given the limitations/vulnerabilities of the existing drone software.

For this reason, the secondly ranked option, having independent entities to audit/test the proposed application in order to give them a certification can be useful in terms of segregation of duties and guarantee of independence. The idea of app store can still be implemented, with a specific platform on which all certification entities can act. From an operational perspective, this can be easily implemented and is widely used in other sectors in terms of certification.

The third option that prohibits the change to the existing drone software limits development and keeps the drone ecosystem closely tied to the drone producers for any new features. This can have anti-competitive consequences. Further, there have been similar discussions in the last years with respect to software embedded on the internet of things devices and lack of possibility for users/other entities to change it or to include security features into it. The

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discussions are currently in the sense that this prohibition is not beneficial from a competition perspective, from the point of view of advancing science and from a security perspective.

Question 7 was "Who is liable in case the drone software contained vulnerabilities from the outset and these permitted a hacker to control the drone and generate damages? (Multiple choice question)". The answer options for this question can be found in the legend of the figure below.



Figure 2. Question 7 responses - liability in case of outset vulnerabilities

Source: Author's processing

This question is aimed at identifying the best place to include additional controls in terms of drone vulnerability verification. Further, this gives additional clarification on how the preventive security measures, such as the ones included in the previous section, can be implemented within the drone ecosystem, from its production to the moment it is sold to/used by the user.

The responses are interesting in the sense that the entity that audited or tested from a cyber security perspective is considered by 28% responsible, while the software producer is considered responsible by 44%. Of course, this depends in practice on the manufacturing process. Current legislation, including the EU Product Liability Directive and general tort law generally view the producer as liable for the vulnerabilities it embedded in the drone software/hardware. Nevertheless, there may be instances in which other stakeholders in the drone ecosystem may be considered as having a significant role in particular aspects that can lead to these stakeholders being considered liable. Such aspects have also been analyzed briefly in the relevant literature, include in (Bassi E., 2019).

In terms of distinction between the software producer and the entity that audited/tested from a cyber security perspective, there are a couple of points to consider. On the one hand, the general legal doctrine and responsibility matrix views the producer as liable for the products it has created, even if these are certified or analyzed by other entities before they are placed on the market. On the other hand, the entity auditing/testing the drone should be held liable for not identifying certain types of vulnerabilities that should have been identified based on known standards at the time.

One proposed approach can include the general liability of the producer, with the auditing/testing entity being a check point. In terms of liability, the producer could, in a litigation, request certain damages from the auditing/testing entity only if the auditing/testing methodology were not properly applied and, thus, certain vulnerabilities were not identified. Otherwise, holding the auditing/testing entity liable for all vulnerabilities may be excessive for its role in the drone ecosystem and may incentivize the producer not to invest in the security of drones. Thus, a balance must be stoked in order to keep all entities involved in the drone ecosystem engaged in the cyber security measures improvement process.

The percentage of respondents considering the cyber security solution as liable (17%) is quite high. This response should be further analyzed in order to understand the reasoning of the respondents. On the one hand, it may entail that the respondents do not fully comprehend the role of a cyber security solution that generally aims at actively

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rejecting cyber-attacks or detecting intrusion of threat actors in the system. Thus, the role of the cyber security solution is more a reactive one that does provide security against zero-day attacks, for instance. Consequently, the cyber security solution can be held liable for not identifying the infections or not preventing the cyber-attacks it could have been prevented based on known indicators of compromise, threat signatures and attack mechanisms. However, it cannot be held liable for not detecting zero-day attacks or vulnerabilities that can be exploited. On the other hand, this high percentage shows that respondents consider that there should be other entities, independent ones from the producer, in the drone ecosystem that should ensure the security of the drone, aside from the producer.

Around 7% of the respondents consider the drone distributor as responsible. This can be generated especially by situations in which the drones are produced outside the country where they are sold (e.g. for the EU market the drones are produced outside of the European Union). In order to address this case, two mechanisms can be implemented. The initial EU/national distributor that brings the drones on a specific market is the one certifying the drones at the EU/national level and it remains liable for all consequences, with the possibility to request the payment of damages from the drone producer. However, this creates a more complex ecosystem in case vulnerabilities are found and should be addressed in order to enhance security of the drone. Another, more practical mechanism, is for the distributor not be liable for selling the drone provided by the producer and for the producer to obtain all certifications and address all vulnerabilities identified during the certification process or afterwards, with the distributor having no role in this respect.

It is interesting to see that there are 4% of respondents that users are responsible for cyber-attacks. This entails that these respondents consider that there is a minimum set of cyber-hygiene actions that a user should implement and respect, as a typical form of using the drone. Lack of compliance with these results in a causality effect between the lack of compliance and the consequences in case of a cyber-attack. Thus, even if the percentage of respondents having this view is low, this can be taken into account when outlining the preventive security measures to be implemented by various entities in the drone stakeholders.

Thus, it seems that respondents are viewing a shared responsibility in case of cyber-attacks. This can be transposed in a shared responsibility in terms of verification and improvements to the drone software. Of course, this has to have a long-term implementation, as new cyber threats and vulnerabilities can appear based on technology advancement.

As it can be seen from the preventive measures section above, it seems that, from a technical perspective, the approach is similar. There are certain improvements that can be performed by the producer of the drone, certain vulnerabilities that can be identified in practice by other stakeholders in the drone ecosystem and certain rules that should be implemented by users, with partial/silos identification of such aspects in existing literature such as (Bouhcer P., 2014). Nevertheless, the legislation and operational process does not fully address these aspects and should be adjusted in order to balance the responsibility with the best placed stakeholders to address the risks, while not providing excessive cumbersome obligations on a particular stakeholder.

The eighth question was "Which of the following are useful preventive measures in case of software vulnerabilities included from the outset in the drone software? (1 to 5 scale, 1 representing total disagreement and 5 total agreement). The answer options for this question can be found in the legend of the table below.

Table 2. Question 8 responses – preventive measure for outset vulnerabilities

Response/Scale	1	2	3	4	5	Average score
Cyber security auditing before the drone is placed on the market	7	9	31	41	165	4.38
Periodic cyber security auditing to be performed by the user in order to be allowed to fly the drone	34	26	52	45	96	3.57
Failsafe mechanisms in case the drone is taken over by hackers in order to safely land the drone and alert the user	14	9	30	48	152	4.25
Cyber security software to be included in the drone to prevent intrusions and respond to them	6	8	25	37	177	4.47

Source: Author's processing

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This question addresses specific types of preventive measures to be implemented in order to identify vulnerabilities and to prevent negative consequences in case these are used by threat actors during a cyber-attack.

The respondents view as very important real-time cyber security solutions and cybersecurity auditing before placing drones on the market, with these two security measures being ranking first and second in terms of their utility.

Further, additional technical mechanisms such as a failsafe mechanism that can ensure safe landing and shut down of the drone are also consider highly desirable. This show that, in addition to real-time responses to cyber-attacks, respondents consider the need for ensuring lack of negative consequences on property and people when a cyber-attack occur when the drone is flying.

One aspect worth further analyzing is the fact that periodical auditing is not considered useful by respondents. This should be further analyzed, as vulnerabilities can be identified in time and not at the outset, when the drone was placed on the market. The use of cyber security software may not be sufficient in this respect, with additional checks in terms of penetration testing and vulnerability management being required. Thus, it may be that the respondents did not view this distinction between the scope of cyber security software and independent security verifications. Alternatively, it may be that they consider there is a need for more frequent vulnerability scans/penetration testing exercises and not just annual ones. This aspect can be further analyzed to understand the expectations of the users and of the other stakeholders.

The aim of corroborating adequately the above mechanisms together with the other preventive security measures mentioned in the previous section is to ensure a better resilience in time (through continuous monitoring as well). The concept of resilience has been in focus in past decade, including in the context of drone usage, as detailed, for example, by Coopmans C. (2014).

The fourteenth question was "Do you think there will be improvement generated by drone usage in the field of activity they are used for?". The answer options for this question can be found in the legend of the figure below.



Figure 3: Question 14 responses - drones utility in improving activity field

Source: Author's processing

The question aims to understand the view of the respondents in terms of utility of drone in various sectors. The majority (79%) consider the drones useful in terms of improvement brought to existing manners of approaching

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the same issue. In terms of advantages brought by the drone, the majority (67%) consider the drones bring efficiency to existing processes, whereas 12% consider they provide accuracy in terms of performance of the tasks.

This entails that there is general positive feedback in terms of using drones, with the security concerns being set aside by the respondents by reference to the benefits their use can bring.

It is interesting to see that around 18% of respondents have mentioned that drones maybe can bring advantages. This lack of confidence can be explored further in order to understand the fears of the respondents in terms of using drone. One angle can be that they are concerned with using drones in certain specific sectors or activities and for these they are reluctant on the usefulness of drone. Another angle can be that they are not confident on the actual usability of drones or on their security against attacks or bugs. Further, in certain cases, it may be that the respondents are not familiar with the benefits of using drones in certain activities and their reluctance comes from lack of familiarity with the technology and the process.

Nevertheless, the results show positive feedback in terms of drone usage, as was the case for the press release issued by public authorities, including (European Commission, 2014). This is also reflected by the responses to the other questions within the questionnaire, which show that, even though respondents have certain concerns on the operational side, have a general view that drone usage can be integrated in daily life.

5. Conclusion and future research directions

The article shows that there are various types of preventive security measures that can be implemented to prevent cyber-attacks on drones. Such prevention mechanisms are becoming more important given the wide use of drone in terms of industry sectors, territorial reach and activities for which they are used, as detailed in (SESAR Joint Undertaking, 2017). These can fall within two main categories: technical and organizational. The organizational aspects have to be taken into account when setting-up the creation of security measures and the roles and responsibilities in this respect.

As shown in the results to the questionnaire, each stakeholder in the drone ecosystem has a specific role, which has to be taken into account when designing the entities responsible with the implementation of the security measures or with supplementary controls to verify existing vulnerabilities.

In terms of entities responsible for cyber-attacks, the respondents have the same view of shared responsibility among the entities involved in the drone ecosystem. One additional aspect to be had in mind is the constant monitoring of the need for security measures. On this point, the respondents were divided, as some of them did not view periodical reviews of the drone software as useful, with an instant vulnerability scanning solution being preferred. This shows once again that the cyber threat landscape is ever changing and that very swift adapting must take place in order to prevent cyber-attacks.

Regardless of the security issues that may arise and the need for additional implementation of preventive measures both in legislation and in practice, the respondents view the use of drone in various sectors as positive in terms of the efficiency of performing certain tasks and in terms of the accuracy of the results obtained in various tasks. Additional clarity is brought by the overview provided in this paper than in the existing literature identified relating to the preventive security steps that can be taken, as is the case for (Novaro Mascarello L. and Quagliotti F., 2017).

As next steps and future research, it is essential to determine clearly the role of each stakeholder in the ecosystem in terms of quality assurance and cyber security. This entails a balance between the liability of the particular stakeholder and its role in preventive active actions, as such balance has been hinted in literature such as (Carlsen, Christopher, Tarr, Julie-Anne, 2021). Further, this can assist with identifying the view of all stakeholders involved in the drone ecosystem and with the manner in such to have an integrated approach towards preventive security measures in order to increase the trust of users and of stakeholders in the use of drone.

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Organisational aspects of social insurance in case of illness with temporary incapacity to work in Bulgaria

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Abstract

Illnesses and accidents are events that to a large extent predetermine the uncertainty that accompanies human daily life. Their occurrence is associated with deterioration of health and limitations in physical activity and ability to work, which allows to outline the previously expected adverse effects of both economic and social nature – loss of income from employment due to the state of incapacity to work and additional costs to meet emerging priority needs. The research interest in the paper is focused on the organisational framework of insurance for temporary incapacity to work due to general illness in Bulgaria, perceived by the authors as the link between the technical and socio-economic dimensions of risk. The dynamics in the values of the indicators characterising the occurrence of temporary incapacity to work and the parameters of the provided insurance protection are monitored, on the basis of which an assessment of the organisational level of the sickness insurance are made. It is concluded that the observed changes in the generalising characteristics of the risk exposure of the persons included in the insurance population give grounds to provoke a discussion on the need to take corrective actions aimed at refining the organisational framework of insurance protection according to the dynamics of socio-economic development.

Keywords: illness, accident, insurance for temporary incapacity to work due to general illness, cash benefits in case of temporary incapacity to work due to general illness.

Jel Codes: H55, I38

1. Introduction

Illnesses and accidents are events that to a large extent predetermine the uncertainty that accompanies human daily life. Their occurrence is associated with deterioration of health and limitations in physical activity and ability to work, which allows to outline the previously expected adverse effects of both economic and social nature – loss of income from employment due to the state of incapacity to work and additional costs to meet emerging priority needs. Illnesses and accidents quite rightly engage a considerable part of the attention of the International Labour Organisation and the resources of every society:

- in 1927, with Conventions №№ 24 and 25 on sickness insurance, the International Labour Organisation linked the occurrence of incapacity to work due to deteriorating health with the right to cash benefits and appropriate treatment (International Labour Conventions in Bulgaria, 1992, pp. 268 - 269; 272), and with Recommendation 29 outlines the organisational principles of benefits and medical care provided (Электронный фонд правовых и нормативно-технических документов [Elektronnyy fond pravovykh i normativno-tekhnicheskikh dokumentov] [Electronic fund of legal and normative-technical documents], 2021);

- in 1944, with Recommendations $N_{\mathbb{N}}$ 67 and 69, the International Labour Organisation linked the guarantee of income with the mechanisms of functioning of social security and social assistance (Электронный фонд правовых и нормативно-технических документов [Elektronnyy fond pravovykh i normativno-tekhnicheskikh dokumentov[Electronic fund of legal and normative-technical documents], 2021) and outlined the organisational framework of the necessary medical care (Электронный фонд правовых и нормативно-технических документов[Elektronnyy fond pravovykh i normativno-tekhnicheskikh dokumentov][Electronic fund of legal and normative-technical documents], 2021);

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- in 1952, with Convention N_{2} 102, the International Labour Organisation introduced basic standards for the organisation of medical care and payments for sickness and disability within the national social protection systems (State Gazette, 2008);

- in 2012, with Recommendation № 202, the International Labour Organisation directed the socio-political impact towards the achievement of basic universal guaranteed payments and medical care aimed at reducing poverty, lack of protection and social exclusion as a complex effect of the functioning of social security systems, social assistance, negative income taxation and labour market policies (Электронны фонд правовых и нормативно-технических документов [Elektronny fond pravovykh i normativno-tekhnicheskikh dokumentov][Electronic fund of legal and normative-technical documents], 2021).

Indicative in this respect are the data officially published by Eurostat for 2019, according to which the share of social payments made for temporary incapacity to work, provided in cash and in kind, in the Gross Domestic Product and in the total volume of payments from the social protection systems in the countries of the European Union (27 - in 2020) in 2018 is, respectively, 7.8% and 29.30% (Eurostat, 2021), in case of share of the total amount of the payments made in cash, granted without assessment of the need (through the mechanisms of the conducted insurance protection), in the produced Gross Domestic Product and in the total volume of the payments made by the social protection systems in the European Union, respectively, 1.1% and 14.3%¹ (Eurostat, 2021).

The research interest in the present study is focused on the organisational framework of insurance for temporary incapacity to work due to general illness in Bulgaria, perceived by the authors as the link between the technical and socio-economic dimensions of risk. The main purpose of the study is to test the hypothesis about the need of taking corrective action in order to refine it according to the dynamics of socio-economic development, in connection with which the changes in the values of the indicators reflecting the specifics of the manifestation of temporary incapacity to work due to general illness and the parameters of the provided insurance protection are characterised.

2. Literature Review

The issues of creating, structuring and functioning of the systems for social protection and social security, as their main element, arouse justified research interest.

In their study "Social Protection Concepts and Approaches: Implications for Policy and Practice in International Development", Norton, Conway and Foster (Norton, 2001) link social protection to actions taken in response to vulnerabilities and deprivations related to the adverse effects of existing risks considered socially unacceptable within a policy or society, through social assistance and social security mechanisms. They also describe the classic scheme of social security functioning – developed in relation to labour and employment, based on the collection of social security contributions and making payments as a substitute income, temporary or permanent incapacity to work and unemployment.

A. Bonilla García and J.V. Gruat, in their study published by the International Labour Organisation entitled "A life cycle continuum investment for social justice, poverty reduction and sustainable development" (Bonilla García & Gruat, 2003), connect the development of social protection systems with the principle of integration of payments and services, based on the processes of monitoring and analysis of the state of protection mechanisms in order to identify weaknesses and initiate the necessary actions for their improvement. In the context of evolutionary changes in the architecture of social protection systems, they define social insurance as an element that upgrades social assistance, subject to development taking into account the existing links between personal contribution and the contribution of employers (perceived by them as individual capital) with due consideration. According to them, the role of social protection in the working life phase should be bind to the efforts to maintain sustainable personal and social potential through the mechanisms for promoting employment and protection against risks and incapacity to work.

In her study entitled "Social protection: Topic guide" (Browne, 2015), Evie Browne links social protection to public and private initiatives that ensure the transfer of income or consumption of people living in poverty or at risk, stating that its modern development must be based on a combination of payments, services and employment. According to her, social security is realised through contribution-based programmes, against which the obligation to cover expenses in the event of life cycle events – maternity, unemployment or illness. The desired social effect

¹ Authors' calculations based on Eurostat data (Eurostat, 2021).

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of its functioning, in the conditions of modern development can be achieved after combining it with appropriate services. The second most important (after the state) source of financial resources for social protection activities Evie Browne mentions households and individuals, and as one of the forms of their personal participation – insurance.

In "Policy Paper on Social Protection" (Shepherd, 2004), <u>Andrew Shepherd</u>, <u>Armando Barrientos</u> and <u>Rachel</u> <u>Marcus</u> present social security as an element of social protection based on formal employment and manifested through a set of public measures to compensate for the loss or significant reduction income from work due to various unforeseen events (illness, maternity, accident at work, unemployment, disability, old age, death of the person providing monetary maintenance), to guarantee access to health care and family payments for children.

In "Basic Social Protection: Positions of Key Development Actors" (Loewe, 2008), Dr. Markus Loewe presents society as a large insurance pool, the members of which through mutual assistance protect themselves in the case of certain events or in certain situations, where part of the taxes (in the role of insurance contribution) can be understood as a form of personal participation in the insurance fund.

In his study entitled "Social Insurance and Health" (Ziebarth, 2017), Nicolas R. Ziebarth examines the influence of parameters of the protection provided (amount and duration of the paid benefit) on the health and economic behaviour of the insured persons.

The general organisational framework for short-term insurance benefits in case of temporary incapacity to work due to general illness is set out in a handbook published by the International Labour Organisation in 1984 (International Labour Organisation, 1984) – the benefit is of a contributory nature and is paid to the insured person in the event of temporary incapacity to work, certified by the mechanisms of the medical examination, with the purpose to replace, in whole or in part, the lost income.

Neno Pavlov (Павлов, 2011) presents the architecture of the social insurance model in Bulgaria as based on the liberal principle of security through diversity, free choice, self-responsibility and competition and positions the short-term social insurance within the so-called First Pillar – the State Social Security. It is organised on a pay-as-you-go principle and is based on solidarity, with defined payments and approaching the philosophy of the classic Bismarck model.

3. Research Methodology

The analysis of the state of social insurance in case of temporary incapacity to work due to general illness in Bulgaria is based on official statistical information published by the National Social Security Institute (NSSI) and the National Statistical Institute (NSI) of Bulgaria. The values of the main indicators characterising the parameters of the provided insurance protection in 2010 and for the period 2015 - 2020 are traced.

The specificity of the manifestation of risk is characterised by the use of indicators: Frequency of insurance events, showing the average number of occurred contingencies for 1 person (insured or incapable to work) during a certain period; Severity of insurance events, showing the average duration of incapacity for work caused by 1 insured case; Severity per 1 person (insured or unable to work), indicative of their average number of days of incapacity to work, and the required minimum amount of the contribution for social insurance in case of temporary incapacity to work due to general illness is established by the logic of the so-called Harmful factor (Георгиев, Йорданов, & Yordanov, 2001, p. 176 и сл.). Some of the data published by the NSSI, presenting the age specifics of risk manifestation, are summarised by age groups, adopted and used by the NSI in conducting the statistical survey of the population (National Statistical Institute, 2021). The source of information on the number of working days in the respective years is the platform for taxes and accounting KiK Info (KiK Info, 2021).

The classical tools of scientific research in the field of economics and the traditional methods of statistical study and characterisation of the state of the processes and phenomena of the objective reality are used (historical method, graphical method, methods of deduction and induction, methods of analysis and synthesis, descriptive analysis, comparative analysis, development analysis), regarding organisational framework of social insurance in case of temporary incapacity to work due to general illness in Bulgaria, regulated by the texts of the Social Insurance Code (Social Insurance Code, 2021).

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4. Findings and Discussion

4.1. Organisational framework of the social insurance in case of temporary incapacity to work due to general illness in Bulgaria

The general organisational framework of the social insurance in case of temporary incapacity to work due to general illness in Bulgaria, in its predominant part, is described in the texts of the Social Insurance Code (Social Insurance Code, 2021):

- Article 2 (1) imposes on the State Social Insurance the provision of payments (benefits, allowances and pensions) in case of temporarily reduced or lost working capacity;

- Article 2 (2) determines the scope of the social insurance in the General Disease and Maternity Fund – it includes insurance regarding temporary incapacity to work, temporarily reduced working capacity or maternity;

- Article 2 (3) binds the implementation of the provided protection with the payment of insurance contributions for persons insured;

- Article 4 specifies persons, who shall be compulsorily insured depending on the specifics of the labour activity exercised by them. Compulsory insurance in General Disease and Maternity Fund is subject to the different categories of persons exercising employment according to the logic of employment, presented differently depending on the legal basis for the occurrence of the insurance relations. Some of the persons who work as self-employed have the opportunity, at their own request, to be insured in the General Disease and Maternity Fund;

- Article 5 regulates the status of the social insurance contributor, defined as a natural person, legal person, unincorporated association as well as other organisations, which are obliged by law to make insurance contributions for other natural persons, and of the self-insured persons, defined as natural persons, obliged to make insurance contributions at their own expense;

- Article 6 (1), item 5 determines the relative amount of the social insurance contribution General Disease and Maternity Fund -3.5%;

- Article 6 (2) defines the insurance income, from which the due absolute amount of the contribution is determined - all remunerations, including the accounted and non-paid or non-accounted ones and other incomes from labour activity, taking into account the ones determined by the Budget of State Public Insurance Act for the calendar year, the minimum monthly amount of the insurance income (for certain categories of persons – the minimum salary for the country) and maximum monthly amount of insurance income;

- Article 13a regulates the right of the persons insured for general disease and maternity to cash benefits for: temporary inability to work as a result of general disease, sanatorium treatment and in case of urgent medical examinations or tests, quarantine, suspension from work prescribed by the medical authorities, for taking care of an ill or quarantined family member, for urgent need to accompany an ill family member to a medical check-up, test or treatment, and for taking care of a healthy child dismissed from a child-care facility because of quarantine imposed on that facility or on the child;

- Article 40 (1) binds the right of the insured persons to monetary compensation instead of remuneration for the time of leave due to temporary inability to work if they have at least 6 months of insurance coverage of this risk;

-Article 40 (5) obliges the insurers to pay to the insured persons for the first three working days of the temporary inability to work 70% of the average daily gross remuneration for the month, in which the temporary inability to work has occurred, but not less than 70% of the average daily agreed remuneration;

- Article 41 (1) regulates the determination of the daily cash benefit for temporary loss of working capacity due to general disease in the amount of 80 percent of the average daily gross remuneration or the average daily insurance income on which insurance contributions for general illness and maternity have been paid or due (for self-insured persons – deposited insurance instalments) of 18 calendar months preceding the occurrence of the inability to work, but not more than the amount of the average daily net remuneration for the period from which the benefit is calculated;

- Article 41 (5) limits the amount of the income from which the monetary compensation is determined to the maximum monthly amount of the social insurance income for the respective 18-month period;

- Article 42 (1) regulates the terms of payment of the cash benefit for temporary loss of working capacity – from the first day of occurrence till the restoration of the ability to work or the establishing of disability.

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4.2. Parameters of social insurance in case of temporary incapacity to work due to general illness in Bulgaria

Indicative of the organisational level of social insurance in case of temporary incapacity to work due to general illness in Bulgaria is the official statistical data, presenting or allowing to calculate the value of indicators describing the specifics of risk and the main parameters of its functioning – Average annual number of insured persons, Average amount of the insurance income, Average level of the paid indemnity, Frequency of insurance events, Severity of insurance events, Severity (number of incapacity days) per 1 insured, etc.

According to data from the National Social Security Institute, presented in Table 1, the average annual number of persons insured in the General Disease and Maternity Fund in 2020 is 2565.5 thousand people, which is by 234.3 thousand people less compared to 2010 and by 30.1 thousand people less than in 2015. During the period 2015 – 2019, the average annual number of insured persons in the General Disease and Maternity Fund increases annually and reaches 2655.3 thousand people, and the subsequent decrease registered in 2020 can be explained by the global impact of the pandemic situation on the dynamics of economic activity and employment. As it can be seen from Figure 1, the average annual number of persons insured in the General Disease and Maternity Fund in 2020 represents 82.2% of the average annual number of persons employed in the Bulgarian economy and 95.2% of the average annual number of persons for 2010.

Table 1. Average annual number of employed persons, Average annual number of persons insured in the State Social Insurance (SSI) and Average annual number of persons insured in the General Disease and Maternity Fund (GDMF) in 2010 and during 2015-2020.

Indicators	Year	Year								
	2010	2015	2016	2017	2018	2019	2020			
Average annual number of employed persons, thousand	3052,8	3031,9	3016,8	3150,3	3152,7	3233,1	3121,7			
Average annual number of persons insured in the SSI, thousand	3008,4	2755,9	2765,1	2779,8	2790,2	2794,0	2693,7			
Average annual number of persons insured in the GDMF, thousand [*]	2799,8	2595,6	2611,4	2627,7	2641,7	2655,3	2565,5			

*Authors' calculations according to data from the National Social Security Institute.

Source: National Social Security Institute: (National Social Security Institute, 2011, p. 188); (National Social Security Institute, 2016, p. 90); (National Social Security Institute, 2017, p. 85); (National Social Security Institute, 2018, p. 80); (National Social Security Institute, 2019, p. 76); (National Social Security Institute, 2020, p. 78); (National Social Security Institute, 2021, p. 88); (National Social Security Institute, 2021); (National Social Security Institute, 2021, p. 88); (National Social Security Institute, 2021); (National Social Security Institute, 2021, p. 88); (National Social Security Institute, 2021); (National Social Security Institute, 2017).

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Graph 1. Average annual number of persons insured in the General Disease and Maternity Fund (GDMF) compared to the number of persons employed and insured in the State Social Insurance (SSI) during the period 2010–2020.

Source: Authors' calculations based on the data in Table 1.

The data given in Table 2 present the dynamics of insurance income and gross salary in Bulgaria. In 2020, the average monthly amount of the insurance income of the persons insured in the General Disease and Maternity Fund is BGN 1,193.73, which is by BGN 28.58 more than the average monthly insurance income of the persons insured in the State Social Insurance and by BGN 267.10 less than the average gross monthly salary in the country in 2020, and the increase compared to 2010 is almost 1.9 times. The existing differences can be explained by the lower amounts of the insurance income of the persons who have taken advantage of the possibility for voluntary insurance for general illness and maternity. As it can be seen from Graph 2, during the period 2010 – 2020, the level of the average monthly insurance income of the persons insured in the State Social Insurance and the average gross monthly salary of the employees in the country is slightly declining, reaching values of 102.6% and 80.7% in 2020, respectively.

Table 2. Average monthly insurance income of the persons insured in the State Social Insurance (SSI), Average monthly insurance income of the persons insured in the General Disease and Maternity Fund (GDMF) and Average gross monthly salary in 2010 and during 2015 –2020.

Indicators	Year								
	2010	2015	2016	2017	2018	2019	2020		
Average monthly insurance income of the persons insured in the SSI, BGN	573,30	704,44	747,72	824,36	889,82	1010,53	1091,15		
Average monthly insurance income of the persons insured in the GDMF, BGN*	593,70	725,31	769,33	848,43	914,74	1037,73	1119,73		
Average gross monthly salary, BGN*	648,08	877,92	948,25	1037,33	1146,25	1267,42	1386,83		

*Authors' calculations according to data from the National Social Security Institute.

Source: National Social Security Institute, National Statistical Institute: (National Social Security Institute, 2011, p. 188); (National Social Security Institute, 2016, p. 90); (National Social Security Institute, 2017, p. 85); (National Social Security Institute, 2016, p. 90); (National Social Security Institute, 2017, p. 85); (National Social Security Institute, 2016, p. 90); (National Social Security Institute, 2017, p. 85); (National Social Security Institute, 2016, p. 90); (National Social Security Institute, 2017, p. 85); (National Social Security Institute, 2016, p. 90); (National Social Security Institute, 2017, p. 85); (National Security In

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Social Security Institute, 2018, p. 80); (National Social Security Institute, 2019, p. 76); (National Social Security Institute, 2020, p. 78); (National Statistical Institute, 2020) (National Statistical Institute, 2021).



Graph 2. Average monthly insurance income of the persons insured in the General Disease and Maternity Fund (GDMF) compared to the average monthly insurance income of the persons insured in the State Social Insurance (SSI) and the average gross monthly salary of employees in 2010 and during 2015 - 2020.

Source: Authors' calculations based on the data in Table 2.

The data given in Table 3 present the specifics of the manifestation of the covered insurance risk in 2010 and during the period 2015 - 2020. The number of registered insurance events in 2020 is by 151128 more than in 2010 and by 512184 less than in the previous 2019. The total number of days of incapacity to work for which benefits were paid by the General Disease and Maternity Fund in 2020 is 17564352 – by 4290753 days more than in 2010 and by 366284 days more than in the previous 2019. These data are devoid of cognitive significance if they are not linked both to the number of the insurance population and to each other.

As it can be seen from Graph 3, during the period 2010 - 2020 the calculated values of the indicator "Frequency of insurance events" are in the range from 0.731 cases per 1 insured person in 2010 to 0.857 cases per 1 insured person in 2020, with a maximum registered in 2018 - 1040 cases per insured person. During the same period, the values of the indicator "Severity of insurance events" vary from 6.49 days per 1 contingency occurred in 2010 to 7.99 days in 2020, which is the registered maximum value. The values of the indicator "Severity per 1 insured" during the period 2010 - 2020 are in the range from 4.74 days in 2010 to the maximum for the period 6.85 days in 2020. The significant increase in the Severity of insurance events registered in 2020 can be explained by the specifics of the risk manifestation in the conditions of a complex epidemic situation.

Table 3. Number of insurance events and Number of days of incapacity to work with benefits paid due to general disease in 2010 and for the period 2015 – 2020.

Indicators	Year									
	2010	2015	2016	2017	2018	2019	2020			
Number of insurance events (number of paid benefits)	2046738	2308498	2507185	2582844	2748173	2710050	2197866			
Number of days with benefits paid	13273599	15343741	16602043	17055882	17594959	17198068	17564352			

Source: National Social Security Institute: (National Social Security Institute, 2021, p. 23); (National Social Security Institute, 2020, p. 14); (National Social Security Institute, 2019, p. 14); (National Social Security Institute,

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2018, p. 7); (National Social Security Institute, 2017, p. 7); (National Social Security Institute, 2016, p. 7); (National Social Security Institute, 2011, p. 7).



Graph 3. Frequency of insurance events, Severity of insurance events and Severity (in days) per 1 insured person in 2010 and during 2015 – 2020.

Source: Authors' calculations based on the data in Table 3.

The data presented in Graph 4 reflect the age specificity of the risk manifestation. The calculated values of the Severity of insurance events indicator by individual age groups are a kind of reflection of the existing functional dependencies between persons' age and the risk manifestation. During the years there is an increase in the Severity per 1 insured person, with increasing age – for persons divided into groups up to 29 and after 40, clearly expressed in relation to persons over 50 and especially over 55.

The values of the indicator registered for 2020 for all age groups increase sharply compared to the values of the same indicator for the previous 2019, which can be explained by the specifics of risk in the complex epidemic situation in the country and the registered sharp increase in both cases and periods of incapacity to work related to quarantine.

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9,000 -							
8,000 -							
7,000 —							
6,000 -							
5,000 —							
4,000	2010	2015	2016	2017	2018	2019	2020
up to 20	5,777	6,012	5,773	5,769	5,615	5,558	6,581
from 20 to 24	5,972	6,487	6,311	5,441	5,923	5,875	7,377
from 25 to 29	5,972	6,520	6,454	6,374	6,275	6,118	8,058
from 30 to 34	5,773	6,138	6,088	6,085	5,922	5,848	7,472
from 35 to 39	5,863	6,036	5,992	5,991	5,724	5,625	6,953
from 40 to 44	6,217	6,281	6,276	6,242	5,914	5,820	7,055
from 45 to 49	6,720	6,646	6,655	6,620	6,354	6,260	7,668
from 50 to 54	7,008	6,882	6,560	6,850	6,576	6,536	8,105
from 55 to 59	7,451	7,193	7,187	7,132	6,878	6,799	8,565
from 60 to 64	8,184	7,799	7,768	7,658	7,306	7,262	9,387
65+	8,379	8,111	8,016	7,873	7,899	7,831	10,550
	un +	o 20	from 20 to 24	from 25 f	to 20fron	20 to 24	-

Graph 4. Severity (in days) per 1 insured person by age groups in 2010 and during 2015 – 2020.

Source: Authors' calculations based on data published by the National Social Security Institute: (National Social Security Institute, 2011, p. 7); (National Social Security Institute, 2016, p. 7); (National Social Security Institute, 2017, p. 7); (National Social Security Institute, 2018, p. 7); (National Social Security Institute, 2019, p. 14); (National Social Security Institute, 2020, p. 14); (National Social Security Institute, 2021, p. 23).

The data presented in Table 4 are indicative of the socio-economic characteristics of the consequences of the risk manifestation. The number of persons with paid benefits in case of temporary incapacity to work in 2020 is 1127070 (43.9% of the number of persons insured in the General Disease and Maternity Fund), which is significantly less than in 2010 (1599727 or 57.01% of the number of persons insured in the General Disease and Maternity Fund) and especially compared to 2017, when the record for the period 2015-2020 – 1989929 persons were registered (75.7% of the number of persons insured in the General Diseases and Maternity Fund). The observed increase in the number of persons with paid benefits for temporary incapacity to work and their share in the totality of persons insured in the General Diseases and Maternity Fund) be perceived as a kind of reflection of the already mentioned specifics of risk in the conditions of a complex epidemic situation in the country.

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Table 4. Persons with paid benefits for temporary incapacity to work due to general disease in 2010 and for the period 2015 - 2020.

Indicators	Year								
	2010	2015	2016	2017	2018	2019	2020		
Number of persons with paid benefits	1599727	1791076	1927086	1989929	985578	970951	1127070		
Share of the persons with paid benefits in the number of the persons insured in the "GDM" fund, % [*]	57,1	69,0	73,8	75,7	37,3	36,6	43,9		

*Authors' calculations based on the data in Tables 1 and 4.

Source: National Social Security Institute: (National Social Security Institute, 2011, p. 6); (National Social Security Institute, 2016, p. 6); (National Social Security Institute, 2017, p. 6); (National Social Security Institute, 2019, p. 6); (National Social Security Institute, 2020, p. 6); (National Social Security Institute, 2021, p. 8).

The calculated values of the indicators "Frequency of insurance events" and "Severity of 1 person with paid benefit", presented in Graph 5, reflect the social aspects of risk manifestation. The average number of contingencies per person with paid benefit in 2020 is 1 950, which is by 0.671 more compared to 2010 and by 0.841 less than the previous 2019, with an average number of days of incapacity to work per person with benefit paid 15.58, which is by 7.28 more than in 2010 and by 2.13 less than in the previous 2019. The dynamics of these two indicators, in general, reflects the changes in the specifics of the manifestation of risk associated with the sharp decline in the registered number of persons with paid benefits in 2018 compared to previous years, while relatively maintaining the total length of periods of incapacity to work. In 2020, the Frequency of occurrence of an insurance event per 1 person with paid benefit is by 1,093 higher compared to the Frequency of occurrence of a contingency per 1 insured person, and the Severity of 1 person with paid benefit (in days) is higher by 8.73 compared to the Severity of 1 insured person.



Graph 5. Frequency of occurrence of a contingency and Severity (in days) per 1 person with paid benefit in 2010 and in the period 2015 - 2020.

Source: Authors' calculations based on the data in Tables 3 and 4.

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The data given in Table 5 present information on the dynamics of the average daily amount of benefits paid in case of temporary incapacity to work - as an absolute amount and in % compared to the average daily amount of gross salary and the average daily amount of insurance income of the insured in the State Social Insurance and General Disease and Maternity Fund. The average daily amount of 1 benefit paid in 2020 is BGN 39.03, which represents, respectively, 58.63% of the average gross salary for the country (which in principle forms the insurance income of the majority of persons insured in the General Disease and Maternity Fund), 74.51% of the average daily amount of the insurance income of the persons insured in the State Social Insurance and 72.65% of the average daily amount of the insurance income of the persons insured in the General Disease and Maternity Fund. The average daily amount of the benefit for temporary incapacity to work in 2020 is higher, by BGN 17.27 compared to the average daily amount of the benefit paid in 2010, but its level compared to the average amount of both the gross salary and the insurance income of the persons insured in the General Disease and Maternity Fund decreased respectively by 11.88% and 2.98%. As it can be seen from the data presented in Graph 6, the increase in the average daily amount of the benefit in case of temporary incapacity to work, in % compared to 2010, for the period 2015-2020 lags behind the increase in both the average gross salary and the increase in the average daily amount of the insurance income of the persons insured in the State Social Insurance and in the General Disease and Maternity Fund.

Table 5. Average daily amount of 1 benefit for temporary incapacity to work in 2010 and for the period 2015 - 2020.

Indicators	Year							
Indicators	2010	2015	2016	2017	2018	2019	2020	
Average daily amount of a benefit, BGN	21,76	25,47	26,86	28,5	31,22	34,29	39,03	
Average daily amount of benefit compared to average gross salary,%*	70,51	60,92	59,49	56,78	56,52	56,14	58,63	
Average daily amount of benefit compared to the average insurance income of the persons insured in the SSI, % [*]	79,71	75,94	75,43	71,45	72,81	70,41	74,51	
Average daily amount of benefit compared to the average insurance income of the persons insured in the GDMF, % [*]	75.63	73.74	73,33	69.43	70.83	68.57	72.65	

^{*}Authors' calculations based on the data in Table 2 and information on the number of working days published by the tax and accounting platform KiK Info.

Source: National Social Security Institute, KiK Info: (National Social Security Institute, 2021, p. 23); (National Social Security Institute, 2020, p. 14); (National Social Security Institute, 2019, p. 14); (National Social Security Institute, 2018, p. 7); (National Social Security Institute, 2017, p. 7); (National Social Security Institute, 2011, p. 7); (National Sec

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Graph 6. Increase of the average daily amount of the benefit due to temporary incapacity to work and of the average daily amount of the gross salary and of the insurance income of the insured in the State Social Insurance (SSI) and in the General Disease and Maternity Fund (GDMF) during the period 2015 – 2020

Source: Authors' calculations based on the data in Table 5.

The data given in Table 6 present the main financial parameters of the General Disease and Maternity Fund. The total amount of benefits paid due to temporary incapacity to work is constantly increasing and in 2020 reaches BGN 685608.8 thousand, with a total amount of cash benefits and allowances paid by the fund BGN 1347652.7 thousand and a total amount of income from insurance contributions BGN 1208570.3 thousand. The observed trend of steady increase in the costs of benefits for temporary incapacity to work due to general illness, the total costs of benefits and allowances and income from social security contributions is due to changes in the number and composition of the insured population, the size of social security income and the specifics of risk manifestation. The fund's deficit in 2020 reaches BGN 143,049.4 thousand.

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Table 6. Financial parameters of the General Disease and Maternity Fund in 2010 and for the period 2015-2020.

Indicators	Year							
maleators	2010	2015	2016	2017	2018	2019	2020	
Paid benefits in case of temporary incapacity to work, BGN thousand	288842,3	390822,1	445920,0	486175,1	549240,6	589681,7	685608,8	
Expenses for benefits and allowances at the expense of the GDMF, BGN thousand	760540,7	903556,5	983002,2	1070654,4	1171057,4	1240230,3	1347652,7	
Income from insurance contributions to the GDMF, BGN thousand	572536,1	824319,0	825861,8	935512,2	1016665,5	1157363,9	1208570,3	
Financial status of the GDMF, (+/-, BGN thousand)	-189723,4	-83526,1	-161582,8	-139538,5	-158941,8	-87541,8	-143049,4	

Source: National Social Security Institute: (National Social Security Institute, 2021, p. 23); (National Social Security Institute, 2020, p. 14); (National Social Security Institute, 2019, p. 14); (National Social Security Institute, 2018, p. 7); (National Social Security Institute, 2017, p. 7); (National Social Security Institute, 2011, p. 7); (National Social Security Institute, 2011, p. 7); (National Social Security Institute, 2011, p. 7); (National Social Security Institute, 2016, p. 128); (National Social Security Institute, 2017, p. 125); (National Social Security Institute, 2018, p. 116); (National Social Security Institute, 2019, p. 112); (National Social Security Institute, 2020, p. 112); (National Social Security Institute, 2021, p. 126).

As it can be seen from the data presented in Graph 7, the share of benefits paid for temporary incapacity to work in the total costs of benefits and allowances paid by the General Disease and Maternity Fund and in the income from social security contributions of the fund assumes its maximum values, respectively, 56.7% and 50.9% in 2020. The fund's deficit compared to the income from social security contributions varies from 33.1% in 2010 to 7.6% in 2019 and reaches, in 2020, 11.8%. At the same time, the required minimum amount of social security contribution sufficient to cover temporary incapacity benefits increased from 1.45% in 2010 to 1.99% in 2020 (Graph 8).

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60,0 - 50,0 - 40,0 - 30,0 - 20,0 - 10,0 -							
0,0	2010	2015	2016	2017	2018	2019	2020
	year						
Share of benefits paid in case of temporary incapacity to work in relation to the costs of benefits and allowances at the expense of the GDMF, %	38,0	43,3	45,4	45,4	46,9	47,5	50,9
Paid benefits in case of temporary incapacity to work in relation to the revenues from insurance contributions	50,4	47,4	54,0	52,0	54,0	51,0	56,7
The GDMF's deficit compared to the revenues from social security contributions	33,1	10,1	19,6	14,9	15,6	7,6	11,8

Graph 7. Paid benefits in case of temporary incapacity to work and the deficit of the General Disease and Maternity Fund compared to the total expenses for cash benefits and allowances and the revenues from social security contributions in 2010 and in the period 2015-2020.

Source: Authors' calculations based on the data in Table 6.



Graph 8. Minimum amount of the social security contribution required to cover the benefits paid in case of temporary incapacity for work in 2010 and within the period 2015-2020.

Source: Authors' calculations based on the data in Tables 1, 2 and 6.

5. Conclusions

The contemporary social insurance model in Bulgaria was introduced by the Social Insurance Code in early 2000. With a special law, in 2008, the Convention $N_{\rm 2}$ 102 of the International Labour Organisation was ratified (Ratification Act of Convention $N_{\rm 2}$ 102 of the International Labour Organisation for Social Security (Minimum Standards), 1952, 2008). This fact is a kind of attestation for the compliance of the organisational framework of social insurance in case of temporary incapacity to work due to general illness in the country with the main methodological formulations, as well as with the established practice worldwide and in the European Union countries. However, this does not mean that the system has reached its full potential, on the contrary – the

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observations made at least show the need for discussion about the possibilities for its development and improvement:

- through direct changes in the levels of payments provided;

- through changes in the mechanism for determining the base values used as parameters in defining the amounts of payments granted;

- through changes in the "payment architecture" and the transition, for instance, to a two-component model, including a universal base, with or without the target financial contribution of the state, and an additional element directly related to and reflecting the individual insurance contribution;

- through a directed interest in integrating the potential of personal insurance in the mechanisms of insurance protection in case of illness with temporary incapacity to work.

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Knowledge in the context of strategic management of the military education system

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Abstract

Shared good practices and experience in the use of a Balanced Scorecard are analysed, and evidence is provided that the model presupposes reaching a consensus between the organizational vision and strategy. The strategy and its goals for involving the whole organization in the strategic initiatives and ensuring the work on the card with investments and resources are explained. An attempt is made to reconsider the model of organizational behaviour through the accumulation of managerial experience. In this context, the card manifests itself as a mechanism for implementing organizational change. Mastering the behaviour of disparate indicators and finding an effective balance in their management prove that the strategic map is a method for verifying the adopted organizational strategy. An attempt is made to summarise the practices of application of balanced cards in the field of education, and an offer is made to implement the Balanced scorecard in "Georgi Rakovski" Military Academy in Sofia, Republic of Bulgaria.

Keywords: strategic management, training, Balanced Scorecard (BSC), perspectives, implementation.

Jel Codes: P00, I20

1. Introduction

An organization's success is not only measured by its financial performance, customer satisfaction, quality management, innovation and motivated employees – these are factors that better reflect the state of the organization than the profit announced in its annual financial statements.

The Balanced Scorecard is a new approach to strategic management. It provides a structured methodology by which the shortcomings of traditional strategic management systems can be avoided. The approach was developed in the early 1990's by Robert Kaplan and David Norton.

The Balanced Scorecard aims to communicate the strategy throughout the organization, therefore all employees in the organization will know what their role is in achieving the overall strategy.

2. Nature of the Balanced Scorecard

The balanced scorecard looks at a company from four points of view, which Kaplan & Norton call "perspectives" (Terziev, Georgiev, 2017; Terziev, Georgiev, Ivanov, 2021). These perspectives are vital to the organization and should answer the following key questions:

- Finance Perspective: In order to be financially successful, how should a company present itself to its shareholders and potential investors?
- Clients Perspective: In order for its vision to be successful, how should the company present itself to its clients?
- Internal Business Processes Perspective: In order for the company to satisfy its shareholders and customers, which business processes should be optimized, which should be shortened and which should be developed?

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- Learning and Growth Perspective: Can the company continue to grow, increase its efficiency and increase its revenues?

The Balanced Scorecard is a practical tool to help organizations implement their business strategy (Zahariev, 2014). Strategic goals, criteria and action plans are formulated for each perspective. An example of a Balanced Scorecard is shown on Figure 1.



Figure 1. Balanced Scorecard of results

Source: Authors

3. The structure of the Balanced Scorecard

According to the Kaplan & Norton methodology, the structure of the Balanced Scorecard consists of several levels:

- Vision;
- Strategies;
- Perspectives;
- Strategic goals;
- Success factors;
- Key performance indicators and
- strategic initiatives, arranged in an Action plan (Table 1):

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Table 1: General structure of the Balanced Scorecard

VISION					
STRATEGY					
Perspectives	Customers	Finance	Internal processes	Learning Growth	and
Strategic goals					
Critical factors of success					
Key indicators of results					
Action plan					

Source: Authors

4. Reasons for offering the introduction of a balanced scorecard at the "Georgi Rakovski" Military Academy in Sofia, Republic of Bulgaria

Gradually modified versions of BSC began to be used in areas outside of business – social activities, education, local and state government and activities of non-governmental organizations.

Higher military education in Bulgaria has radical traditions, experience and significant achievements that cannot be underestimated and neglected. In the conditions of market economy, the system of higher education in Bulgaria has undergone a process of significant change. Access to higher education has been facilitated, which has led to an increase in the number of highly qualified students and professionals and to the modernization and expansion of the fields of higher education and professional fields.

However, we should also note the number of negative trends and problems, such as: the annual "battle" of higher education institutions for students lowering the quality of the educational process in order to maintain financial subsidies, the availability of graduates without practical implementation in the labour market and outdated training facilities.

5. Proposal of a Balanced Scorecard Model for "Georgi Rakovski" Military Academy in Sofia, Republic of Bulgaria

Based on the methodology of Kaplan & Norton, the Balanced Scorecard model for the "Georgi Rakovski" Military Academy can include four key directions (perspectives):

- Learners perspective;
- Academic and administrative staff perspective;
- Internal processes perspective;
- Material and technical facilities and finance perspective.

The Learners and Academic and administrative staff areas provide an answer to the question what learners expect and what lecturers and administrators need to do in order to obtain a competitive product that fully meets the expectations of society as a whole and the system of defence and security, incl. the military education system.

The areas Internal processes and Material and technical facilities and finance analyse those university processes, material and technical and financial prerequisites that play a key role in maximizing the satisfaction of the academic community, the defence and security system and the successful development of the university.

The modelling of each area (perspective) takes into account established views on the development of the European research area, as well as national goals and requirements set out mainly in the texts of the Higher Education Act,

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the Academic Staff Development Act of the Republic of Bulgaria and the latest criterion requirements set by the new socio-economic conditions.

The technological implementation of a strategic plan is carried out by decomposing the factors and indicators of success of the university by units and determining specific commitments of the units and their staff for their achievement. The technological solution itself envisages a broad and democratic discussion of the goals and the achieved results and the search for alternatives for a more efficient future development. This presupposes initiating and bringing the plan in full compliance with the achievements and changes in the social environment. At the same time, it is planned to conduct comparative studies on the activities and results of other, primarily foreign educational institutions, as well as to constantly monitor the level of compliance of university activities with state requirements and public expectations and attitudes. A conceptual model of a balanced scorecard for "Georgi Rakovski" Military Academy is shown on Figure 2.



Figure 2: Balanced scorecard for "Georgi Rakovski" Military Academy

Source: authors

As a basis for the development of the conceptual model of Kaplan & Norton, respectively the proposal for a Balanced Scorecard for the "Georgi Rakovski" Military Academy a model of a strategic map is set and its structure includes 6 perspectives:

- Goals and achievements;
- Stakeholders;
- Processes of education and administration;
- Training and development of lecturers;
- Development and work of the administrative staff;
- Financial efficiency.

An example template of a strategic map is shown on Table 2.

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Goals and achievements	Mastering of kn professional habits	owledge and	Competitiveness of knowledge at a national level	
Participation and satisfaction of customers and stakeholders	Establishment of safe and productive atmosphere	Involvement satisfaction parents	and Participation of and posit towards the activity	of community ive attitude e university's
Efficient and resultative processes of education and administration	Efficiency of f education f	Fransport and food	Safe and maintained buildings and equipment	Readiness for the new academic year
Education and development of the teaching staff	Competency of teac	hing staff	Satisfaction of lectu	rers
Development and work of the administrative staff	Competency of staff	administrative	Satisfaction of admi	nistrators
Financial efficiency	Efficient financial n	nanagement		

Table 2. Model of a Balanced Scorecard for "Georgi Rakovski" Military Academy

Source: authors

The example is interesting and indicative, because with the included first perspective Goals and Achievements the leading social goals of the whole educational system are represented by goals related to the achievements of students, materializing mastery of curricula and formation of knowledge competitiveness at a national level. This is what conveys the strategic nature of this scorecard template.

The other level of the card covers a set of goals that seek convergence between learners' goals and society's demands. For this reason, the summary name Stakeholders and customers was chosen.

The goals structured in the next level provide information on how the education system and the specific organization provide value to the product that society expects and consumes.

There are many examples where the next two areas (perspectives) of teachers and administrative staff are summarized. Experience has shown that their differentiation provides information in greater detail, which makes it possible to assess as objectively as possible the place and role, as well as the individual contribution of each person in the whole educational process.

Following the classic structure technology and the instructions of the creators of the model Kaplan and Norton, the strategic map is based on the direction Finance. In fact, it can be argued that with the imposition of the policy of institutional and financial independence, its role becomes fundamental and key to the success not only of the management model, but also for the future of the educational institution.

Summarizing the practices of applying a balanced card in the field of education, project managers and consultants note that the system is making targeted progress in improving student achievement and organizational efficiency.

6. Conclusion

The starting position for creating a substantiated proposal, constructing a balanced card covering the work of the "Georgi Rakovski" Military Academy can be considered in two directions (Adamov, et al. 2010; Terziev, Georgiev, Andreeva, 2020a; 2020b):

- The first is related with an analysis of already existing practices;
- The other stems from the possibility of the object itself to be examined, analysed to a degree sufficiently convenient for structuring a card. In this context, official data provide an opportunity to conclude that:

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"Georgi Rakovski" Military Academy has a stated mission and goal and this creates an opportunity to create a vision, and for the organization itself this convincingly proves that it has a strong strategic orientation.

As part of the system for defence and security, the "Georgi Rakovski" Military Academy performs its activity definitely legally and lawfully.

On this basis, a pattern vision can be created, according to which the "Georgi Rakovski" Military Academy can see itself in the future as a leader among higher education institutions in the Republic of Bulgaria, conducting student training and research in the field of defence, security and projects management related to their development and improvement.

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Population ageing and economic growth in central and eastern European countries

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Abstract

This paper examines the relationship between population ageing and its effects on the economic output, on 10 Central and Eastern European countries. Most of the countries included in the analysis are experiencing a significant increase on the size of older population, the old-age dependency ratio having rates between 40% and 50% in 2019, while ageing is more pronounced if we look at the economic old-age dependency ratio (has range of values between 45% and 58% in 2019, for the countries analysed). We use the variation in the rate of population ageing across CEE countries over the period 1990-2019 to estimate the economic impact of ageing on economic growth per capita. We find that a 10% increase in the fraction of the population ages 60+ decreases the growth rate of GDP per capita by 7.2%. But population ageing has even a stronger impact on productivity growth, showing that a 10% increase in the proportion of elderly population contributes to a reduction of 10.1% of GDP per worker.

Keywords: population ageing, economic growth, CEE countries

Jel Codes: J11, O47

1. Introduction

Population ageing and its economic implications became, in the last years, a major area of interest for researchers, specialists and authorities involved in decision-making. These concerns have been amplified by the 2007 - 2008 global economic crisis and, more recently, by the health crisis.

The effects of population ageing on economic growth have been amplified in the last years in multiple countries' economies, but assessing their magnitude has small empirical evidence. In this context, the analysis and the assessment of the effects that population ageing on economic growth is particularly useful to study.

The relationship between growth of economic output and population growth has been studied extensively, but most of the analysis were applied on well-developed countries. Various studies show that the economic growth may be relatively slow in the coming years, taking into account that the population growth would slow considerably (Baker et al., 2005; Peterson et al., 2017, Bloom et. al., 2010).

For Central and Eastern European Countries, the literature contains a limited number of studies which assess the impact of population ageing on economic growth. The countries from this part of Europe, which have experienced major economic changes since the 1990s by moving to a market-based system and abandoning the central planning, can be distinguished from the rest of European Union countries through their specific characteristics. The measures undertaken in 1990s, to restructure the economic system, along with privatization of public services and price liberalization, generated large economic and social phenomenon. Through the changes, the major ones are explained by rising unemployment as newly privatized firms tried to become more efficient, price inflation due to removal of price controls imposed by the governments, increased emigration, the decline of birth rates and the uncertainties given by the economic environment. Once these countries started the negotiations for their accession to European Union and the measures for pre-accession phase were applied, the economies of these countries became more stable. However, the global financial crisis which begun in 2007- 2008 affected again the CEE countries and shown their weaknesses and economic vulnerability: in 2009 the Baltic countries (Estonia, Latvia and Lithuania) recorded a drop of 14% in gross domestic product level, while other multiple nations (Hungary, Slovenia, Romania, Slovakia) faced a reduction of more than 5% of GDP. The actual health crisis, caused by the pandemic, will certainly emphasize these economies' vulnerability.

In this article we analyse the relationship between economic output and changes in population structure on 10 Central and Eastern European (CEE) countries. The countries included in the analysis are: Bulgaria, Czechia, Estonia, Latvia, Lithuania, Hungary, Poland, Romania, Slovenia and Slovakia. Due to unavailability of data for

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the whole period of interest, Croatia has been excluded from this study. The analysis period considered is between 1990 and 2019. Economic growth is assessed by the main economic indicator GDP per capita, expressed in US dollars and by the productivity growth (expressed as GDP per worker). Population ageing is defined by the proportion of the cohort 60 years old and over from the total population or from the working age group. By estimating a panel model, we assessed the impact of population ageing on economic growth and productivity growth. The paper is structured as follows: in Section 2 we present a survey of the literature on the population ageing and its main effects on economy. Section 3 describes the data and the methodology which was used for the estimation of panel data model. In Section 4 we present the empirical analysis, while the last section presents the main conclusions.

2. Literature Review

The problem of demographic transition presents a high interest for all governments and worldwide organisations because populations are ageing rapidly across advanced economies and many emerging market economies, being the result of rising life expectancy and declining fertility. The social and economic changes have a high impact of population size, its structure and on the demographic trends.

Population growth has been and will continue to be problematic as more people inevitably use more of the finite resources available on earth, thereby reducing long-term potential growth (Linden, 2017).

Economic growth is measured, in multiple studies, by changes in a country's gross domestic product (GDP) which can be decomposed into its population and economic elements by writing it as population times per capita GDP (Peterson et al., 2017).

For decades, economists and social thinkers have debated the influence of population change on economic growth. Three alternative positions define this debate: population growth either restricts, promotes or is independent of economic growth. All of these explanations, however, focus on population size and population growth. In recent years, however, the debate has given insufficient attention to a critical issue: the age structure of the population, which can change dramatically as fertility and mortality rates change. People's behaviour and needs vary at different stages of life, this fact explaining that changes in a country's age structure can have significant effects on its economic performance (Bloom at al., 2003).

In his important book on inequality, Thomas Piketty (2014) observes that economic growth "always includes a purely demographic component and a purely economic component, and only the latter allows for an improvement in the standard of living". Different researchers offer arguments and show empirical evidence for the robust population growth, which enhances economic growth, while others find evidence to support the opposite conclusion. Studies on the same field find that the effects vary with the level of a country's development, the source or nature of the population growth, or other factors that lead to nonuniform impact (Peterson et al., 2017).

Studies show that ageing is detrimental to countries' economic growth, with noticeable nuances depending on countries' development level: the level of ageing significantly and negatively impacts on developed countries' growth, but now on the less developed and emerging economies. Based on the study Maestas et. al. (2016) created on United States countries, between the economic output and population ageing is an inverse relationship; by increasing the fraction of elderly population, the growth rate of GDP per capita decreases. Piketty's analysis (2014) shows that economic growth would be relatively slow in the future, one argument for this being the demographic component, which is expected to have a very slow growth as well. Other studies on the subject, such as Bloom et. al. (2010), shown that population ageing will tend to lower the labour force participation which may raise concerns about a future slowing of economic growth.

If population growth and per capita GDP growth are completely independent, higher population growth rates would clearly lead to higher economic growth rates. It would still be true that, as noted by Piketty (2014), only the growth in GDP per capita would give rise to improvements in economic well-being. This is also sustained by Acemoglu and Restrepo (2018) who found a positive link between the two indecators, saying that the economies with higher ageing rates are characterised by a higher technology adoption, which can be considered the market response to increasing labour shortages and upward pressure on wages (Kim et al., 2020).

On the other hand, if population growth affects per capita output growth, higher population growth rates would contribute to either higher or lower overall economic growth depending on the nature of its effects on per capita GDP (Peterson et al., 2017). This is what Heady and Hodge (2009) proved in their study, finding evidence that

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growth in the young population is the main drag on economic growth, while the effects of adult population growth are more varied and dependent upon such other factors as institutions and policies, especially with regard to labour, health, and education. In these circumstances, it depends about the actual economic level of the country, to conclude about the relationship between population growth rates and economic output. So, the slower economic growth in developed country is a consequence of the declining population growth rates, while in less developed countries, the high population growth rates can actually slower the economic growth.

The population ageing has a different impact on economic growth, based each country characteristics and level of development. OECD countries are more likely to see modest, but not catastrophic, declines in the rate of economic growth, while in most non-OECD countries, declining fertility rates will cause labour-force-to-population ratios to rise as the shrinking share of young people will more than offset the skewing of adults toward the older ages. These factors suggest that population ageing will not significantly impede the pace of economic growth in developing countries (Bloom et. al., 2010).

As Peterson (2017) concludes, the effect of population growth on per capita economic growth will probably remain highly country specific although population policies may have some longer-term effects on population growth and age structure.

3. Data & Methodology

Population ageing is a demographic challenge and a phenomenon which gets amplified recently in both developed and under development countries, as a result of declining fertility rates and also of rising life expectancy.

In this paper we analyse the relationship between population ageing and the impact on economic growth, in 10 Central and Eastern European countries (Bulgaria, Czechia, Estonia, Latvia, Lithuania, Hungary, Poland, Romania, Slovenia and Slovakia), on the period 1990-2019. Usually included in the CEE group, Croatia has been excluded due to the lack of availability of data before 2000. The data sources are Eurostat and World Bank.

The main indicator to analyse the population ageing in usually considered the ratio between the elderly population and the working age population, known as the elderly dependency rate, based on the definition provided by OECD.

To measure the population ageing from an economic perspective, United Nation (2019) propose another indicator: the economic old-age dependency ratio. It captures the interactions between demography and economy, using information about population, consumption and production in a given economy, disaggregated by age. Is defined as the number of consumers aged 60 and over, divided by the number of workers at all ages.

The research conducted by Maestas, N., Mullen, K. J., and Powell, D. (2016) highlighted the elasticity of economic growth with respect to population ageing that incorporates the economic response to demographic changes, and which thus may be useful to predict future impacts on economic growth as population ageing continues to unfold. Their research was applied on the United State countries dataset and doesn't include the indirect effects of federal policies on budget and policy responses. It approaches the general representation of aggregate economic output and its subcomponents, through an econometrical function of $y_{st}=F[\Omega_{st}, k_{st}, l_{st}]$, where y_{st} is per capita output at time *t* in state *s*, Ω_{st} is the (per capita) stock of ideas or technology, k_{st} is an index of physical capital per person, and l_{st} is the per capita effective labour input. In broad terms, the equation considers the relationship between output growth and growth in the older population share, in the context where it depends on three key elasticities (production, labour productivity and labour force participation).

In our paper, we followed the approach proposed by Maestas, N., Mullen, K. J., and Powell, D. and estimated a model where the dependent variable is the GDP per capita for the country *s* at the time *t*. On the independent list of variables, we included the ratio between population aged 60 and over to the total population, while *X* includes a set of time - varying control variables whose influence is also allowed to vary over time (the log of the fraction of workers in each industry) to account for initial conditions that may predispose states to particular growth paths. The log-difference specification for both dependent and independent variables normalize comparisons of growth across countries with different initial population shares and yields an easily interpretable elasticity, β .

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The equation can be written as:

$$lnGDP \ per \ capita_{s,t+10} - lnGDP \ per \ capita_{st} = \\ = \varphi_t + \beta \left[ln \left(\frac{Population \ 60 \ +_{s,t+10}}{Total \ population_{s,t+10}} \right) - ln \left(\frac{Population \ 60 \ +_{st}}{Total \ population_{st}} \right) \right] + X'_{st} \delta_t + (\varepsilon_{s,t+10} \ -\varepsilon_{st})$$

An indicator obtained from GDP per capita is productivity, expressed as GDP per person employed. The labour input is essential in any economy, and this is the reason we modelled it.

The instrument used to model the economic growth is the predicted change between period t and t+10 in the log of the fraction of each country population aged 60 and over. All variables used in the models are based on the logarithmic difference for a 10-year period, for each country.

In order to measure the output, we considered the GDP per capita based on purchasing power parity, for each of the 10 countries. Based the definition offered by World Bank, our source of data for the output, GDP per capita on purchasing power parity is "gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current international dollars based on the 2011 ICP round."

We used panel data to estimate the coefficients of a simple OLS model, with country fixed effects; we also controlled the heterogeneity across the countries and applied Hausman test in order to choose the type of panel data model.

4. Empirical Results

4.1. Dataset description

The article includes an analysis of 10 Central and Eastern European countries, for the period between 1990 and 2019, to estimate the effects of population ageing on the country economic output per capita.

For a better understanding of the level of ageing of the populations from the countries analysed, we start our empirical analysis with a set of variables which are definitory for societies where fertility has a descendent trend and population have a longer life expectancy. One of the most common indicators to check the sizes of old population within working age group, the old age dependency rate, has changed significantly in the last years. The ratio between elderly population, aged 60 years old and over and the working age population, aged 20 to 59 years old, has an increasing slope in all CEE countries analysed (Figure 1).

Elderly population rate records, in 2019, a range between 40% (in Slovakia) and 53% (in Bulgaria), according to Eurostat data and our own calculations. In the other countries, at every 100 persons within their working age are between 45 to 51 old persons.

In most of the CEE countries, the elderly dependency rate increased dramatically in the last 30 years. But out of the group of countries analysed we can remark Slovenia, where the proportion between older population and the active one – has almost doubled its size. Very high increasing rates, over 60% in 2019 compared with 1990 can be also noticed in countries like Lithuania (67.2%), Poland (61.9%), Romania (61.3%) and Latvia (60.6%). The other CEE countries also record high increase in the elderly dependency rate, but out of the group analysed, only Hungary has shown a slower growth in elderly dependency, in 2019 compared with 1990, under 40% (is 37.8%). Hungary and Poland are the countries with an almost constant trend of old-age dependency rates, which didn't change much until 2002 and 2004.

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Figure 1. The evolution of old-age dependency ratio for CEE countries, on the period 1990 - 2019

Source: Eurostat, 2021

These data shows that population is becoming older in all countries, being the effect of declining fertility and increasing longevity.

Ageing population from these countries means that a relatively small cohort of working age people will support growing numbers of retirees, with potential consequences on slowing the economic growth. These demographic trends have a number of implications for government and private spending on pensions, health care, and education and, more generally, for economic growth and welfare (OECD).

The other indicator which measures the population ageing from an economic perspective is the economic old-age dependency ratio.

Based on own calculations using data from Eurostat and World Bank and displayed on Figure 2, the economic old-age dependency ratio records higher rates compare with the normal old dependency ratio. So, population ageing leads to an overall increase from minimum 30 effective old consumers (aged 60 and over) per 100 effective workers (all ages) in 1990 to almost 60 by 2019. These rates are explained, mostly, by the increasing share of older persons in the population. The highest economic old age dependency rate is registered by Bulgaria (58%), while the lowest rate is registered by Slovakia (45%). The percentual change of the economic old age dependencies in 2019 compared with 1990 show that six countries from our group have an increase of less than 50% (Hungary with only 25%), while the highest change is registered by Romania (the value of economic old age dependency in 2019 was 85.2% higher than in 1990).

These values show an increased demand for financing the health care services and pensions, putting a higher pressure on all workers, if other measures won't be applied (older persons to work longer and to consume relatively less than other age groups).



Figure 2. The evolution of economic old-age dependency ratio for CEE countries, on the period 1990 - 2019

Source: Eurostat, WorldBank 2021

For all input and output data included in the analysis, we construct 10-year growth rates for each country: the growth of a variable as year t refers to the percent change between t-10 and t. The descriptive statistics for the indicators used in the paper are presented in Table 1.

Cable 1 . Descriptive statistic	s of the indicators	used in this study
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Descriptive statistics of the indicators used, for period 1990-2019				
	Mean	Standard Deviation	Min	Max
Proportion of population 60+ from total population	20.7	3.3	14.7	28.2
Percent change in fraction of population 60+	2.8	1.1	0.4	5.8
Percent change in GDP per capita	72.6	39.0	-22.9	199.9
Percent change in GDP per person employed	33.2	21.7	-7.7	114.8
Percent change in employment to population ratio	-1.9	6.9	-21.6	11.1

Source: Eurostat, World Bank; our own calculations

Proportion of population 60+ from total population of CEE countries analysed has ranges between 14.7% to 28.2%, with an average of 20.7% and a standard deviation of 3.3%.

The economic growth, defined through GDP per capita also varies substantially across countries and years. Overall, the 10-year growth rate has ranges from -22.9% to 200%, with an average of 72.6% and standard deviation of 39.0%.

Productivity growth, measured as the 10-year growth rate in GDP per person employed, ranges from -7.7% to 114.8%, with an average of 33.2% and standard deviation 21.7%. Finally, labour force growth, the other

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component of growth in GDP per capita, ranges from -21.6% to 11.1%, with an average of -1.9% and standard deviation 6.9%.

4.2. Panel data results

For panel data estimations, in order to control for heterogeneity across the countries from our sample we estimated a simple pooled OLS model with country fixed effects. We also applied Hausman test in order to choose the type of panel data model. We tested the stationarity in panel data using several unit root tests (Levin et al, 2002; Im et al, 2003).

Table 2 contains the coefficients summarising this relationship, based on a Panel Least Squares Model, where the dependent variable is the change in the logarithm of GDP per capita, while the independent variable is the change in the logarithm of the proportion of population aged 60 and over within total population. The point estimates indicate that states experiencing growth in the fraction of individuals ages 60+ also experience slower growth in per capita GDP.

The estimated equation shows that a 10% increase in the fraction of population ages 60 and over decreases the growth rate of GDP per capita by 7.2%. There is an indirect relationship between the two variable and an increase in the elderly population rate would diminish the growth of GDP per capita.

The second estimation is between GDP per person employed, also called labour productivity and the same independent variable, given by the proportion of people aged 60 and over within the total population. Based on this model, we can observe that population ageing has even a larger effect on productivity growth: a 10% increase in the fraction of the population 60+ leads to a 10.1% decrease in the rate of growth in GDP per person employed. This value shows that ageing has a strong negative impact on productivity growth, a country with an older population having, by default, less workers.

Dependent variables			
Independent variable		$\Delta Log(GDP per capita)$	$\Delta Log(GDP \text{ per person employed})$
$\Delta Log(proportion of$	Coefficient	-0.719032*	-1.012291***
total population)	t-statistic	-2.410850	-5.326632
	Prob	0.0168	0.0000

Table 2. Results of Panel Least Squares of the equations estimated

***p<0.01; **p<0.05; *p<0.1.

Source: Eurostat, WorldBank; our own calculations

5. Conclusions

The aim of this paper is to check the relationship between population ageing and the economic growth in 10 Central and Eastern European countries.

Population from these countries become older and older every year, based on the figures we got for the old-age dependency ratio and the economic old-age dependency ratio. The values of these indicators increased between 38% and 80% from 1990 to 2019 in the group of countries analysed, demonstrating the high economical pressure elderly have on working population. The old-age dependency ratio shows that for a cohort of 100 working age people exists more than 40 people aged 60 and over in 2019. These values can go up to 53% in countries like Bulgaria, in 2019. The ageing population seem to be more pronounced if we look at the proportion of older people within workers, which has values between 45% and 58%. In terms of percentual change registered in 2019 compared with 1990, in most of the countries the economic old age dependency rate has increased by maximum 50%, but for the other countries the modification should raise authorities' concerns (85% in Romania).

Using a panel data model, we assess the magnitude of population ageing on economic growth. Our estimate of the elasticity of growth with respect to ageing is that a 10% increase in the fraction of the population ages 60+ decreases growth in GDP per capita by 7.2%. In the case of increasing the population of 60 years old and over by

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10%, the coefficient estimate shows that the productivity growth (expressed by GDP per person employed) would decrease by 10.1%.

The results of our paper show that the speed of ageing is likely to slower the growth in the economic output, being expressed either as GDP per capita or productivity. By ageing, a population would increase their demands for social care, health care and pensions, putting a higher pressure on the working age group. Governmental measures need to be revised and reforms to be implemented, so that elderly can have a secured income which will contribute to their well-being and also to support them, if want to remain active on the market. So, the main role of policy would therefore be to help people, from early ages, and to educate them in the spirit of a life cycle financial planning.

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The relationship between banking sector financial indicators and BIST BANK Index: ARDL bounds testing approach

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Abstract

The aim of this study is to determine the effect of banking sector financial variables on BIST BANK index. In the study, the effect of 8 financial variables belonging to the banking sector on the BIST BANK index is examined with the ARDL bounds test using monthly data for the period January 2010-August 2021. The results indicate that there is a cointegration relationship between the 8 financial indicators used in the study and BIST BANK index. In addition, it is determined that the increase in the Equity / Total Assets, Loans / Total Assets, Return on Equity, TL Loans / Total Loans, Net Foreign Currency Position / Equity and Capital Adequacy Standard Ratio increases BIST BANK index in the long run.

Keywords: BIST BANK Index, Financial Variables, ARDL Bounds Test

Jel Codes: G11, G21

1. Introduction

The banking sector has the largest share in Turkish financial markets like most of the economies. According to September 2020 data, when the asset sizes of financial institutions in Turkey are evaluated, banks are in the lead with a share of 84% (TBB, 2021). The banking sector has a size of about 5 times the total assets of all other financial institutions.

In addition to having an important place in the financial markets, the banking sector also constitutes an important investment area for investors. Banks offer opportunities to bond investors with the bonds they issue, moreover banks whose stocks are traded in Borsa Istanbul constitute an important alternative for stock investors. As of September 2020, 21.7% of the total capital of the Turkish banking sector is traded publicly (TBB, 2021). Stocks of 10 banks traded on Borsa Istanbul compose BIST BANK index. As of 31.12.2020, the market value of the BIST BANK index is approximately 472 billion TL (64 billion USD). In 2020, the total transaction volume of which 27% was carried out by foreign investors and 73% by domestic investors is approximately 146 billion USD. As of December 2020, 3,560 foreign and 469,063 domestic investors trades in the stocks included to BIST BANK index. (TÜYİD & MKK, 2021). In addition, futures contracts and options which are the underlying stocks of 6 banks in BIST BANK index are also traded on the Borsa Istanbul Futures and Options Market.

The banking sector, which has a significant size in the Borsa Istanbul market, is an important investment alternative for investors. For investors, it is important for investment decisions to predict the return they will get from their investments. In order to predict the return, it is necessary to know the factors that affect the value of the invested asset. In this study, the effect of the financial variables of the Turkish banking sector on the BIST BANK index is investigated.

2. Literature Review

Although there are studies investigating the macroeconomic factors that have an effect on the bank value for the Turkish market (Özkul and Akgüneş, 2015; Kendirli and Çankaya, 2016; Topaloğlu and Karakozak, 2018; Sarıgül and Şengelen, 2020), there are also studies investigating the effects of the financial indicators of the banks on the bank stock values and these studies are summarized in Table 1.

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Table 1. Literature Review

			Variables		
Author(s)	Data Set	Methodology	Dependent Variables	Independent Variables	Findings
Beştaş & Tekin (2013)	Data of 11 deposit banks traded on the Istanbul Stock Exchange (ISE) for 2011	Canonical Correlation Analysis	Canonical variable derived from Price/Earning s and Market Value/Book Value ratios	Canonical variable obtained from Equity / Total Assets, Total Loans and Receivables / Total Assets, Return on Assets, Return on Equity, Total Revenues / Total Expenses, Liquid Assets / Current Liabilities	It was determined that the most important variable forming the canonical variable, which is expressed as the linear component of financial ratios, is the return on assets, the important variable forming the other canonical variable is the market value/book value variable, and there is a strong and two-sided relationship between the two canonical variables.
Koçyiğit (2013)	Data of 12 deposit banks traded on the ISE between 2006 and 2010	Panel Regression Analysis	Annual Cumulative Stock Return	Efficiency Values Established by Data Envelopment Analysis, Annual Total Asset Change and Equity/Total Assets Ratio	It was determined that the annual total asset change and the Equity/Total Asset ratio affect the annual cumulative stock returns positively.
İpekten, Aghapour & Shahinpour (2014)	Semiannual data of 21 banks and insurance companies traded on Borsa Istanbul between 2008 and 2012	Panel Regression Analysis	Logarithm of Stock Prices	Asset Turnover Rate, Return on Assets, Capital Ratio, Return on Equity, Ratio of Resource Created as a Result of Operations to Total Assets, Logarithm of the Previous Value of the Stock, Logarithm of Total Assets, Operating Period of the Company	It was determined that the capital ratio, the logarithm of the stock's value in the previous period, the logarithm of the total assets and the operating period of the company affect the stock prices positively, and the ratio of the resource created as a result of the activity to the total assets affect the stock prices negatively.
Kurt & Köse (2017)	Quarterly data of 9 banks traded on Borsa Istanbul for the period 2002Q4- 2016Q2	Panel Granger Causality Test	Stock Returns	32 financial ratios used to express banks' capital adequacy, balance sheet structure, asset quality, liquidity, profitability and income-expense structure	It was concluded that (equity- fixed assets)/total assets and TL loans and receivables/total loans and receivables ratios are the Granger reasons for the stock returns.
Acar & Ulusan (2018)	Data of 9 banks traded on Borsa Istanbul	Multiple Regression Analysis	Beta of Stocks	66 financial ratios	TL Deposits Per Branch, Net Balance Sheet Position / Equity and Interest Income / Total Assets have a positive effect on firm betas and Foreign Currency

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			Variables			
Author(s)	Data Set	Methodology	Dependent Variables	Independent Variables	Findings	
	between 2007 and 2016				Liquid Assets / Foreign Currency Liabilities, Fixed Assets / Total Assets, Personnel Expenses / Other Operating Expenses have a negative effect on firm betas.	
Korkmaz & Dilmaç (2018)	Quarterly data of 12 banks and 5 insurance companies traded on Borsa Istanbul for the 2008-2015 period	Panel Regression Analysis	Market Value/Book Value and Tobin's Q Ratio	Asset Growth Rate, Asset Size, Return on Equity, Leverage Ratio, Intangible Assets and Liquidity Ratio	It was determined that the return on assets and intangible assets have a positive effect on the market value/book value for banks. Asset size and leverage ratio affect the market value/book value negatively. Asset growth rate and liquidity ratio affect Tobin's Q ratio negatively.	
Duranay & Gocmen- Yagcilar (2019)	Data of 10 deposit banks traded on Borsa Istanbul for the period 2007- 2016	Panel Regression Analysis	Annual Shareholder Return	Total factor productivity change, technical efficiency change and technological change obtained by Malmquist analysis, market (BIST- 100) return, Book Value/Market Value and Return on Assets	It was determined that the market (BIST-100) return has a positive effect on the shareholder's return, while Book Value/Market Value and Return on Assets have a negative effect on the shareholder's return.	
Çalış & Sakarya (2020)	Data of 12 banks traded on Borsa Istanbul between 2015 and 2017	Correlation Test	Average Annual Stock Return	Financial success values obtained through PROMETHEE technique from 15 ratios expressing capital adequacy, asset quality, liquidity, profitability and income- expenditure structure	It was determined that there is a positive relationship between the annual average stock return and financial success in 2016, but there is no significant relationship for the other years.	

When the studies in the literature are examined, it is seen that the factors affecting the bank stock values are examined by using the data of individual banks. In this study, the effect of the financial indicators of the sector as a whole on the BIST BANK index is investigated by using the variables utilized in the literature, thus to contribute to the literature by differentiating from the previous studies is aimed. In addition, since the studies in the literature were carried out by using data from individual banks, quarterly, semi-annual or annual data in which bank financial data were disclosed were used. In this study, monthly data of the banking sector obtained from the Banking Regulation and Supervision Agency (BRSA) database are used.

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3. Data & Methodology

In this study, the effect of financial indicators of the banking sector on the BIST BANK index is investigated. For this purpose, the natural logarithm of the BIST BANK index and the financial variables of the banking sector which were selected in similar studies in the literature are used and these variables are shown in Table 2. The data for the period of January 2010-August 2021 is utilized in the study.

Symbol	Variable
XBANK	Natural Logarithm of BIST BANK Index
EQ/TA	Equity / Total Assets
CRDT/TA	Loans / Total Assets
ASSETPROFIT	Return on Assets (%)
EQUITYPROFIT	Return on Equity (%)
ASSET	Natural Logarithm of Assets Size
TLCRDT/TCRDT	TL Loans / Total Loans
NFCP/EQ	Net Foreign Currency Position / Equity
CPTLAD	Capital Adequacy Standard Ratio

Table 2. Variables Used in the Study

In the study, the effect of the financial variables of the banking sector on the BIST BANK index is examined with the ARDL bounds test developed by Pesaran, Shin and Smith (2001). With Equation 1, cointegration is tested for the unlimited ECM and in case of cointegration, the effect of independent variables on BIST BANK index is investigated with Equation 2 and Equation 3.

 $\begin{aligned} \Delta XBANK_t &= y_0 + \sum_{i=1}^{a} y_{1i} \Delta XBANK_{t-i} + \sum_{i=0}^{b} y_{2i} \Delta EQ/TA_{t-i} + \sum_{i=0}^{c} y_{3i} \Delta CRDT/TA_{t-i} + \\ \sum_{i=0}^{d} y_{4i} \Delta ASSETPROFIT_{t-i} + \sum_{i=1}^{e} y_{5i} \Delta EQUITYPROFIT_{t-i} + \sum_{i=0}^{f} y_{6i} \Delta ASSET_{t-i} + \sum_{i=0}^{g} y_{7i} \Delta TLCRDT / \\ TCRDT_{t-i} + \sum_{i=0}^{h} y_{8i} \Delta NFCP/EQ_{t-i} + \sum_{i=0}^{j} y_{9i} \Delta CPTLAD_{t-i} + \alpha_1 XBANK_{t-1} + \alpha_2 EQ/TA_{t-1} + \alpha_3 CRDT / \\ TA_{t-1} + \alpha_4 ASSETPROFIT_{t-1} + \alpha_5 EQUITYPROFIT_{t-1} + \alpha_6 ASSET_{t-1} + \alpha_7 TLCRDT / TCRDT_{t-1} + \\ \alpha_8 ANFCP/EQ_{t-1} + \alpha_9 CPTLAD_{t-1} + \epsilon_t \end{aligned}$

 $\begin{aligned} XBANK_{t} &= y_{0} + \sum_{i=1}^{a} y_{1i} XBANK_{t-i} + \sum_{i=0}^{b} y_{2i} EQ/TA_{t-i} + \sum_{i=0}^{c} y_{3i} CRDT/TA_{t-i} + \\ \sum_{i=0}^{d} y_{4i} ASSETPROFIT_{t-i} + \sum_{i=1}^{e} y_{5i} EQUITYPROFIT_{t-i} + \sum_{i=0}^{f} y_{6i} ASSET_{t-i} + \sum_{i=0}^{g} y_{7i} TLCRDT/TCRDT/TCRDT_{t-i} + \\ TCRDT_{t-i} + \sum_{i=0}^{h} y_{8i} NFCP/EQ_{t-i} + \sum_{i=0}^{j} y_{9i} CPTLAD_{t-i} + \epsilon_{t} \end{aligned}$ (2)

 $\Delta XBANK_{t} = y_{0} + \sum_{i=1}^{a} y_{1i} \Delta XBANK_{t-i} + \sum_{i=0}^{b} y_{2i} \Delta EQ/TA_{t-i} + \sum_{i=0}^{c} y_{3i} \Delta CRDT/TA_{t-i} + \sum_{i=0}^{d} y_{4i} \Delta ASSETPROFIT_{t-i} + \sum_{i=0}^{e} y_{5i} \Delta EQUITYPROFIT_{t-i} + \sum_{i=0}^{f} y_{6i} \Delta ASSET_{t-i} + \sum_{i=0}^{g} y_{7i} \Delta TLCRDT/TCRDT/TCRDT_{t-i} + \sum_{i=0}^{h} y_{8i} \Delta NFCP/EQ_{t-i} + \sum_{i=0}^{j} y_{9i} \Delta CPTLAD_{t-i} + \psi ECT_{t-1} + \epsilon_{t}$ (3)

4. Findings

In this study, ARDL bounds test is used to determine the financial indicators of the banking sector that have an impact on the BIST BANK index. Since the critical values in the ARDL bounds test are tabulated according to whether the variables are I(0) or I(1), the variables should be tested against the possibility of being I(2) (Gülmez, 2015). The stationarity of the series is tested with Augmented Dickey-Fuller Unit Root Test and Phillips-Perron (PP) Unit Root Test and the results are shown in Table 3.

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	Augment	ed Dickey	-Fuller Uni	it Root Test	t Phillips-P	erron (PP)	Unit Root	Test
	I (0)		I (1)		I (0)		I (1)	
Variables	Constant	Constant- Trend	Constant	Constant- Trend	Constant	Constant- Trend	Constant	Constant- Trend
EQ/TA	-1.8890	-4.1159	-10.5154	-10.4776	-1.7981	-3.7675	-11.3166	-11.2609
	(0.3367)	$(0.0076)^{a}$	$(0.0000)^{a}$	$(0.0000)^{a}$	(0.3802)	(0.0212) ^b	$(0.0000)^{a}$	$(0.0000)^{a}$
CRDT/TA	-3.3682	-1.2629	-11.2710	-12.6247	-3.4151	-1.1666	-11.2709	-13.3728
	(0.0138) ^b	(0.8926)	$(0.0000)^{a}$	$(0.0000)^{a}$	(0.0120) ^b	(0.9127)	$(0.0000)^{a}$	$(0.0000)^{a}$
ASSETPROFIT	-2.6630	-3.4352	-2.5382	-2.5519	-5.5781	-5.2981	-16.0198	-15.9067
	(0.0834) ^c	(0.0513) ^c	(0.1089)	(0.3031)	$(0.0000)^{a}$	(0.0001) ^a	$(0.0000)^{a}$	$(0.0000)^{a}$
EQUITYPROFIT	-2.8849	-3.0999	-2.7182	-2.7500	-5.4247	-5.2543	-16.1643	-16.0636
	(0.0499) ^b	(0.1108)	(0.0737) ^c	(0.2188)	(0.0000) ^a	(0.0001) ^a	$(0.0000)^{a}$	$(0.0000)^{a}$
ASSET	-0.0393	-3.3891	-10.8211	-10.7868	0.0360	-3.2663	-10.9637	-10.9316
	(0.9525)	(0.0570) ^c	$(0.0000)^{a}$	$(0.0000)^{a}$	(0.9595)	(0.0763) ^c	$(0.0000)^{a}$	$(0.0000)^{a}$
TLCRDT/TCRDT	-1.3364	-2.2707	-10.9667	-10.9293	-1.2965	-2.4107	-10.9716	-10.9288
	(0.6114)	(0.4467)	$(0.0000)^{a}$	$(0.0000)^{a}$	(0.6302)	(0.3724)	$(0.0000)^{a}$	$(0.0000)^{a}$
NFCP/EQ	-3.1092	-3.4091	-14.3202	-14.3050	-3.1434	-3.4699	-14.3332	-14.3687
	(0.0281) ^b	(0.0543) ^c	$(0.0000)^{a}$	(0.0000) ^a	(0.0257) ^b	(0.0467) ^b	$(0.0000)^{a}$	$(0.0000)^{a}$
CPTLAD	-2.6401	-2.8253	-6.6913	-6.8183	-2.6396	-2.7014	-8.9744	-8.9456
	(0.0875) ^c	(0.1909)	$(0.0000)^{a}$	$(0.0000)^{a}$	(0.0875) ^c	(0.2378)	$(0.0000)^{a}$	$(0.0000)^{a}$
VDANK	-4.0612	-4.0474	-7.5831	-7.5647	-4.0738	-4.0523	-14.7741	-14.8902
ADAINK	(0.0016) ^a	(0.0094) ^a	(0.0000) ^a	(0.0000) ^a	(0.0015) ^a	(0.0092) ^a	(0.0000) ^a	$(0.0000)^{a}$
a h 1 a 1	F o(1.40		1					

Table 3. Unit Root Test Results

^a, ^b and ^c denote 1%, 5% and 10% statistical significance levels respectively. The values in parentheses are the probabilities of t statistic.

According to the results of both unit root tests in Table 3, it is determined that the variables are stationary at the level or at the first difference. For this reason, the variables can be used in ARDL bounds test.

The appropriate lag length is determined in the first stage of ARDL bounds testing (\$im\$ek, 2016). In the study, the lag length is determined according to the Akaike information criterion. According to the Akaike Information Criteria, the appropriate model is determined as ARDL (4, 4, 3, 1, 1, 4, 1, 0, 0) (Figure 1).

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Figure 1. Selection of Appropriate Lag Length for ARDL Bounds Test

Bounds test results for the determined ARDL model (4, 4, 3, 1, 1, 4, 1, 0, 0) are given in Table 4. Since the F-statistic is determined to be greater than the upper limit critical value at the 1% significance level, the null hypothesis (H₀) stating that there is no cointegration between the variables is rejected and the alternative hypothesis (H₁) stating that there is cointegration between the variables is accepted at the 1% significance level.

Model	F-	Probability	Critical values for the F-statistic ^a		
Woder	statistics	Trobability	I(0)	I(1)	
(4, 4, 3, 1, 1, 4,		10%	1.85	2.85	
1, 0, 0)	3.8942	5%	2.11	3.15	
		1%	2.62	3.77	

Table 4. ARDL Bounds Test Results

^a These are the critical values determined by Pesaran, Shin and Smith (2001) for T = 1000 and k = 8.

Akaike information criteria (AIC) is used in the selection of the optimal lag length and the maximum lag length is determined as 4 for each variable.

After determining that there is cointegration between the variables, long-term coefficient estimates for the variables are executed and the results are shown in Table 5. According to the results, it is determined that the CRDT/TA variable at the 1% significance level, the EQ/TA, TLCRDT/TCRDT and CPTLAD variables at the 5% significance level, and the EQUITYPROFIT and NFCP/EQ variables at the 10% significance level affects BIST BANK index positively in the long term. It is determined that the increase in the Equity / Total Assets, Loans / Total Assets, Return on Equity, TL Loans / Total Loans, Net Foreign Currency Position / Equity and Capital Adequacy Standard Ratio increases the BIST BANK index in the long run. On the other hand, the increase in the ASSETPROFIT variable decreases the BIST BANK index. The effect of the change in the ASSET variable on the BIST BANK index could not be explained statistically. In addition, the Jarque-Bera test result shows that the error terms in the model are normally distributed. As a result of the Breusch Pagan Godfrey Test, there is no autocorrelation

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problem in the model. The Ramsey RESET Test result also shows that the model is well defined. In addition, parameter stability for the predicted model is examined with CUSUM and CUSUMSQ tests and the test results are shown in Figure 2. When Figure 2 is examined, the fact that the plots showing CUSUM and CUSUMSQ are within the limits (95% confidence interval) confirms the stability of the estimations.

Table 5. Long-Run Coefficients Estimation Results

Dependent Variable: XB	ANK		
Independent Variable	Coefficient	t-statistics	Probability
EQ/TA	16.4265	2.5033	0.0138
CRDT/TA	4.3941	3.5143	0.0006
ASSETPROFIT	-1.0292	-1.8071	0.0735
EQUITYPROFIT	0.1107	1.7800	0.0778
ASSET	0.0034	0.0204	0.9837
TLCRDT/TCRDT	1.6935	2.0612	0.0417
NFCP/EQ	1.9555	1.8464	0.0675
CPTLAD	0.0822	2.3434	0.0209
С	0.1184	0.0478	0.9619
Diagnostic Tests			

Diagnostic Tests		
	Statistics	Probability
Jarque-Bera	0.1046	0.9490
Breusch-Godfrey Serial	0.4756	0.6228
Breusch Pagan Godfrey	1.1796	0.2725
Ramsev RESET Test	0.4364	0.5102





The short-term coefficient estimates of the variables based on the error correction model are presented in Table 6. The one period lagged value of the error term (ECM(-1)) has a value between -1 and 0 and is statistically significant. This indicates that the effects of a shock in the short term will disappear and the long-term equilibrium will be approached. The fact that the ECM(-1) coefficient is -0.33 indicates that after a shock, about 33% of the deviation in the long-term balance will be resolved within a month and return to long term equilibrium in about 3 months.

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Dependent Variable: XBANK			
Independent Variable	Coefficient	t-statistics	Probability
D(XBANK(-1))	-0.074892	-0.896647	0.3719
D(XBANK(-2))	0.253557	2.908551	0.0044
D(XBANK(-3))	0.209656	2.409105	0.0177
D(EQ/TA)	25.73188	6.107191	0.0000
D(EQ/TA(-1))	-1.910959	-0.399186	0.6905
D(EQ/TA(-2))	-13.26598	-2.744234	0.0071
D(EQ/TA(-3))	-15.49147	-3.358338	0.0011
D(CRDT/TA)	-0.855308	-0.598767	0.5506
D(CRDT/TA(-1))	-0.661217	-0.431645	0.6669
D(CRDT/TA(-2))	-3.215348	-2.199873	0.0299
D(ASSETPROFIT)	0.036542	0.244347	0.8074
D(EQUITYPROFIT)	-0.006365	-0.393181	0.6950
D(ASSET)	2.392257	4.100737	0.0001
D(ASSET(-1))	0.503299	0.811564	0.4188
D(ASSET(-2))	-1.462835	-2.416256	0.0173
D(ASSET(-3))	-1.215053	-2.356205	0.0202
D(TLCRDT/TCRDT)	2.532348	2.553253	0.0121
ECM(-1)	-0.339522	-6.492867	0.0000

Table 6. ARDL Error Correction Model Results

5. Conclusion

Turkish banking sector is an important investment alternative for investors. As for all other investments, it is of great importance for investors who will invest in the Turkish banking sector, as well as for managers who focus on maximizing shareholder value, to determine the factors affecting the value of bank shares. In this study, it is focused on the purpose of determining the financial variables of the banking sector that affect the BIST BANK index. For the period January 2010-August 2021, the ARDL bounds test is used with monthly data of BIST BANK index and 8 financial indicators.

The findings reveals that there is a cointegration relationship between the used banking sector financial indicators and the BIST BANK index. Also, it is determined that the increase in the Equity / Total Assets, Loans / Total Assets, Return on Equity, TL Loans / Total Loans, Net Foreign Currency Position / Equity and Capital Adequacy Standard Ratio increases BIST BANK index in the long run. The increase in the Equity / Total Assets, Net Foreign Currency Position / Equity and Capital Adequacy Standard Ratio raises the BIST BANK index and these findings indicates that the decrease in the risk in the banking sector has a positive effect on the value of the stocks. The fact that the increase in the Loans / Total Assets increases the BIST BANK index also shows the positive effect of efficiency of banks on stock values. The positive effect of the increase in the TL Loans / Total Loans on BIST BANK index can be interpreted as the fact that the banks made TL loans evaluated more positively by the investors. Again, it is determined that the increase in the Return on Equity increased the BIST BANK index as expected.

The findings obtained in the study will be a guide for investors who will invest in the BIST BANK index. In periods when Capital Adequacy Ratio, Net Foreign Currency Position/Equity and Equity/Total Assets increases, in other words, the bank risks in these aspects are lower, the return on their investments in the BIST BANK index will be higher. In addition, BIST BANK index to be included in the portfolio in periods when the return on equity increases will make a positive contribution to the portfolio return. Since the increase in loans extended by banks, especially TL loans, also positively affects BIST BANK index, it is expected that investments to be made in the BIST BANK index will provide higher returns in periods when the loan volume increases. In addition, this study, which shows the effect of sector variables on the value of banks, includes results that bank managers can use to achieve their financial goals.

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Fintech and digital transactions in Romania

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Abstract

This study examines the impact of Fintech and Digital Transactions in Romania. In the analysis, the rise of the Financial Technology and the growth of the digital transition. The study compares the growth of digital transactions in the European Union with Romania. First of all, the access to high speed internet and the increase of the digitization rate have led to the increase of the digital transaction rate in Romania in the last years. Second, companies in the financial technology sector have begun to develop new financial products in recent years designed to facilitate digital transactions. The scope of the study, the factors that help the development of digital transactions in Romania and the increased potential for companies in the area of financial technology to invest in the development of new financial products.

Keywords: financial technology, digital transactions, payments

Jel Codes: F40, F30, E42

1. Introduction

The technological evolution in recent years has had a direct impact on economic development, bringing a number of advantages for both the average consumer and companies. The financial area and the way the transactions are made have gone through the vast process of technologicalization, becoming much faster, more secure, and you're simple.

Financial technology or Fintech, are companies that use modern software solutions and technologies to provide financial solutions to the average consumer. Companies in the Fintech area have had a fairly large advance, both in the European Union and in Romania. First of all, due to the speed of innovation and adaptation for new markets, being adapted to the new needs of customers. Fintechs enjoy the flexibility and fast mode of change that is an advantage over domestic competitors, the classic banks.

Financial technology has begun to take a breakthrough in recent years in Romania due to the wide range of internet coverage in the country. The way of absorbing the new technology was quickly adopted by the average consumer. First of all due to its fast evolution, integration and comfortable way of being operated on any device.Romania enjoys an advantage when it comes to digital financial transactions because of its digitization effort.

2. Literature review

Fintech startups and ecosystem trends in Romania 2021, article by ROTSA (Romanian Tech Startups Association), provide the overview of the Fintech industry in Romania during the Pandemic and the large number of fintech employees. This article shows the evolution of the Romanian ecosystem and its evolution during the COVID 19 pandemic in Romania

CEE Fintech Atlas 2019 year book, provide the the overview of the fintech ecosystems in Central and Eastern Europe. Being the first atlas that classifies the fintech ecosystem in the CEE area, the evolution and development of those companies. It collects both the interview and the vision of the founders but also the financial evolution of the companies.

Fintech in a Flash: Financial Technology Made Easy, 2017 The author updates the evolution of fintech and the way in which the new technology revolutionizes the way of money transfer, payments or wealth management. The way commercial banks are gradually turning into technology companies. The author also talks about how Blockchain will have a big impact in the financial services industry. The way in which the use of blockchain will replace the third party during payment transactions becoming much more secure and cheaper compared to traditional banks.

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Business Review 2019, Article, based on a report published by Deloitte in 2017, the authors reveal how companies in the fintech industry are developing in Europe, coming to the aid of entrepreneurs in Romania and Poland coming with a series of guidelines on the technological revolution in the financial area.

Romanian Consumer Behaviour and Payment Choice in Online Shopping. A Marketing Perspective, 2020 Paper One of the most recent papers on how to choose payment in online shipping in Romania in 2020. The authors analyze the Consumer's decision-making, regardless of the goods purchased by them, in the first place is cash upon delivery followed by digital payments.

3. Methodology

In this paper a qualitative research is carried out. First of all, scientific results are analyzed, especially scientific articles published in various publishing houses or atlases (including CEE ATLAS 2019). Secondly, we analyzed different economic reports made by different specialized institutions (Deloitte, ROTSA, etc.). It was analyzed how to adopt and penetrate mobile internet using statistical data collected from specialized reports or sites specialized in data analysis.

According to Statista, the smartphone user penetration rate in Romania rise from 31,52 percent in 2015 to 67,27 percent in 2021, but the forecast shows that the number of smartphones will increase to 76,37% in 2025.



Figure 1: Smartphones user penetration rate in Romania

Source: Statista

The number of companies offering mobile internet services began to grow in Romania and the market calibrated the price of services offering accessibility to consumers.

Starting from 2010 the mobile internet penetration in Romania rise, from 3% of population in 2010 to 71% in 2020 and in 2025 almost 84% of population will have access to the mobile internet.

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Figure 2. Mobile internet penetration in Romania

Source: Statista

The number of mobile internet users in 2016 it was only 8,17 mil. users increase to 14,36 mil. users in 2021 and in 2026 almost 16,19 mil. users will be in Romania.

The number of mobile phone owners in Romania has started to increase significantly, along with internet connectivity. The mobile Internet has a great connection on the territory of the country, whether we are talking about mobile data or we are talking about wi-fi coverage each smartphone is connected to an internet source.



Figure 3. Internet users in Romania

Source: Statista

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Smartphone users in Romania have begun to see the benefits it offers not only in terms of communication but also in terms of how to facilitate access to products and services they need. In this context, the way of shopping is segmented and developed. The shift from shopping in physical stores to online stores has led to a huge increase in ecommerce.

The turnover registered by the business to customers companies is on an increasing trend in the ecommerce sector. Increase from 1,04 billion euro in 2013 to over 4,68 billion euros in 2019 shows the way in which the new generation prefers to do their shopping, the fast way of adopting e-commerce in Romania is in an ascending trend.



Figure 4. B2C e-commerce turnover in Romania

Source: Statista

The volume of digital transactions has started to increase in Romania, visibly. If in 2017 the value of online payments was about USD 3,195 million, in 2021 this amount almost doubled, reaching USD 6,250 million, and the trend shows that in 2025 in Romania over USD 10,606 million will be registered.







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Figure 6. Digital payment in Romania compared to EU 27

Source: Statista

If we compare all the digital payments that are made in Romania with those in the EU 27, we can see a linear increase from 2017 to 2025. First of all, the volume of transactions directly related to the total value in million USD. From 2017 to 2021, the value of registration transactions in Romania and in the EU-27 almost doubled. In Romania, it increased from USD 3,195 million to 6,250, respectively in the EU-27 from 434,449 to 784,761.

According to the Ministry for Romanians Everywhere, in 2019 over 9.7 million Romanians live abroad. The vast majority of them are abroad to support the families who remained in Romania. Among Romanians, the most popular ways to transfer money were either by bank transfer or by Western Union.

In recent years, Romanians in the diaspora have begun to send money by digital transfer, known as Digital Remittances. Digital Remittances area unit cross-border cash transfers revamped the web by the migrant population. From 2017 to 2021 the total value of Digital Remittances increased from 113 million euros to 354 million euros, the total value tripling. Digital Remittances follows an upward trend, so that by 2025 the total value will reach 701 million euros.

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Digital Remittances - Transaction Value



Source: Statista

According to European Banking Authority in 2017 they divided fintech into 4 categories:

- Payment service: mobile wallets, peer-to-peer transfers (P2P), digital currency exchange
- Personal finance management service: risk aanalysis, crowdfunding
- Investment service/ investment management: trading services, copy-trading, e-trading.

4. Fintech market in Romania

A study published in November 2018 by Digital Evolution: Connected Consumer Monitor, shows that 16% of internet users in Romania use financial products offered by financial technology companies.

They are motivated primarily by the flexibility of fintechs to make financial decisions and get rid of banking bureaucracy. At the end of 2018, Raiffeisen Bank International in Romania publishes an annual report on the Romanian fintech market and what financial services they offer.

Thus, out of a total of 49 financial technology companies, 18, representing 37%, offer retail banking services, 9, 18% presenter offer technology services, and only 8 companies, respectively 6%, offer SME services Banking or wealth management and the rest of the companies offered only payment service.

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Figure 8. Fintech market in Romania Source: Statista

5. Conclusions

The rapid adoption of digital payments in Romania and the development of the Fintech industry in Romania, is due to the rapid use of mobile internet and the penetration of smartphones on the local market. The final consumer adapting to the new technological evolutions that have taken place in recent years.

First of all, the transition from classic to e-commerce led to the direct development of the payment method. In recent years, the volume of online transactions is on an upward trend both in Romania and in the EU 27.

In the second year, peer-to-peer transfers have begun to grow due to people's need to transfer money faster, more securely, and cheaper without hitting the banks' bureaucracy. Fintechs, adapting quickly to the needs of the final consumer, have led to a greater adoption of them.

Romanian entrepreneurs began to bend to the industrial revolution, developing new financial solutions contributing to the development of the fintech market.

Finally, we can say that the new technology has changed the financial industry and the way of payments, making it cheaper, more accessible and more secure, being adopted by the final consumer.

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The influence of perceptions of ease and utility of usefulness on behavioral intentions to use SIPEJAR on undergraduate program of economic education, Universitas Negeri Malang Year 2020

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Abstract

SIPEJAR (*Sistem Pengelolaan Pembelajaran*) is an official e-learning implemented by Malang State University in supporting the distance learning. For the new students, SIPEJAR is a new system. Because the freshman is in a transition period, perceived ease of use and usefulness, this study aims to measure and analyze students' behavioral intention to use SIPEJAR, influenced by perceived ease of use and perceived usefulness. The method used in this research is quantitative. The subjects of this study were undergraduate students of Economic Education Program, Universitas Negeri Malang Year 2020, who were taken using a proportional sampling of 104 students. The results of this study indicate that perceived ease of use and usefulness have a positive and significant effect on student behavioral intentions to use SIPEJAR either partially or simultaneously. Furthermore, based on the calculation of the effective contribution results, it was found that the perceived usefulness gave a more significant influence than the perceived convenience, which was 37.3% of the 54.6% of the total influence exerted by the two variables. The results of this study can be used as material for consideration for the Universitas Negeri Malang in developing SIPEJAR. They can encourage lecturers and students to use and utilize SIPEJAR in their studies.

Keywords: perceived ease of use, perceived usefulness, intention to use SIPEJAR

Jel Codes: A22, I21, O33

1. Introduction

E-learning implemented in an educational institution can be one of the attractions and the advantages for them to compete with other educational institutions in terms of information access ease, flexibility, efficiency, and space for students (Edmunds et al., 2012 Budhianto, 2020:14). The official *E-learning* which used by Universitas Negeri Malang since 2018 for distance learning is SIPEJAR (*Sistem Pengelolaan Pembelajaran*). Through SIPEJAR, students can access the course learned, have a discussion, and upload their tasks. The students can access all features on the http://sipejar.um.ac.id. Moodle-based LMS (Learning Management System) platform runs this system. LMS is a software that can be used as a medium for delivering learning materials and online and webbased multimedia resources, besides organizing and evaluating the learning process, accommodating interactions and collaborations between educators and students. Meanwhile, the advantage of Moodle as an LMS product is open source, so that it is free to use and can be adjusted as needed (Suartama & Tasra, 2014:13). In addition, the students and lecturers can use moodle development to support the application of e-learning in learning which can contain various features such as communication, assignments, collaboration, quizzes, and primary features that can be used to upload files for lecture needs (Rizal & Walidain, 2019:182).

For new students, the use of SIPEJAR is considered a new thing and a process to adapt to use it. New students are transitioning from high school environments that are not accustomed to using e-learning systems to college environments that generally have implemented e-system in the learning process. Thus, it is necessary to look at the tendency of students to use the SIPEJAR. Fred Davis, in 1989 used TAM (*Technology Acceptance Model*) model to explain the behavioral tendencies of users in using technology (Lai, 2017:26). TAM model places two main causes in explaining the tendency of users to use technology, namely perceived usefulness and perceived ease of use (Davis, 1989 in Murillo et al., 2020:14). Perceived convenience measures a person's belief that using a particular system does not require a lot of effort and special abilities.

In comparison, the perception of usefulness measures a person's confidence that the use of a system can improve performance (Davis, 1989 in Murillo et al., 2020:3). Perceptions of ease and utility have been proven to be the

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variables that most influence user behavioral intentions in e-learning (Liu & Wei, 2019:71). Furthermore, the TAM model has been widely used in research related to user tendencies towards the use of e-learning (Murillo et al., 2020:3). Then, the researchers are interested in finding out and explaining the relationship between the perceptions of ease and utility on behavioural intentions to use SIPEJAR for students of the 2020 Economics Education S1 Study Program (new students). Therefore, the researchers determined the title "The Influence of Perceptions of Ease and Utility of Usefulness on Behavioral Intentions to Use SIPEJAR on Undergraduate Program of Economic Education, Universitas Negeri Malang Year 2020."

2. Methods

This study uses a quantitative approach with descriptive research. The aim is to analyze the effect of perceived usefulness and ease on SIPEJAR acceptance. In this study, there are two independent variables and one dependent variable. The two independent variables used in this research are perceptions of utility and ease of use. In contrast, the dependent variable is the tendency or desire to use SIPEJAR all of the time.

The population in this research was all students of the Undergraduate Program in Economic Education, Universitas Negeri Malang of 2020, with the number of 142 students who were classified into five offerings. More than 100 students were taken as the sample by proportional sampling method.

The type of data used was quantitative data with the primary data source. Data collection was conducted by spreading the research instruments as closed questionnaires to respondents. Those were distributed to the students of the Undergraduate Program in Economic Education of Universitas Negeri Malang of 2020 by Google Form sent to WhatsApp belonging to each respondent. Meanwhile, the data analysis technique was carried out using multiple linear regression analysis techniques and performed t-test and F-test for hypothesis testing.

3. Result of analysis

Result of data analysis of this research can be shown by Table 1 and Table 2 as follows:

Table 1. t-Test Result (Partial)

Coefficients^a

		Unstandardized Coefficients		Standardized Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	1.440	1.778		.810	.420
	Perception of Ease	.208	.062	.285	3.376	.001
	Perception of Utility	.343	.055	.530	6.281	.000

a. Dependent Variable: Behavioral Intention

Source: Data Processed by SPSS version 25 (2021)

Based on Table 1, the ease perception variable (X1) has a significant value 0.001 less than 0.005 or (0.001 < 0.05) and t-calculation at 3.376 more than t-table 1.983 or (3.376 > 1.983), then we can decide that H0 is rejected and Ha is accepted, meaning that ease perception (X1) has a significant influence to behavioral intention (Y). Furthermore, the utility perception variable (X2) has a considerable value 0.000 less than 0.05 or (0.000 < 0.05) and t-calculation at 6.281 more than t-table 1.983 or (6.281 > 1.983), so it can be decided that H0 is rejected and Ha is accepted meaning that the ease perception (X1) has a significant influence to behavioral intention (Y).

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Table 2. F-Test Result (Simultant)

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	823,653	2	411,827	60,778	,000 ^b
	Residual	684,363	101	6,776		
	Total	1508,016	103			

a. Dependent Variable: Behavioral Intention

b. Predictors: (Constant), Utility Perception, Ease Perception

Source: Data Processed by SPSS version 25 (2021)

Based on Table 2, it is known that significant value 0.000 less than 0.05 or (0.000 < 0.05) and F-calculation value at 60.778 more than F-table 3.086 or (60.778 > 3.086). Therefore, if Ha is accepted, meaning the Ease Perception (X1) and Utility Perception (X2) have simultaneously significant effects on Behavioral Intention (Y).

Meanwhile, Perceptions of Ease and Utility variables influence Behavioral Intention. It can be seen from the SPSS model summary result that the adjusted R2 is 0.546. It shows that the perceptions of ease and utility can explain 54.6% of the behavioral intention variable. At the same time, the remaining 45.4% is defined by the other variable outside the research model. Thus, the utility perception variable greatly influences 37.3% of the behavioral intention variable.

4. Discussion

Perception of convenience positively and significantly affects behavioral intention to use SIPEJAR in **Undergraduate Students on Economics Educational Program of Universitas Negeri Malang Year 2020.** That means the higher the perceived ease of using SIPEJAR, the higher the behavioral intention of students to use SIPEJAR. Thus, the students have behavioral intentions to SIPEJAR because it is easy to learn, operate, interpret, and use everywhere and anytime. This finding is in line with research by Abdullah et al. (2016:86); Chang et al. (2017:138); Wardani (2017:188); Ibrahim et al. (2017:885), Rahmawati & Narsa (2019:267), Salloum, et al. (2019:12); Hasnan (2021:14) where perceived ease has a relationship with student's intention to use elearning.

Furthermore, this research found that the ease perception does not significantly influence the students' behavioral intention of using SIPEJAR in their studying activities. It is because they do not have experience in using SIPEJAR. The ease of SIPEJAR should be considered, particularly for giving an initial impression for new students in using it and helping them to learn and adapt to use this learning method. Rahmawati & Narsa (2019:267) mentioned that the ease of using the system needs to be considered for the first impression because the convenience will later encourage the students to explore the system further until it finally impacts the system their tendency to use e-learning. Thus, using this system makes it easy for new students to learn and adapt using SIPEJAR. It is what makes the tendency of students to continue to use SIPEJAR not pay too much attention to the ease of the system but rather to other factors such as the benefits provided by SIPEJAR.

Perception of usefulness positively and significantly affects behavioral intentions to use SIPEJAR in undergraduate students on the Economics Educational Program of Universitas Negeri Malang Year 2020. It means that the higher the perceived usefulness of SIPEJAR, the higher the behavioral intention of students to use it.

The undergraduate students' Economics Education Program have behavioral intentions to use SIPEJAR. Due to many advantages in enhancing the effectiveness, productivity, and speeding up the completion of business and fulfillment of academic needs. Such as obtaining lecture materials, collecting assignments, discussing course materials to other topics of lecture information so that the perceived benefits can make students intend to continue using SIPEJAR in their studying activities. The findings are in line with the research of Abdullah et al. (2016:86); Chang et al. (2017:138); Rahmawati & Narsa (2019:267); Dewi & Zaky (2019:29); Salloum et al. (2019:13); Arianto et al. (2020:118); Tawafak et al. (2020:825); Al-Fraihat et al. (2020:79), where the utility perception correlates with the behavior intention for using e-learning.

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The research found that utility perception impacts the ease perception meaning that SIPEJAR should be the primary consideration in determining students' behavioral intentions. This condition makes the student understand more and have the benefits of SIPEJAR, particularly in helping to fulfill the academic needs and accomplish its responsibilities. The benefits received will influence the students' tendency to use SIPEJAR. The findings are supported by Sukendro et al. (2020:7) and Al-Fraihat, et al. (2020:79), who found that utility perception strongly influences behavioral intention to use *e-learning*. Unlike Rahayu et al. (2017:93), who stated that the benefits of using e-learning do not mean students to use the system.

Those perceptions give positive and significant influences to behavioral intention to use SIPEJAR. The higher the ease perception and the utility, the higher the behavioral intention to use SIPEJAR. For example, the undergraduate students on the Economics Educational Program of Universitas Negeri Malang Year 2020 have a behavioral intention to use SIPEJAR because it can provide convenience while providing benefits in their lecture activities. Both are the main factors that influence the behavioral intention of users to continue using a technology (Davis et al., 1989 in Dewi & Zaky, 2019:4). They will use a system if its usage can provide convenience in its usage and provide benefits to support learning activities (Fajar, 2020:118). The findings in this study are in line with the research findings of Abdullah et al. (2016:86); Chang et al. (2017:138); Wardani (2017:188); Salloum et al. (2019:13); Hasnan (2021:14), in which the perception of convenience and the perception of usefulness affect the behavioral intention of users to use e-learning.

The ease of use and benefits provided by SIPEJAR are things to consider because the system's ease of use can help new students quickly adapt. The perceived benefits can increase students' behavioral intention or tendency to continue using SIPEJAR, especially for new students who do not have experience. In using the system, the ease of use and benefits provided by SIPEJAR are important factors in determining the tendency of students to continue using SIPEJAR. The results of research support this finding by Rahmawati & Narsa (2019:267) which states that convenience plays an important role in providing the user's first experience, and usefulness affects user considerations regarding continuation to use the system. Meanwhile. Salloum et al. (2019:13) stated that when students feel that e-learning is easy to use and can provide benefits, then these students tend to continue using elearning.

5. Conclusion

Perceptions of ease positively and significantly affect behavioral intentions or students' tendencies to use SIPEJAR in undergraduate students on the Economics Educational Program of Universitas Negeri Malang Year 2020. Perceptions of convenience and usefulness positively and significantly affect students' behavioral intentions to use SIPEJAR in Economics Education Program. Therefore, it is highly recommended for lecturers to introduce, use and make SIPEJAR the only LMS in their lecture activities. Moreover, the educator can be the reason students have higher utility perception because indirectly, students use SIPEJAR if there is a stimulus from the lecturers.

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The impact of social investment on social economy in Bulgaria

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Abstract

There is a strong relationship between social investment and the level of development of social economy. Furthermore, social investment and access to funding is considered a key component of social economy ecosystem in Bulgaria. The aim of the paper is to research and discuss the emergence of a social finance market in Bulgaria as a tool to support sustainable development of social economy sector as a coherent alternative in addressing the economic crisis and the increasing social inequalities. The main research question that this article aims at addressing is whether the development of social finance initiatives has supported the economic sustainability of social economy sector in Bulgaria. A major conclusion of the research is that the scale of social investment is highly dependent on the level of growth of social economy sector.

Keywords: social investment, social economy, social enterprises in Bulgaria

Jel Codes: A13, J18, L31

1. Introduction

According to the European Economic and Social Committee, there are 2.8 million social economy enterprises and organisations in the European Union, which employ about 13,6 million people and account for 8% of the European Union's Gross Domestic Product (EESC, 2017:2). They operate and use market and non-market resources (human, land, financial, energy, services, capital) at the local level, generating growth and employment and "their financial viability depends on the efforts of their members and workers to secure adequate resources" (Defourny & Nyssens, 2010:239).

According to Willson and OECD, social investment involves private investment that contributes to the public benefit (Wilson, 2014). Earlier descriptions of the social investment market framed it in terms of spectrum, ranging from "impact-first" investors who are willing to provide funding for organizations that are not able to generate market returns to more traditional investors with an interest in "responsible investing" (Freireich and Fulton, 2009).

The conceptualization of social finance in terms of supporting social enterprise initiatives and local development in this paper, concerns social enterprises "whose purpose is to achieve a social mission through the use of market mechanisms" (Ebrahim et al., 2014:82) and their distinguishing characteristic is the "primacy of the social mission". Social enterprises are promoted by the European union as a response towards correcting social and regional imbalances throughout Europe, whereas the social economy sector as a whole has been recognized as one that "has weathered the economic crisis much better than others and is gaining increasing recognition at European level" (Council of the EU, 2015:2) for its output. However, like all market operators, social enterprises need liquidity, financial support, and access to capital and finance in order to sustain their commercial activities, production of services, and goods.

This paper aims at discussing the emergence of a social finance market in Bulgaria as a tool to support sustainable development of social economy sector as a coherent alternative in addressing the economic crisis and the increasing social inequalities. A specific focus will be placed to the adoption of successful initiatives and the development of financial instruments at EU level that can support the growth of new social enterprises together with supporting their resilience. In doing so, the paper will, in the first part, review and address the theoretical underpinnings of the concept of social finance. At the second part, it will proceed by elaborating and providing evidence of the emergence of a social investment instruments providing a brief overview of the main financial streams deployed by social economy, while in the third it will present the different instruments and social finance endeavors that have been utilized and implemented in Bulgarian social economy.

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2. Research Methodology

The main research question that this article aims at addressing is whether the development of social finance initiatives has supported the economic sustainability of social economy sector in Bulgaria. Usually the scale of social investment is highly dependent on the level of growth of social economy sector. Overall, the article aims to provide evidence on the progress achieved regarding the development of social finance markets and instruments and whether that progress was also reflected in terms of the development and sustainability of social economy ecosystems. One of the issues, surfaced from this review is that few studies and papers, especially in English, covering the broader EU area address in scientific discourse the development of social finance as a concept, as well as, the development of social finance instruments and initiatives for social economy. The article is based on a literature review, regarding the state of play of social economy sector and the development of social investment in Bulgaria. The research elaborates data from various bibliographical sources that were initially selected for review in a combination and cross reference with author empirical research of funding instruments for social economy organizations in Bulgaria.

3. Social investment and social economy.

3.1 The emergence of the concept of social finance

Social Enterprises have a landmark feature, an outstanding capacity to combine the social with the financial element (Noya & Clarence, 2007). What distinguishes them especially from private sector organizations and firms is that they aim at generating revenue, which to be used for social causes, rather than to maximize it for their stakeholders. In fact, it may be argued that the difficulty that social enterprises have been witnessing in accessing capital and development finance, together with the constrains on government-based funding especially during the crisis, has given rise to the so-called in the literature 'finance gap' of social enterprises. At the same time the concept of social finance has emerged together with alternative funding initiatives and "social enterprise investment" (Nicholls, 2010:82).

According to Rizzi et al., social finance refers to "a set of alternative lending and investment approaches for financing projects and ventures, requiring to generate both positive impacts on society, the environment, or sustainable development, along with financial returns (Rizzi et al., 2018:805). On the same ground, Moore et al. conceptualize social finance as "the deployment of financial resources primarily for social and environmental returns, as well as in some cases, a financial return" (Moore et al., 2012:116).

3.2. Social investment and the pandemic crises with Covid-19

The COVID-19 crisis caused 6.3% contraction in the EU economy in 2020 accompanied by major turnover losses and a decline in jobs and investment. The European Commission published an update of the EU's industrial strategy on 5 May 2021 to learn the lessons of the crisis strengthen our economic resilience and accelerate the twin green and digital transitions while preserving and creating jobs. The EU's immediate opportunity to support businesses and local communities lies in its recovery efforts. The EU Budget 2021-2027 and NextGenerationEU, and notably the Recovery and Resilience Facility, should be used as a springboard to speed up the recovery in Europe and accelerate the green and digital transition in different industrial ecosystems and economic sectors. The updated EU Industrial Strategy will help to drive the transformation to a more sustainable, digital, resilient and competitive economy. One among the 14 key industrial ecosystems identified is "Proximity, social economy and civil security", estimated at 6.54% of EU GDP (European commission, 2021). This ecosystem contributes directly to local prosperity and well-being of citizens, where they provide essential production, services and revenues. Enterprises in this ecosystem improve resilience by reinforcing local value chains and promote citizens' engagement within their community and in response to local needs. To make this ecosystem recover and to accompany its enterprises on green and digital transition, regional and local authorities are key, as they shape strategies, drive and manage public and social investments closer to the ground in order to reach social economy. Key measures in this direction are to strengthen the competitiveness and sustainability of social enterprises and achieve social added value through:

- providing various forms of support to social economy thereby fostering the growth, scale-up and creation of social enterprise ;
- facilitating access to markets including the tools of digitalization;
- promoting social entrepreneurship and entrepreneurial skills;

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- promoting a favourable business environment and promote new business opportunities for social economy, including for social enterprises with innovative business models;
- improve design and access to social investment]
- promoting the modernisation of social economy, contributing to a green, digital and resilient economy.

However what is important for the future development of social investment is that according to the European Industrial Strategy at least 37% of funding should be dedicated to green investments and at least 20% is dedicated to digitalization (European commission, 2021). In fact, it may be argued that the difficulty that social enterprises have been witnessing in accessing capital and development finance from traditional financial institutions, together with the constrains on government-based funding especially during the crisis, has given rise to the so-called in the literature 'finance gap' of SE from the supply side of finance institutions. (Nicholls, 2010:82).

4. Social economy and social investment in Bulgaria

4.1 Specific features and ecosystem for social economy

Social entrepreneurship in Bulgaria is initially developed within the civil sector as a tool for solving social problems in an entrepreneurial way, typical of traditional business structures. The peculiarity of this entrepreneurial model is the joint, balanced debut of social and economic goals with a dual purpose - preserving the possibility of the model to work as a business, and at the same time solve a social problem or fulfill a social goal.

Bulgarian society needs a new approach in the field of inclusive economic growth, which can be realized through social entrepreneurship and innovation of enterprises in the social and solidarity economy. Based on new technologies and a changed understanding and attitude towards social change, the social and solidarity economy sector is able to respond in a new way to the socio-economic challenges, in particular the need to stimulate sustainable and socially inclusive economic growth and to create jobs.

In recent years, the most significant progress has been made on two of the key elements of the institutional analysis of the environment, namely legislation and public policies, which was reflected in the adoption of the country's first Law on Enterprises of Social and Solidarity Economy in October 2018¹. This significant legislative initiative can be seen as a political sign for recognizing the role of the social economy sector in the country. However the experts and researchers of social economy agree that the financing of social enterprises is one of the main problems facing social economy sector (Ilcheva 2019, Todorova 2021).

The Law defines social and solidarity-based economics as a form of entrepreneurship aimed at one or more social activities and/or social purposes carried out by enterprises, including through the production of various goods or the provision of services, in cooperation with state or local authorities or independently. At the same time, a significant freedom of determination of social enterprises is a huge advantage of the law, thus following the widespread model for different legal forms for social enterprises operating under common characteristics in a number of European countries. We can point out three key features of Bulgarian social economy that represent the specific nature of social enterprises such as dimension, ownership and financial strategies represented at Fig.1.

dimension	from small and local to medium enterprises and social businesses
ownership	 public - municipal and non-governmental organisations private - companies and cooperatives
financial strategies	grant and subsidy oriented social investment and income generation

Figure 1. Nature of social enterprises in Bulgaria

Source: Ilcheva M (2019) "Social economy and social entrepreneurship – notions and fragmentary approbations", Veliko Tarnovo, Faber

¹ First legislative act of Bulgarian government on social economy sector adopted in 2018

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Few studies of social economy in Bulgaria show that the majority of self-described as social enterprises according to their legal form fall into one of the four main categories: cooperatives, associations, NGOs (associations or foundations) and persons registered under the commercial law (Ilcheva, 2019). In addition, there is a separate legal and organizational form of social enterprises such as specialized enterprises and cooperatives of people with disabilities, which were created under the Law on People with Disabilities. Another specific model of social enterprises in Bulgaria are municipal social enterprises, which are created under the Municipal Property Act and aim to generate social added value in the implementation of public services, which are a commitment of the municipality.

The first Bulgarian law on social economy provides the grounds for a public policy that stimulates the development of sector and establishes clear rules for a registry of social enterprises and a methodology for measuring the social added value. In regard to local authorities, the law regulates their autonomy in terms of defining the ways in which the municipalities can provide support to operators from social and solidarity economy and with the approval and decision of the Municipal council. According to art.13 from the law, local authorities can provide support to entities from social and solidarity economy in their operations with the following:

- Foster the human resource development within social and solidarity sector through securing access to the electronic platform;
- Elaborating mechanisms and programs to support social entrepreneurship in relation to developing regional aspects of social and solidarity economy through inclusion of municipal integrated plans and strategies for local development;
- Participation in activities of social economy sector through various forms of partnership².

The municipalities could relate the elaborated measures and forms for support with key policies at local level and in this way to create favorable environment for social economy development and adequate support infrastructure for social enterprises. In general, these policies can be defined in the following fields:

- Local policies for socially responsible public procurement and access to markets;
- Programs for improving access to financial resources;
- Policies for providing business support and human resource development for social enterprises;
- Policies for stimulating partnerships for increasing the feasibility of social economy sector.

As pointed by Jeliazkova one peculiarity of Bulgarian social enterprises manifests in the relatively high reliance on public support. The gap between unmet needs of different vulnerable groups and the lack of capital to cover these needs due to low purchasing power of potential clients also contributes to social enterprises' insufficient financing. However while it is appropriate and necessary for the public sector to take a lead in social investment in Bulgaria there is also a key role for the social economy sector to promote self-help and mutuality as drivers for solidarity and inclusion. There is no doubt that if we want to build a viable social economy finance sector in Bulgaria it should be founded and strongly linked with social economy values.

4.2. Access to finance and financial mechanisms

Different sources outline the lack of finance and markets as the main barrier for starting-up and scaling-up social enterprise. The supply side of social investment in Bulgaria has seen a slight expansion especially during the last decade, despite the slow-down of the economic activity due to the health crises and economic recession, both in terms of new supporting mechanisms, as well as, on the development of new financial instruments for financing social enterprises.

The national concept of social economy explicitly underlines that one of the main problems facing the development of social enterprises in Bulgaria is the difficult access to finance. So far, the main source of funding for social enterprises has been public funding from the European Structural Funds through the Operational Programme "Human Resources Development" or private investments and donations. According to Jeliazkova (2020) the main sources of financing for social enterprises at the national level include the support provided to cooperatives and specialized enterprises of and for people with disabilities by the Agency for People with Disabilities and calls for

² Law on enterprises from social and solidarity economy

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tenders announced by national authorities. At the local level, subsidies from the municipalities' budgets attempt to cover these needs. At the EU level, various regional funds and the ESF provide the main artery of support.

In the framework of the Operational Programme "Human Resources Development" in 2017, a targeted procedure for the recruitment of social entrepreneurship projects was announced – procedure BG05M9OP001-2.010 "Development of social entrepreneurship". The main objective of the procedure is to facilitate access to employment and to provide support for the social inclusion of vulnerable groups by creating appropriate conditions for their professional integration in the field of social economy. With a total budget of BGN 15 000 000, provided by the European Social Fund, more than 150 projects of social enterprises, employers, specialized enterprises of people with disabilities, cooperatives of people with disabilities, social service providers and non-governmental organizations are supported.

Additional financial instruments providing combined micro financing and loans to social enterprises are brand new on the financial market in Bulgaria, and their apperiance is intensified after providing public resources through venture capital funds or providing guarantees within the ESIF. Since the middle 2018, "Microfund" Foundation provides loans to social enterprises, with the funds being granted with the help of the Financial Instrument "Microcredit with Shared Risk" under operational program "Human Resources Development" 2014 -2020, financed with funds from ESIF and managed by fund manager of financial instruments Bulgaria Plc³. The loans amount to up to EUR 25 000 and are granted to an existing or start-up social enterprise that offers a product or service that has a social return, while achieving a measurable and positive social impact.

An evidence based research for the access to funding from European investment and structural funds of Bulgarian social enterprises shows that 86% of the officially registered social enterprises received funding from various European funds and operational programmes. One conclusion that can be made is that the project funding has a vital role in starting a social enterprise or scaling up its services and markets. We can see at the figure below that there is a trend for more social enterprises to apply for social investment projects, which is demonstrated by the fact that more than half of the registered social enterprises have received funding from two different sources.





Source: Author survey of project funding of registry of social enterprises in Bulgaria

In the last year an innovative funding mechanism for social enterprises has been developed and implemented in Bulgaria as part of the Social Innovation Finance Programme of Sofia Municipality. This funding instrument was piloted in 2018, as initially the programme for financing social innovation projects is with a total budget of BGN 100 000. In early 2019, Sofia Municipality program "Social Innovation" was launched, and the programme aims at improving the quality of life, the social inclusion of vulnerable groups by stimulating the implementation of

³ Financial instrument implemented with funding from European Structural and Investment Funds within programmatic period 2014-2020

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short-term social innovation projects with the active participation of civil society (Sofia Municipality 2019). The programme provides funding from the municipal budget for social innovation projects of a single value of up to BGN 5 thousand, which should be realized over a period of up to eight months.

Table 1.	Financial	microfinance	instruments	for	social	enterprises
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Financial intermediary	Type of financing mechanism	Investment focus	Source of funding
SIS Credit Ltd.	Loan/bank guarantee	All sectors, start-up and scaling social enterprises	European structural funds/National funding
Microfund Ltd.	Loan/microfinance	All sectors, start-up and scaling social enterprises	European structural funds/National funding
First investment bank	Loan/bank guarantee	All sectors, scaling social enterprises	European structural funds

Source: Data of online survey of financial microfinance instruments in Bulgaria

A good example for a successful local policy for business support and human resource development in the social enterprises is "Accelerator Startup Sofia". This initiative is implemented as a major objective and leading priority in the strategy "Europe 2020" and Innovation strategy for smart specialization of Sofia. It operates as a joint platform amongst the Municipal guarantee fund for small and medium enterprises, Sofia municipal privatization and investment agency and programme "Europe" of Sofia municipality.

The pilot edition of the initiative is implemented in two integrated modules for a period up to four months – access to financing as a grant programme with a total budget of 100 000 leva and a mentoring (business consulting) programme. "Accelerator Startup Sofia" provides support to business projects that lead to demonstration, elaboration and/or improvement of innovative product (goods or services) or process which classify with the main thematic investment priorities for Sofia. The programme provides support for the establishment and expansion of social enterprises that contributes to the employment and motivation of disadvantaged groups and creates favorable conditions for their professional integration within social economy. What is unique for the programme is that it provides mentoring, communication and institutional support for innovative, startup social enterprises combined with educational and tailored activities and access to networks and contacts, shared co-working space and environment.

5. Conclusion

In the last years there is a dramatic shift to investment culture in social economy sector which is understood as seeking grants not as a gift or donation and more as an investment in society. The return of a such an investment is social and ecological combined with financial dividend which usually is accepted as a key driver for investment. One still can argue whether the social return should be bigger than the financial dividend when making a deicing for a specific social investment. However if we wish to see larger social enterprises evolving in Bulgaria then there must be access to substantial and diverse social investment funds for social economy.

Despite its growing policy attractiveness and public awareness at national level, the social enterprise concept is however little understood as a key driver for social change and social inclusion and its real size and social impact is still hardly measured in Bulgaria. A practice that is adopted by a growing number of local authorities in Bulgaria is to delegate certain public interest services to social enterprises and in this way to support the advancement of social economy sector (Galera G, Salvatori G, 2015). In order to continue to create a conducive ecosystem for social economy the Bulgarian policy makers should develop structures and instruments at regional level to support the social economy, including targeted institutional support, through initial and in-service training programs, social enterprises (Social Economy Europe, 2018). When formulating adequate policies to support the social economy, it is important to take into account the specific characteristics of social economy as hybrid structures, the variety of models and disadvantaged groups that are supported, and the particular symbiosis between financial viability and the ability to create social impact.

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There is no doubt that social finance is enhancing knowledge-based entrepreneurship and social innovation and contributes to sustaining local development and social economy endeavors. During the recent pandemic, the need for social interventions rises significantly, and so does the need for facilitating the distribution of resources for addressing social needs (Oudeniotis and Tsobanoglouq 2020).

The future of social enterprises in Bulgaria depends on how the financial and managerial challenge would be met. In particular, we could expect an increase in social investment through national and local governments that will provide better support to social economy combined with a better access to European structural and investment and therefore the tools for providing such support will improve. Finally, Bulgaria as an EU member country with a relatively young sector of social economy still need to go a long way to achieve a better distribution of the social investments across various needs of society balancing between effective social economy and growing social needs.

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Opportunities and challenges towards digital social economy in Bulgaria

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Abstract

The report reviews the contemporary challenges of digital transformation of social economy in Bulgaria and the perspectives for its future development. Key factor for the digital transformation of social economy is the European policy for green, digital and social Europe. The author is analyzing the status of Bulgarian economy and society in relation to digital transformation, while outlining the future applications related with silver economy, digital labour platforms, digital innovation hubs and artificial intelligence. However, the challenges for the digital transformation of social economy are becoming more important in terms of investing in digital skills and infrastructure, and at the same time balancing the social impact and the value for society.

Keywords: digital social economy, digital transformations, sharing platforms

Jel Codes: A13, J18, L31

1. Introduction

We all witness the in influence and change of our lives by the digitalization, it affects our labour activity, new tendency in doing business, using public services, by all means our everyday lives. The main aim of changes and innovations invented in technology is to make the life of all European citizens much better. It is obvious that in the same time digital transformation does not happen structure the same way and speed different social groups, on the contrary, it brings to deeper social inequalities. What are the tendencies in digital development of social Economy in Bulgaria and what is the challenge which could limit the social influence to the digital technology. The main aim of the present report is to define the tendency of the digital transformation and the expected challenges affecting the social entrepreneurs in Bulgaria, so that they should remain competitive and helping people in disadvantages situation. No argue, the social entrepreneurs will face numerous challenges, most of which connected will the increasing contradiction between technology and social effect. The social contractors on the one side have to be variable and innovative in order to be competitive, and on the other hand they have to keep the connection with the community and increase the social extra value.

The digital social and economic transformation is the key for achievement of the digital future of Europe. This obtains everything – from cybersecurity to the critical infrastructures, from Digital education – to the abilities and experiences, from democracy – to the medias and it is the combined priority to achieve green, unified and Social Europe (EC, 2019).

The actual process of the digital transformation in Europe characterizes with the following key tendencies:

- Turbulent and full range digital transformation of the European Economy;
- Uneven distribution only 20% of SMEs in Europe are highly digitalized.
- Different speed of input of electronic management 75% digital public services in some European countries while 30% below are another (EC, European Digital Innovation Hubs 2019);
- Increase digital inequality and exclusion;
- COVID-19 crisis confirmed the necessity of fast development and invention of digital transformation in all economic and social sectors.

Europe's digital transformation of social economy plays a key role to maintain the associated economic growth. Companies and public organizations have to integrate digital technologies in their business and managing processes, products and services to gain maximum usage inventing innovations in order to improve the ECO and social uses. In addition of all of it, the clever and smart use of the information as a resource can be transformed in a powerful engine for growth, new working places and open new business and innovative possibilities.

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2. Research methodology

The article is trying to review the contemporary challenges of digital transformation of social economy in Bulgaria and the perspectives for its future development. The main research question that is addressed is whether the social economy in Bulgaria has the capacity for digital transformation in order to stay competitive and generate higher social value. The research methodology includes review of main European and national documents and analysing data from DESI index, which shows that Bulgaria is lagging behind in the application of ICTs in various sectors and society. Overall, the article aims to provide evidence on the challenges for the digital transformation of social economy and identifying opportunities that can stimulate this process.

3. Digital transformation at the focus of European policies

The strategy of EU in the field of digital technology has an important task doing the digital transformation to be more useful to the people, the economy and the planet, considering the values of EU. In the politics creating Unified digital market – Europe admits that the global economy in world's scale transforms in digital and the social economy would not decrease from the whole process, on the contrary, is significant to accept and do politics and measures to encourage the appliance of ICT using Internet based market and digital social services. The European strategy about digital transformation that was accepted in 2020 predicts three ways of action as seen on figure 1:





Source: European Commission, (2020) Shaping Europe's digital future

Another EU's key instrument stressed on investment in digital abilities is the programme "Digital Europe". (EC, 2020). It will support the development of detailed digital abilities in order to imply that kind of technologies in the economy as a whole, as well as to support the digital capacity of the education suppliers. Another initiative of the European Commission is the preparation of the judicial act for digital services which will help the required, temporary responsibility and safety of the digital platforms, services and products and thus will be completed the common unified digital market.

Europe has got clear vision and frame for reliable artificial intelligence based on high achievements and trust, which is presented in the White paper concerning the artificial intelligence, accepted in 2020 (EC 2020 White paper). Its aim is through partnership between private and public sector to be mobilised resources within the whole chain to create valuable capacity, as well creating promising stimulus for spreading the artificial intelligence. The expected uses improving the artificial intelligence are numerous, not only for the citizens, for example better public services so as for the economics and guarantee the social rights.

Another innovation on European level is the establishment of European digital information centres which should play central role in the process of improvement of using artificial intelligence, high productive computers and cybersecurity and many others high technological products and initiatives of the public organisations (EC, 2019). They are planned as structures following the model "one desk" which helps the companies to be much more competitive within their business processes, products and services, when use digital technologies. They offer an access to technological expertise and experimentation, following the principle "Testing before Investing ". The

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European digital innovative centers should supply and offer innovative services such as access to financial education and development of abilities necessary for successful digital transformation.

To open the potential growth at one the same time to the common digital market and the social economy, it has to be obvious that not only it is useful for the social economy, but the whole community needs and uses the digital transformation of social economy. It brings the importance of increasing the social uses. Of great importance is to be adopted the structure of social economy with equal participation in common digital market by using the potential of social economy to keep and save of European social model and increase the standard of living of the population (JRC, 2017).

The possible steps and initiatives to improve this process are connected to be able to recognize the potential of growth of the unified digital market and the social economy. It is also reported that only how the participants in the social economy can use the digital economy (Balaran, 2016). An additional measure is to assure that the social enterprises can participate in the common digital market and they can help each other financially. Possible measures which are going to be accepted and issued by European commission to improve the digital measures of social economy are connected with the following:

- Simplifying the rules of international electronic transactions the present rather complicated and not clear procedures most of the social enterprises and their clients refuse using the electronic trade.
- Improve the role of online platforms of social economy this is very important form point of view to be ensured easy access to the information of consumers and partners of social economy as well as presenting the possibility of the social economy to become an integrated part of shared economy.

One of the recommendations of the European parliament is to test the possibilities to put in the online information system which provides news, researches, analyses and online channels to make the social economy seen at common European level. The other use of integration of online information system is to ensure connection with the unified digital market, the growth of level of working places and to make better consumer markets.

4. Bulgaria in the process of digital transformation

Although the serious investment and digital transformation to be in the focus of the European priorities, the digitalization is characterized with uneven distribution in sectors and countries. Bulgaria is seriously behind this process and this negative tendency is illustrated in the Digital economy and society index (DESI). The European index DESI reports and watches five measurements – connectivity, human capital, use of internet, integration of digital technologies and digital public services. Bulgaria occupies the last 28th place in the European Union. The tendency is the luckiest level of Digital experience in European Union and it is getting worse in % of population. The digital experience in Bulgaria is 29% while the European Union it is 58% (DESI index, 2020). Another sphere where Bulgaria shows a serious decline is the indicator of integration of digital technologies where we occupy the last place.



Figure 2. Comparison Index DESI between Bulgaria and EU

Source: from DESI - Digital economy and society index at EU level, measured every year

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This includes the trade done by small and middle companies by internet. While in Bulgaria it is only 7%, the average for EU is 18%. Only 2% of the turnover in Bulgaria is formed by the digital trade and usage of social media by the business for Bulgaria it is only 10% while for EU in comparison with Bulgaria it is 25% average. Although the beginning of the global Covid - 19 health pandemic in 2020, the education and trade was intensified according DESI for 2020 still Bulgaria keeps negative tendency in organizing online courses (it is only 3% for Bulgaria to 11% average for EU), as well as 31% for online shopping in Bulgaria as the average for EU is 71% (DESI 2020).

To overcome this serious misbalance between Bulgaria and EU, the Bulgarian government worked out and accepted "Strategy for Digital Transformation for the period 2020 - 2030" as a common political frame together with National program of "Digital Bulgaria 2025, priorities of "National program for development 2030", so as many other national strategic documents (Bulgarian government, 2020). In the strategy is reported that the digital transformation is a necessity of a technological development of Bulgaria to create conditions for innovation and growth of business, increasing the efficiency of the labor forces, competitive digital economy and high standard of living. The basic principles on which the strategy of digital transformation of Bulgaria is based on are the following:

- Oriented towards consumer attempt and access to all digital services in terms of digital transformation, people and consumers are the engine of the change.
- Ethical and socially responsible access, usage, sharing and management of the data digital data leave to be in use by common interest and terms of improvement of the digital services and the process of decision making.
- **Technologies as a factor with a key role** the technologies are means and not an aim in the digital transformation. Integrating modern technologies with simple decisions is the ideal combination which will make our country intelligent, competitive and sustainable.
- **Cybersecurity from the stage of projection** the implementation of system of standards and norms to ensure security of network and information resources of all stages of digital process establishment.
- **Mutual collaboration** the success of digital transformation is in the use of the model of participation all countries of interest taking part of decision in all parts of main important stages for the Society and creation of business platforms of participancy.

Regarding the character of social economy with the significant orientation and interest in inventing innovation most of which are based on ICT it is obvious that serious proves miss concerning the digitalization of the sector. It is obvious that all European and national policies confirm that the technological innovations must go hand to hand together with the social innovations as the crossing point of all is the social policies.

5. Digital Social Economy

5.1. Scope and applications of digital social economy

In the nearby future is expected the complete digital transformation of the social economy and this process is connected with increasing number in searching of definite electronic products and services. And that kind of sector can be definitely specified the so called silver economy, which includes services for active aldering in good health condition with a strong argument is the prognoses of the European Commission that till 2050 one of each three Europeans will be over 65 years old (European commission, 2018, silver economy). Another key sector in the social economy for health and social services of high application of ICT– medical robots and telemedicine as well as public social innovations which includes the conception of "clever, smart cities" and internet of the things (IOT)¹. The social entrepreneurs because of their mobility and ability could be rather competitive presenting digital marketing and services to creative industries.

Another sector with potential growth with a key role in the social economy are mutual platforms and platforms for social investment as well as digital platforms for labour and occupation (Eurofund, 2019). All this finds its place

 $^{^{1}}$ The strategy for the artificial intellect in Bulgaria until 2030 defines a very broad application of IoT – smart devices connected through Internet.

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of the conception in the "shared economy". "Access", "shared" or "platform" are means of terms, describing the so called economy the base of which is the sharing – new forms of organizing the production and the access of goods and services or the so called Collaborative economy². Within this social innovation, the business partners do not rely on third side to defense the price or managing the processes. It is a fact that in the last decade is obvious the tendency of s mass improvement of "shared economy" because of several facts:

- Increased and easy access of Internet and in particular mobile access which significantly reduce the price of the economical collaboration: For example to do selling buying;
- Social nets booming which stimulate sharing information and digital goods and services in a new way;
- Digitalization of more goods and books get in wide range of access through the digital technologies. But there are the examples of much more examples.
- The World's Covid-19 pandemic together with the economic and ecological crises which encourage people searching new forms in sharing the limited resources.

The shared economy has got a significant growth in Europe and according the European commission, the share of that type of economy almost reaches the level of traditional economy. Some experts calculate that the future collaborative economy could bring between 160 - 572 billion euro to the Economy of EU. Through this new business model goods and services should be merchandise basically through the access of sharing and excluded the property (COM(2016) 356). This process can be organized by company which owns the resources or through platform which simply connects the owner's providing services and consummers.

Digital platforms of occupation are with priority and new strategic factor and player in the European labour market. As s concept, the so called working platforms or occupating platforms are not connected by simple definition or categorisation. They are a part of a new conception for improving economy and are described as mutual act among business models easy use by the digital platforms. In this way an open market is created for short time use of goods and services (JRC 2019). That kind of services are provided online by professional service delivers and private persons.

Remarkable examples of Internet platforms include services provided from home, mobile services or work at home of another person's. These companies created in the last decide show improved market rate and so as the increasingly variety of the provided heterogenetic services.

The future of the European economy together with the sector of social economy is connected with the use of digital technology. The analyses of the last years show the significant growth of the monetary value of transactions between collective platforms, so as the growth of transections is 56% between 2013 and 2014 and a lot more – to 77% between 2014 and 2015. These analyses affect services concerning accommodation and finance services, as well as transportation domestically and professional services.

The process of digital transformation of social Economy is connected with several basic applications of informative technologies as follows:

- Application of (ICT) providing services in the social economy;
- Using Internet selling goods services electronic trade;
- Application of artificial intellect;
- Use of social media to mobilize communities / social marketing;
- Platforms for shared economy;
- Providers of digital / cloud services.

This tendency increasing and with broad use of social nets which stimulate sharing information, goods and services and their access gets easy and broadly used by the digital technology. The wide invention of the digital platforms and platforms of labor and shared economy is explained with the easy access and the action is explained by the

² The term that is used in EU is a collaborative economy

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digital platforms which create open market shorting use of goods and services (Borzaga, C., Salvatori, G., & Bodini, R. 2019). Usually that kind of services is provided online by professional and private persons.

Another field of wide range of appliance of information technology as a part of social economy addressed the European challenges with aging population is the use of (ICT) technologies for prevention, diagnostics, and treatment. Covid-19 pandemic increase the process and the necessity of using the artificial intelect digital thermometer, smart appliance maintaining health data, software and appliances for social distance smart cameras, Chabot systems – intelligent accessories with virtual assistant and other block chain technologies. A good example is the Digital skills partnership in UK, where governmental agencies, businesses and social economy organizations identify digital job vacancies and train people to fill these jobs (EASME 2020).

The use of digital social economy are dough less and we have to have in mind the key role and measurements of the information technologies in the social economy, connected with the four fields of potential development, as it shown on fig 3:



Figure 3. Key application of ICT in the social economy

Source: European Commission, "New technologies and digitalization: Opportunities and challenges for the social economy and social economy enterprises" (2020)

5.2. Challenges facing the Digital Social Economy

The mail challenges facing the digital social economy in Bulgaria are connected with shortage of digital skills as it is reported as the main challenge at EU's level. The digitalization and globalization lead to the increasing need of new knowledge and experience from the one side of employers and on the other hand the employees. Of great significance is the combination of technical and social knowledge and experience which make the converse of human resource of the most valuable capital for the social economy. Another great challenge for the social economy is all these technical abilities to supply by the so called "soft abilities" and experiences which need great investment for education and development of the needed experiences and competence. Another enormous big challenge is connected with the weak connection between the social economy and digital sector which explains the low use of ICT in the social sector. First are the absence or not enough finances to apply the ICT in the social and solidarity economy enterprises. And the third key challenge to develop digitalization of the social economy can be specified as not enough information and knowledge and the possibilities of the informative technologies and the artificial intelligence, or let's say it this way – with shortage of recourses to make effective investments in the digitalization. And in the same time one should not ignore the possibilities to increase the digital transformation of social economy in Bulgaria. Here are some of the specific recommendations:

• To be created with an easy access courses for basic digital knowledge and experiences needed in the social sector and social economy;

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- Informative infrastructure and technological support to the social enterprises;
- Development of policy and financial mechanisms to support the invention with higher speed the social innovations with ICT;
- Organizing Living Labs and digital information center through which the social enterprises can transfer examples for successful use of ICT products and services;
- Creating conditions for financial and innovative Hubs in the social economy with the main aim to be tested new ICT technologies;
- Creation of organized online platforms for an access and sharing data, offering products and services of social enterprises.
- As an adequate measure for improving the process of digitalization of the social economy of Bulgaria can be defined the intentions to the Ministry of the labor and the social policy, to create regional focus points with the main aim modernization of Social and solidarity economy enterprises and finances have been based in the National Plan for recovery and resilience Through this project of digitalization the processes of work not only of social enterprises as well as implying individual Digital (software / hardware) decisions in constructive models. Another expected achievement to speeding up the digitalization is the creation of digital platform (ecosystem) to improve the social and Solidarity Economy (National plan for recovery and resilience 2021).

6. Conclusion

The high speed with which the global economy and society, the digital economy, digital technology change and possibilities of connection ensured by the European Digital Market. This may support the growth and development of social economy, its variety and addition to the European market. That is the way to support encourages the potential of the Social Economy to open new working places, the social inclusion and extra value to resistible and included growth. We should not ignore the fact that the differences knowledge, the technologies show that 60% the differences of the growth and the growth and the income increase in the different countries. Digitally enabled social economy organizations are set out to capitalize on the potential offered by digital technologies. For example, digital social platforms may be used as an open virtual infrastructure to catalyze community engagement, deploy applications of various nature - from booking appointments and geolocation to payment and content sharing apps - and extend operations outside the local community within which they are deployed (EASME 2020).

In the same time one of the serious challenges facing the digital economy is how to decrease the digital division of the society. Numerous experts and an analyzer confirm that the key factor in the fight with digital switching off is the digital experiences and knowledge. The big concern is the fact that over 1/3 of the Europeans in active age have no basic digital education although most of the working places require basic IT experience and in the same time only 31% have got the knowledge to work with Internet (EC, 2018).

The present and the nearby digital economy must be focused on people. They have to occupy the central place it occurs and is expected that the following 5 years only the artificial intelligence and the robotics will need open 60 million new working places in world's scale, and mean while many work places would be changed or others will disappear. The new technologies will generate new possibilities for work and allow variable labor conditions, but it must be guaranteed that the new places of work are so qualified and the people rely on the necessary skills to fulfill them.

Even the high speed of invention and booming of the digital technology, like cloud technology and digital platforms the representatives of social economy sector are categorical that the technological access and the social effect which is generated (EASME, 2020). More often the social economy face the choice of unpredictable technological changes and the social reaction to these changes, and its ability to extract the best innovations, which carry out the highest social effect, and it will guarantee besides the digital and social transformation of the society.

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Tourists' emotion towards humanoid robots in accommodation industry

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Abstract

Robotic systems have evolved and increasingly been employed by various sectors in time. In this study, humanoid robots employed in the field of accommodation and the perspectives on these robots are examined. The analyses are conducted taking the user comments and assessments found in the website "booking.com". Sentiment analysis and text mining are conducted within the study. Emotions are classified as positive, negative or neutral. 371 comments out of a total of 462 user comments are classified as positive, whereas 50 comments are classified as negative and 41 as neutral. According to the results of the analysis, a majority of the users are found to have positive emotions. The users who expressed negative emotions appeared to be disturbed by the appearance of the robots and the slowness of operations.

Keywords: Humanoid robots, text mining, sentiment analysis

Jel Codes: M15, M30, M31

1. Introduction

Robotic systems can conduct a variety of tasks within the framework of various applications in cooperation with humans. A robot communicates with a human with various possible techniques such as speaking, gestures and body language (Kosuge and Hirata, 2004). Whereas most of the robots were industrials robots in the past; humanoid robots, especially the ones operating as service robots, has become widespread in the resent years (Leminen, Westerlund, and Rajahonka, 2017). Service robots constitutes a comprehensive class of robots that involve all kinds of nonindustrial applications and perform beneficial services for the welfare of humanity (Ferro and Marchionni, 2014). Humanoid robots, which have human-like bodies and mobilities, have the capability to use the tools designed for humans. In addition, thanks to their human-like gestures and facial expressions, humanrobot interactions have become more efficient (Wu, 2013). Robots play an increasingly important role in the lives of humans in line with technological developments. Smart robots operating for service purposes are interacting with humans as a part of the daily life. Therefore, human-robot interactions have become an important research topic (Luo and Wu, 2012). Human-Robot Interaction can be defined as the designing and assessment of the communication between robotic systems and humans (Goodrich and Schultz, 2007). Humanoid robots are promising tools especially for the handicapped and the elderly, considering the ways they are employed in the service industry (Yu et al., 2015). Robots are designed to be a part of the lives of ordinary people. This situation results in a need for the formation of new models of interaction between robots and humans drawing upon human social and communication skills. In addition, human-robot relations should be interpreted within the context of employment of robots and based on empirical studies on humans and robots in real environments (Severinson-Eklundh, Green and Hüttenrauch, 2003). Humanoid robots or androids have been developed and marketed through three general lines: entertainment robots (e.g., toy robots), service robots (e.g., task-oriented robots such as security guards and receptionists), and companion robots (e.g., robots employed for long-term social interactions such as teachers and housekeepers) (Carpenter, Eliot and Schultheis, 2006). An increase in the task-oriented employment of humanoid robots has been observed in the recent years. This study aims to investigate the perspectives on humanoid robots employed in the accommodation industry.

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2. Literature

A review of literature reveals that the majority of the studies on humanoid robots comes from the field of engineering. A review of studies related to social sphere show that especially the studies that examine the ethical issues related to robots, discuss the appropriateness of employment of robots in the service industry, and investigate human perspectives on the participation of robots to social life draws attention.

Users can manage their daily activities through services that rely on applications based on artificial intelligence. Fernandes and Oliveira (2021) investigated the motivations of young people in adopting digital voice assistants. The findings pointed out uncanny valley phenomenon concept. Uncanny valley phenomenon implies that the more the appearances of robots get similar to humans, the more trustable people find them, but when this similarity passes a certain threshold people find them eerie (MacDorman, 2006). On the other hand, Nakanishi et al. (2018) showed in their research that the higher potential of humanoid robots to offer friendly services increases the possibility for users to be satisfied with those services. This possibility was higher for women than men. In addition, they showed that verbal interaction of robots with humans negatively affected this experience for humans. Another research by Karar, Said and Beyrouthy (2019) found that humans of all ages showed interest in robots and wanted to interact with Pepper robot. In addition, companies from various sectors were willing to introduce Pepper in commercial events. Another study included the robot Jibo in its investigations, and aimed to understand whether it was perceived as a social being or as an technological object (Farhadi, 2019). This study, which was designed as qualitative research, found that people attributed human-specific characteristics to robots and perceived them as social actors. A study by Mende, Scott, Doorn, Grewal, and Shanks (2019) examined service experiences of humanoid robots in the United States through a set of 7 experiments. These experiments investigated how people reacted to humanoid robots in various conditions and environments (Niemelä, Heikkilä and Lammi, 2017). According to findings, it is important by the stakeholders that the robot creates a warm and fun atmosphere in the shopping mall, as well as providing practical assistance for customers and employees. Another study evaluating the viewpoints of humans toward humanoid robots employed a service robot designed to serve users with mobility impairments, and examined the social aspects of the interactions with this service robot. The results showed that it was insufficient to address only the primary user, and the focus should be the environment, activities and social interactions of the human group who will use the robot (Severinson-Eklundh, Green and Hüttenrauch, 2003).

Robots can have different types of appearances: human-oriented or product-oriented. Human-oriented robots imitate the appearance of humans, whereas product-oriented robots aim to maximize the specific functions of robots. A study on robot appearances compared the two types of robot appearances. This comparison was based on perceived social presence, sociability, and service evaluation of a robot. The findings showed that participants felt a higher social presence when interacting with human-oriented robot compared to a product-oriented one. In addition, they perceived a human-oriented robot as more sociable than a product-oriented one. On the other hand, participants were more satisfied with the service they received from a product-oriented robot than a human-oriented one (Kwak, 2014). Another study compared human-robot interaction with human-human interaction. According to the findings, participants reacted positively to artificial innovative service behavior of a humanoid robot; however, this reaction was weaker compared to human-human interactions in a similar setting (Stock and Merkle, 2018).

A study comparing the viewpoints toward robots working at Henn-na Hotel through social media platforms showed that robots' ability to replace human services disturbed people. Furthermore, there are concerns regarding people losing their jobs as robots have increasingly become capable to take over jobs. In addition, it is found that the hotel should enhance its technology, improve the appearance of the female robot and ease the concerns regarding job loss (Io and Lee, 2020). Another study conducted qualitative research to compare online comments of Japanese and non-Japanese tourists and used 1,498 comments for 9 hotels in Japan that use robot personnel. Finding showed that the interaction of guests with robots was one of the major experiential components in hotels with robot personnel. The results of semantic network analysis showed observable differences between two groups in the sense that user comments from Japanese customers displayed more emotional reactions to human-robot interaction, whereas non-Japanese customers stated that they valued functional and technical aspects of the services provided by the robots more (Choi, Oh, Choi and Kim, 2021).

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3. Research Method

This study aims to examine the thoughts of customers about the services provided by humanoid robots and evaluate the perspectives on humanoid robot technology. The data is analyzed using Sentiment analysis. Consecutive steps followed in the research are showed in Figure 1.



Figure 1. Research Steps

Source: Created by authors

3.1. Data Collecting

The research data is extracted from Booking.com. The examination of this platform revealed that the hotel that received the highest number of comments was Henn-na Hotel, which is located in Hamamatsucho city of Japan. The user comments are extracted by using data extraction bots written by Python programming language. Only the user comments written in English language are taken into consideration. A total number of 589 user comments written in the period between 2018 and 2021 are found.

3.2. Data Preprocessing

The dataset is examined, incomplete or faulty lines are eliminated. In addition, expressions that might result in semantic shift like punctuation marks, stop words or emojis are deleted. In order to filter out stop words, natural language toolkit (NLTK) library and stop words dataset for English language are employed. After data preprocessing, a total number of 462 user comments were left to be analyzed.

3.3. Analysis and Findings

As thoughts are key to human behavior, the need for analyzing thoughts and emotions is felt almost in all fields. People's beliefs, choices and perceptions help understanding how humans see the world (Liu, 2012). In recent years, an increase in the sentiment analysis research volume has been observed, especially in highly subjective text types (e.g., movie or product reviews). The main difference of these texts from news articles is that their aim is clearly defined throughout the text and unique (Balahur et al., 2013). This study uses subjective comments where people who have interacted with robots express their opinions to conduct a sentiment analysis on the reactions to humanoid robots in the service industry. For this purpose, natural language processing (NLP) algorithms are employed. NLP is a field applied for extracting meanings from speech and obtaining useful information. NLP algorithms are created to help machines understand languages by studying how humans perceive and use them (Chowdhury, 2003).

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After data preprocessing is completed, Python programming language is used to run sentiment analysis on the extracted dataset. Sentiment analysis is conducted through Textblob and Pandas libraries. The lines with sentiment scores equal to zero (0) constitutes neutral comments, whereas those with between 0 and -1 constitute negative comments and those between 0 and 1 constitute positive comments. Based on these values, the descriptive statistics of the dataset is given in Table 1.

Table 1. Descriptive Statistics of the Dataset

Min.	Max	Average	Median
-1.0	1.0	0.2186707115378784	0.21858585858585863

Source: Created by authors

The lowest sentiment score attributed to a comment is determined to be -1 and the highest is 1. The average and median values are close to each other. Table 2 shows the comments with the highest and lowest values.

Sentiment Value	Comments
-1.0	When he delivered the pillows, he wore a mask (did not wear it at the reception 3 mins ago). Then he passed the pillows at arms length trying to avoid the room. Disgusting!! This is a disgusting culture!!
1.0	perfect. wonderufl
0.21212121212121213	Modern new hotel and fun place to stay and close Disney land

 Table 2. Example Comments by Descriptive Statistics

Source: Created by authors

According to the results of classification by the code block given in Image 1, 371 user comments out of a total number of 462 comments are classified as positive, whereas 50 as negative and 41 as neutral. User scores that fall between 1 and 10 accompanying user comments on Booking platform are also taken into consideration. Scores that are equal to or smaller than 5 are accepted as negative and those greater than 5 are accepted as positive. According to this classification, 437 out of 462 assessments are classified as positive and 25 are classified as negative.

```
for d in d_mdf:
    TextBlob(d).sentiment
    if(TextBlob(d).sentiment.polarity>0):
        print("pozitif")
    elif(TextBlob(d).sentiment.polarity<0):
        print("negatif")
    else:
        print("nötr")
```

Image1. Performing Sentiment Analysis and Classifications

As is seen in Table 3, positive comments mostly emphasize that robots are fun, whereas negative comments refer to the appearances of robot receptionist. There are also comments stating that robots are not useful or they result in waste of time. Comments that include incomplete sentences or express both negative and positive emotions at the same time are classified as neutral by the algorithm. User comments classified as neutral because they include both positive and negative expressions are identified manually and removed from the dataset. The comments in question are given in Table 4. After this, 38 comments are left out of the initial 41 neutral comments.

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 Table 3. Example of Customer Comments

Comments	Class
Very helpful staff and the robot option was lots of fun	Positive
The robot element is excellent and great fun we also had real staff to help with luggage transfers	Positive
The robot checkin was fun	Positive
Cool robot check in and there is still someone available to speak to	Positive
The robots were fun for my teenagers	Positive
The robots at the reception are creepy	Negative
The reception for booking was a waste of time having the 2 robots	Negative
It was hard to check in with the robot	Negative
Robot check in is inconvenient and useless	Negative
The robots were a little creepy albeit cool	Negative
would prefer staff at reception rather than robots.	Neutral
Robot receptionists interesting but useless	Neutral
The robots and the breakfast	Neutral
The robots in the reception and the simplicity of the check in and out.	Neutral
They must know how to call in big taxi car such as vans	Neutral

Source: Created by authors

Table 4. Neutral Comments Deleted from the Dataset

Comments	Class
The robot check-in is quirky, but doesn't add to convenience. In the end just put your passport in the scanner.	Neutral
Robot receptionists interesting but useless	Neutral
Just a few minutes walk to subway station and convenient store. Cons is lack of human interaction when we had problem to check in.	Neutral

Source: Created by authors

```
text.common_contexts(['robot'])
```

Image 2. Line of Code Showing the Words Used before and after the Word Robot

The words used with the word robot are extracted from all user comments (Image 2). Sentiment analysis is conducted again for each of these words, and 83 words out of 113 are classified as neutral, whereas 20 are classified as positive and 10 are negative. The reason that such a high number of neutral words is obtained is that most of these words are either nouns or verbs. Examples of these words are given in Table 5.

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Words	Class
Helpful	Positive
Friendly	Positive
Sadly	Negative
Hard	Negative
Come	Neutral
Work	Neutral

Table 5. Word Examples Used with the Word Robot

Source: Created by authors

In addition to these analyses, a word cloud is created using the same dataset. Word clouds are simple and visually attractive visualization tools for texts (Image 3). They are used in various contexts to provide an overview of a certain text by analyzing it based on the occurrence frequency of words (Heimerl, Lohmann, Lange and Ertl, 2014). A word cloud library is formed in python to this end.

in checking enough free spacious is styler location receptions come autoasted within luggage near and	11 EM
station provided asy day walk help to carte nexted as helpful C nice pretty real	11
checkin the prilot recommend to lobby the experience of englis	h an #
actifitte take right reak fast FODOL antegreat hand 10t staff good	d i
didnt thing away minarazing which how tv line is the night - clothes	155
hote set of the set of	and all
tind machine Small phone De tokyo find	or deak
welling hit we human conventence work came new we train station and available of interventence though	many

Image 3. Word Cloud Created from the Dataset

By doing this, words found in the dataset are visualized based on their frequency of occurrence and relationships with each other. Most frequently used words are written in larger fonts. If only the most frequently used words are identified, the list given in Image 4 is obtained. This list refers only to the most frequently used 10 words for the others are used significantly less.

```
fd=nltk.FreqDist(yorumlarfiltered)
fd.most_common(10)
[('hotel', 201),
  ('room', 185),
  ('staff', 108),
  ('robots', 102),
  ('robots', 102),
  ('check', 102),
  ('robot', 98),
  ('good', 76),
  ('stay', 70),
  ('really', 64),
  ('near', 60)]
```

Image 4. Listing the 10 most used words in the dataset

Image 4 shows the most frequently used words and how many times these words are used. As the most frequently used adjective, the word "good" attracts attention. Other words are mostly nouns such as "hotel", "robot" etc. Table 6 shows some of these nouns and other words used with them at the beginning or end of expressions that can provide an idea about robots.

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	couple	welcome	hotel	mannequins	pity
	novelty	enjoyable	wonderful	really	serviced
robots	nice	entrance	check	expected	bonus
	transfers	breakfast	less	advertised	futuristic
	breakfast	check	imagined	reception	check
	staff	option	element	expected	advertise
	location	service	great	check	experience
robot	receptionists	human	heads	hard	machine
	helpful	room	self	little	hotel
	thought	nearby	concierge	exerience	provided
	quiet	incredibly	lovely	cool	personnel
staff	helpful	robot	experience	great	came
	stops	nice	friendly	good	even
	real	help	available	check	actual
	great	human	happy	work	answered

Table 6. Phrases Used with Commonly Used Words

Source: Created by authors

4. Discussion and Conclusion

This study aims to investigate the perspectives on the employment of humanoid robots in the service industry. The user comments made on Henn-na Hotel, which employs robot personnel and has a robot-hotel concept are subjected to sentiment analysis. The number of relevant user comments is decreased from 589 to 462 after the data cleaning process. Sentiment analysis classes are identified as positive, negative and neutral. According to the results of the analysis, a majority of the user comments is found to be positive. Both user comments and scorings are compared with the results of sentiment analysis. Similarly, a majority of user scores show that customers had positive feelings towards robots. That most of both user comments and scores are positive show that customers largely hold a positive view for a business that employ humanoid robot personnel. User comments that are classified as positive include statements defining robots as fun and extraordinary. In addition, some comments define robots as helpful and friendly. On the other hand, comments that are classified as negative include statements do a human as a receptionist is a waste of time and those defining robots as horrible in terms of appearance.

Leung (2019) examined the interaction between robots and humans in his study and states that guests welcome the robot when they first meet it, but keep a certain distance later on. According to her findings, humans hesitate to communicate with robot personnel when they first interact with it, because they react to it like an alien person. In addition, more than half of customers made positive comments when they saw the robot receptionist for the first time. Durna and Baysal (2021) also examined comments and complaints on Henn-na Hotel. The relevant data is obtained manually for this study. The performance of robots, experiences of guests and price performance was analyzed. In addition, comments written in all languages were translated to Turkish and included in the analysis. According to the results of the analysis, it was found that it was still early to determine whether or not robotic systems are capable enough to replace humans in work life. Another finding of the study was that customers found robots interesting but were left unsatisfied with their performance.

This study has some limitations. Firstly, it is limited to the accommodation industry. Secondly, it uses the user comments only for one hotel operating in Japan. Thirdly, the user comments on this hotel were limited by the mentioned platform and some data was unavailable to the data extraction bot. Lastly, this study included only those comments that were written in English. Future studies can examine perspectives on humanoid robots from the standpoint of both businesses and customers in detail by using different data collection tools.

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The Bayh Dole Act, an American Patent Policy in Europe¹

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Abstract

In the work with the title: *The Bayh Dole Act, an American Patent Policy in Europe*, we analyze two patent policies in the European Union, concretely the Bayh Dole Act and the Professors' Privilege. The mentioned patent policies concentrate on the legal ownership right of the newly created academic patent. According to the American patent policy - the Bayh Dole Act - the ownership of the academic patent goes to the institution where the academic patent was created. In contrast, the Professors' Privilege gives the legal right for ownership of the academic patent to the academic professors' group which has worked on the creation and registration of the academic patent. On the following pages we are going to compare the mentioned two academic patent policies, and their implementation in the European Union, concretely in Sweden, Denmark, Austria and Hungary. Our main goal in this research paper is to analyze and study if the American academic patent policy is as efficient in the EU as it was in the US.

Keywords: Bayh Dole Act, Professors' Privilege, academic patent

Jel Codes: O31, O32, O38

1. Introduction

People or group of people as a result of a planned action can create intellectual property, what is a created knowledge, thought or information. The value of the intellectual property can be different, it depends on the quality, level of uniqueness and usefulness of the knowledge. People, institutions, companies to save their newly created special knowledge can register the information at the Intellectual Property Office (IPO). IPO after a long administrational process gives legacy right to individuals who applied for registration, it can be a person, group of people, or an institution. This given legacy right for the registered intellectual property is called patent. With patent the owner has right to decide who can use the knowledge and about the period, how long the other side can be an active user of it.

Furthermore, the legal patent owner gets financial compensation from the users of the patent. With patent rights the researcher can save his unique knowledge from the users, who would use it without payment for further researches. Also, it can motivate researchers and institutions for further actions in the act of patenting.

In the research paper, we are going to study and analyze patents, especially academic patents (those patents which were researched and registered by the workers of an academic institution). The action of academic patenting in Europe is not working that efficiently as in the US. Nowadays, in Europe we can define two important patenting systems and policies, the Bayh Dole Act and the Professor's Privilege. The Bayh Dole Act patent policy comes from the United States of America and gives the ownership right to the academic institution, where the knowledge was registered. The new American patent theory says that the academic institutions can provide better service for patent management, marketing and sales than the inventor professors of the patent. The Bayh Dole Act is used since the 2000's in Germany, Austria, Denmark, etc. On the other hand, Professor's Privilege patent theory provides the proprietorship legacy to the person or group of people, who were working on the action of the research and who were registering the newly created intellectual property. This classic European theory defines that the best patent management can be done by those actors, who know the registered intellectual property the best, by those academic professors who were working on its creation. This patent policy is applicated in Italy and Sweden.

We will study publications of world widely famous economics and their ideas, scientific researches about the sphere of academic patent registration. After receiving the theoretical knowledge from these masters of this area, we try to applicate it in practical issues, problems.

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In our work, as we already said before, we concentrate on the European market, and on the academic patent registration on it. Our research concentrates on the Bayh Dole Act American patent theory, its application in some countries. Moreover, we analyze, study and try to define if it is an efficient patent policy and if it can be applied for any country of the world with the same level of efficiency.

2. Literature Review

"Innovations are defined most frequently in accordance with the Manual of Oslo in 2005, elaborated by the OECD and Eurostat, concerning the rules for the collection and interpretation of data on innovation. According to the above manual, innovations include: implementation of a new or significantly improved product (good or service) or process, a new marketing method or a new organizational method in a business practice, workplace organization or external relations" (OECD, EUROSTAT, 2008). (Stasiak-Betlejewska, 2015) "J. Schumpeter stated that new product development, production, management and similar processes have significant effects on competitiveness and that technological developments and in this sense, it will have positive effects on economic growth (Bozkurt, 2015)." (Corekcioglu, 2019)

"Being innovative is relevant, but the integration of information technologies with the innovation activities is much more acute. The question is how innovation capability can be developed within an enterprise and how information capability and knowledge management are integrated into the innovation process (McEvily & Chakravarthy, 2002; Prajogo & Ahmed, 2006, in Jaca et al., 2016). The information is important in the innovation management since the enterprises need to understand their customers, fulfil their needs and expectations, so they should acquire the right amount of appropriate information about the markets (customers, competitors, potential partners etc.). According to Keszey & Biemans (2016), for several decades, the innovation literature emphasizes that successful innovation requires a clear marketing focus and a superior understanding of customer needs." (Kovaľová, Kulčár, 2017) On the following pages we are going to analyze the importance of marketing in academic researches, knowledge transport and innovation management.

2.1 The Effect of Bayh Dole Act Theory in Europe on the Patent Registration

The appearance of the American theory and patent policy of Bayh Dole Act in Europe at the beginning of the new millennial (2000's) has caused conflicts of its effectivity and efficiency between the member of the scientific area. With this new patent policy, the ownership of the intellectual property has gone to the institution where the research and the registration of the patent was happening.

The currently available scientific publications about the act and results cause by the active usage of Bayh Dole Act are divided into two groups. The publications of experts from the first group claim that the number of patent registration is in connection with the applicated patent theory and policy in a chosen country. Consequently, the American Bayh- Dole Act theory creates perfect and ideal environment for its users. Moreover, motivates researchers for further studies and to register their patents, thanks to what the registered patent number is increasing.

The goal of Bayh Dole Act patent policy is to give the power to the hands of the universities, to promote and sell the academic patents and ensure quality knowledge transfer between universities and third parties. Universities have all the knowledge and human capital to provide and offer quality marketing of the academic patent. Professors, researchers working on the patent have high knowledge in their research area, while their abilities in marketing, business and sales do not have to be on the highest level. To ensure these acts to be done with the best quality, the institution where the patent was created gets the right for the ownership. For its legal property the institution has to create and provide the best environment and services for the patent management on the market of the intellectual properties. The Economist newspaper in 2002 wrote that the Bayh Dole Act is "[p]ossibly the most inspired piece of legislation to be enacted in America over the past half-century." (Innovation's Golden Goose, 2002).

Also, Perkins and Tierney in their work analyze the results after applicating the Bayh Dole Act theory, also its influence on university patent creation and registration. They said "the Bayh–Dole Act caused research universities in the USA to increase their focus on patenting and licensing activities." (Perkins J. F., Tierney W.G., 2014)

Zeebroeck N, Pottelsberghe B, Guellec D (2008) with their publication are part of the first group of theorists, who think and say that the rising number of patent registration is the positive result of the implication of the theory of

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Bayh Dole Act. In their work they defined, that Bayh Dole Act "gave universities greater incentives to commercialize technology" (Zeebroeck N, Pottelsberghe B, Guellec D, 2008).

In contrast with this point of view, the other group of scientists think, that the amount of patent registration is not in correlation with the applied policy and theory in the selected country. What means the rise in the patent application is not caused by the institutional ownership-based Bayh Dole Act theory. They say in their works, this growth is caused by different issues, as establishment and creation of new research sectors, like IT, biotechnology, etc. (Geuna, Rossi, 2011, Sapalis and Pottelsberghe, 2003, Lissoni F, Llerena P, McKelvey M, Sanditov B, 2008, Mowery et al, 2001)

Geuna and Rossi (2011) in their publication say, that the American theory does not fit perfectly for all the countries, cannot be applicated in every country with the same level of efficiency. After 2000, the number of registered patents was increasing in most of the countries of the European Union. They defined three reasons and issues, what were the source of this increasement. First of all, the number of registered patents was rising because of the new actors- universities- who appeared in the research market. Also, universities, which were already actively registering their intellectual property became more active thanks to their experience and knowledge received through the previous time period. Secondly, they described that in those countries where the system for knowledge transfer was created slower behind schedule the number of patent registration was increasing in the 2000's. The development of the infrastructure for this exchange of intellectual property was happening, but since it was late, the result has also arrived later, and the increase in the number of registered patents was late, too. According to Geuna and Rossi (2011) the third reason "shows that university-invented patents owned by businesses still play an extremely important role in all countries. There are indications also that university-owned patents have increased in some countries, at the expense of individually-owned and business-owned (but university-invented) patents. If academic patenting data are corrected to account for university-invented patents, then for some countries with long traditions of academic patenting (such as Germany) and for some scientific/technological fields where academic patenting has been particularly important (such as biotechnology), we find evidence of a leveling off or decrease in the total number of academic patents applications by mid 2000s "(Geuna, Rossi, 2011).

Also we can read in the work of Sapalis and Pottelsbetghe (2003) that "the sharp increase in the patenting activity of Belgian universities is mainly due to a technological revolution, the start of the bio-tech era." (Sapalis, Pottelsberghe, 2003).

Other authors Lissoni F, Llerena P, McKelvey M, Sanditov B (2008) are from the group with the same point of view of the efficiency of the Bayh Dole Act- the number of registered academic patents is not in correlation with the currently applied patent policy in a selected country- are saying that academic patenting "does not depend upon IPR legislation, but on the institutional profile of the national academic systems, and possibly on the national specificities of the relationship between university and industry. "(Lissoni F, Llerena P, McKelvey M, Sanditov B, 2008).

Mowery et al. (2001) wrote that the rising patent number is caused by the newly established patent offices in Europe, who supported and motivated universities and researchers for further active work. Moreover, they defined that in some sectors (life sciences- biotechnology) the patent registration was remarkably increasing. Furthermore, in the 70's of the previous century, the patent application in the sector of biotechnologies was increasing by 123%, however, in the other sector they could observe only 22% increase. (Mowery et al. 2001).

To sum up, most of the studied research papers state that the American patent theory of Bayh Dole Act is not efficient for the European market. In the researches they showed, that the rise in the academic patents is not caused by the new patent policy, but by other factors. This theory works well in the US, but cannot be fully copied and implemented in all the countries of the European Union or the world. These issues, barriers in the implementation of the American theory can be caused by the different historical, cultural, political backgrounds in the countries of the EU. Shattock (2005) said "breaking down the bureaucratic barriers to entrepreneurialism in universities is probably at least as important as incentivising it through new financial mechanisms." (Shattock 2005)

3. Data & Methodology

In the research paper named: The Bayh Dole Act, an American Patent Policy in Europe, we analyze patents according to theories of various important economists working on this problem. Our work focusses mainly on university patents in the European Union, on their functions and importance for the countries of developing economies. On the following pages, we define what university patents are and what they are used for, we analyze

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the benefits of patent for universities, for the industrial sector of the country, and their negative aspects. It is very interesting to follow the alterations between different countries, their methods and patenting strategies according to different sectors.

The main goal of this work is to analyze the development of patent activity in selected European countries. The aim is to show and define the difference between two patenting methods: the Bayh Dole Act and the Professor's Privilege. We are observing academic institutions, professors in the European Union, and their habits, experiences with the action of patenting. We analyze, define the advantages and disadvantages of both theories and their application in selected countries of the European Union (e.g., the application of the Bayh-Dole Act in Denmark, and its shortcomings). Also, we discuss if the American model, the Bayh-Dole Act is the most appropriate for appliance in the countries of the EU.

Moreover, we compare two opinions of researchers about the increasing number of patent registration. The first group of researchers think and say that the number of patents increases as a reaction for the newly applied patent theory and policy (Bayh Dole Act or Professor's Privilege). On the other hand, scientists of the opposite party claim, that the increase in the number of registered patents is not caused by the change of patent ownership, but it is the result of newly created sectors, spheres where researchers actively work (for examples, IT, biotechnology, nanotechnology, etc.), and it has no connection with the patent policy or theory in the chosen country.

In addition, as a partial goal we emphasize the difference in the action of patenting between the countries of the Eastern (Austria, Hungary) and the Western block (Sweden, Denmark) of the European Union (the impact of the socialism on the patenting process- the post-socialism environment). We analyze, whether the countries of the Eastern block are sufficiently active in the patenting process compared to the Western block? (Novotný Á, 2010)

The following research is very interesting since this topic, the application of the American theory, of the Bayh-Dole Act is mostly described and applied in European Union as whole, or in the western countries of the EU, but the quantity of research papers written about the eastern part of Europe is significantly lower.

In this research paper, we are testing the following statements:

1. After the implication of the American patent policy, the Bayh Dole Act the number of registrated academic patents has increased (Ledebur, Buenstorf, Hummel, 2009).

2. The number of patent registration was not increasing after applying the theory of Bayh Dole Act because of the new theory, but this rise was caused by the creation and development of new sectors (Sapalis, Pottelsberghe, 2003, Mowery et al. 2001).

To achieve the previously mentioned goals, we use different methodologies. First of all, we study various research papers, webpages, articles about the theme of university patenting. We mostly examine international research documents written in English; due to that with reading articles in English we can increase the quantity and the quality of the information and the knowledge. We are concentrating on the specific studies written about the difference between two patent application theories, the American theory Bayh- Dole Act and the classical European theory of Professors Privilege, since it is the main element of the paper. Moreover, we compare two groups of researchers, the first group of scientists claim that the rise in the number of registered academic patents is caused by the implementation and the active usage of a new patent ownership theory Bayh Dole Act, or the Professor Privilege, they say that the new patent politics motivates researchers positively for patent application. On the other hand, the second group of researchers think, this increasement in the number of registered patents does not depend on the actually applicated patent theory in the country, but it is caused by the establishment of new sectors (IT, biotechnology, ...). Thanks to these newly created sectors, and because of the higher achieved knowledge, the act of patent creating is fastened, what causes the rise in the number of registered patents. This means, we analyze those sectors, spheres in which the most patent was registered in the selected countries during a defined time period, and we argument these two mentioned point of view of the rising patent registration according to the results of our research and data analysis.

The analyzed countries are: Sweden, Denmark, Hungary and Austria. We choose the previously mentioned countries with the goal to compare countries from the western block with countries from the eastern block (the impact of socialism on the act of patenting). From the western block we chose Denmark and Sweden (Scandinavian countries) and from the eastern block Austria and Hungary (Central Europe). Also, we can compare the act of patent registration of the Scandinavian countries with the countries of Central Europe. Moreover, in the selection of the studied countries different ownership theory is applicated (for examples, Denmark- institutional ownership-

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2000, Sweden- inventor ownership (1949), Austria (institutional ownership- 2002) and Hungary (institutional ownership- 2006).

Moreover, we collect and analyze patent data OECD between 1997 and 2017, for the reason that 20 years are long enough to show tendencies in the changes of patent registration number. From this database we filter and select data what is necessary for us to answer our statements and research questions. (For examples: Statement n.1: "The number of patent applications was increasing after applying the theory of Bayh Dole Act (Ledebur, Buenstorf, Hummel, 2009).") Selected analyzed dates are for examples: number of registered academic patents in selected counties in a defined time period, inventor share rate for patents, academic patent registration for NUTS3 regions and academic patent registrations in various sectors. This OECD academic patent dataset, what we were working with has more than 1 316 000 lines. We need to mention, that we concentrate in most of our analysis on the time period 1997-2015, the data from 2016 and 2017 are excluded since the patent registration administration takes longer time period and the dataset is not full and complete, yet. With this strategic movement we would like to avoid and minimalize unreal and incorrect analysis.

Also, we collected data from the World Bank Database, too. We analyzed the academic patent registration in the selected countries according the regions (NUTS 3) where they were registered from, or the inventor share of the registered patents. In most of the examination we were working with per capita academic patent registration rate, with what we would like to secure the fairest comparation of various countries with the highest quality. Per capita patent registration rate is counted from the patent registration number and the population in a certain country (total academic patent registration number/ population).

Also, we define, if there is a significant change after application of a new patent theory. To achieve the necessary data, we will use research method Difference-in-Differences (DiD) average comparing analyses. Difference-in-Differences method is perfect for observation of a newly applied theory, policy. It clearly shows us the effect of the newly implemented policy (Ejermo, Toivanen, 2008). "If sample average data is available for beneficiaries and non-beneficiaries for at least two time periods, the difference-in-differences (DID) method produces estimates of impacts that are in principle more plausible than those based on a single difference (either over time or between groups)." (Evalsed Sourcebook: Method and techniques, 2013)

In the Difference- in -Differences analysis we divided countries into two groups, group of countries where Bayh Dole Act patent policy is implicated (Denmark, Austria and Hungary) and countries where Bayh Dole Act theory is not used (Sweden). We analyze the mentioned groups PRE (before) and POST (after) implication of the new policy, and the impact of the theory for patent registration number. For higher quality comparison without eventual mistakes, we use per capita academic patent registration rate. We count and compare average rate in the selected countries between 1997 and 2015. Furthermore, we do DiD analyses for each studied country separately.

Finally, we study the academic patent registration number in the selected countries according to the sectors. With these analyses we would like to prove statement n.2.: The number of patent registration was not increasing after applying the theory of Bayh Dole Act because of the new theory, but this rise was caused by the creation and development of new sectors. (Sapalis, Pottelsberghe, 2003, Mowery et al. 2001). For these calculations we have used OECD patent database.

4. Results

4.1. Analysis for the Application of Bayh Dole Act Patent Policy

Difference-in-Differences analysis is a research method with what we can compare the result and effect of newly applied theory, policy, method etc. With this quantitative research technique, we compare the situation before and after the new policy. In the work we are going analyze the American patent policy, the Bayh Dole Act theory and its implication results in Denmark, Austria and Hungary. We compare the number of registered patents before the year of application and one year after (we analyze the year after the implication, not from the year when the new theory was applicated – for examples: in Denmark the Bayh Dole Act theory is used since 2000, but we study the result of the new policy only from 2001, because the results of the new theory do not happen immediately, and we do not know is the theory was implicated in January or December). We compare countries where the Bayh Dole Act theory was implicated (Denmark, Austria and Hungary) with a country where the American patent policy is not used, but the classic Professor's Privilege (Sweden). We analyzed the selected countries during 18 years, since 1997 till 2015.

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Comparision - Per capita			
HU	Before	0,1036 ‱	
	After	0,1797 ‱	
	Difference	0,0760 ‱	
AT	Before		
	After	1,5280 ‱	
	Difference		
DK	Before	0,9145 ‱	
	After		
	Difference	0,6695 ‱	
SE	Before		
	After	2,2239 ‰	
	Difference		



Source: OECD Patent Database, own elaboration

On table 5, we studied the changing situation in all the selected countries individually. To sum up, in all the four countries the per capita patent registration rate was rising during these 18 years. We can state, that after implication of the Bayh Dole Act theory the number of registered academic patents were increasing. However, in Sweden this rate increased, too without implication of the American theory. The biggest percentual difference between preand post-data, we could observe in Sweden (without BDA) and Denmark, in the Scandinavian countries.

We need to emphasize, this comparison cannot be taken, considered as a rule, what is always true. Since we have analyzed only four countries, moreover only one country was studied from the group of European countries, where Bayh Dole Act patent theory is not applicated (Sweden). In our work we did not analyze and study enough number of countries to make strong and true statements in academic patent registration sphere.

4.2. Academic Patent Registration in Selected Sectors

In the following part we are going work with academic patent registration in selected sectors. As preciously we wrote, the authors working and analyzing this problematic, the problematic of academic patenting, can be divided into two groups. The first group is contained from specialists who claim the number of academic patent registration has grown with the application of new American patent policy, the Bayh Dole Act theory (Innovation's Golden Goose, 2002, Perkins J. F., Tierney W.G., 2004, Zeebroeck N, Pottelsberghe B, Guellec D, 2008). The scientists from the other group in their publications claim, that the rising number of academic patent registration is not caused by the application of the new American patent policy, but is caused by other indicators, as the establishment of new research sectors and by the rapidly rising development in science and technologies (Geuna, Rossi, 2011, Sapalis and Pottelsberghe, 2003, Lissoni F, Llerena P, McKelvey M, Sanditov B, 2008, Mowery et al. 2001, Sapalis, Pottelsberghe, 2003, Lissoni F, Llerena P, McKelvey M, Sanditov B, 2008, Mowery et al. 2001).

We analyzed four selected sectors (A61-Medical or Veterinary Science, Hygiene, B81- Microstructural Technology, B82- Nanotechnology and H04- Electric Communication Technique). These sectors were chosen from Wipo IP Portal according to the sector analyses of the previously mentioned authors from the second group.

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Graph 1. Academic patent registration in selected sectors- Sweden

Source: OECD database, own elaboration

Graph 1. perfectly shows us the rising trend in patent registration number. We need to mention that purple color represents the quality of academic patents registered in the sphere of Electric Communication Technique and the lighter blue color shows the patent registration number in the sector of Medical or Veterinary Science and Hygiene. Year 2009 shows a rapid reduction, what can be explained by the big economic crisis in 2008/2009. In the case of the country Sweden the activity in Electric Communication Technique has increased significantly during these 18 years, while in 1997 only 223 patents were registered in this sector, by 2015 it has reached the level of 966 patent registrations.



Graph 2. Academic patent registration in selected sectors- Denmark **Source:** OECD, own elaboration

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Next graph introduces us the academic patent registration number in the selected sectors in Denmark between 1997 and 2015. With red color we have mentioned the year, in the case of Denmark- 2000, when Bayh Dole Act patent policy was applicated. As from the previous part of the research paper we know after the year of the application of the new patent policy the patent registration number in the academic sphere was increasing, however many authors in their publications have described that this rise in not caused by the new theory but by sectoral changes. On the graph 22, we see that these authors were correct, after 2000 in Denmark the academic patent application in Medical or Veterinary Science and Hygiene has increased significantly. As in the case of Sweden, the big economics crisis in 2008 had a negative effect even on the Danish academic patent industry. However, this crisis, and the its following decrease have passed in 2 years, in 2011 the academic patent registration number got to its previous, before crisis level again. In Denmark the sector of Medical or veterinary science and hygiene is more significant for patent registration than in Sweden, where the sector of Electric communication technique has played a bigger role.



Graph 3. Academic patent registration in selected sectors- Austria

Source: OECD, own elaboration

If we speak about sectoral academic patent registration in Austria, we need to mention the same characteristics, attributes as previously. The patent registration number in the analyzed sectors was increasing. With red color we tagged the year when the American patent policy was applicated, in the case of Austria it has happened in 2002. Since 2002 we can see rising tendency in patent registration numbers. However, the 2008 economic crises had negative effects on the patent registration market of Austria, too.

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Source: OECD, own elaboration

Finally, we analyze academic patent registrations in Hungary between 1997 and 2015. The red color represents the application year of Bayh Dole Act academic patent theory, in Hungary it has happened in 2006. If we look at the graph, we see changing trend, with rises and reduction, but it we compare it with graph 12, where we studied total academic patent registration is Hungary, we can find similarities. The 2008 economics crises, has negatively influenced the academic patent registration activities.

Also, we need to mention that we studied and analyzed two more sectors, concretely Nanotechnology and Microstructural Technology. The following sectors are not visible on the graphs, since their activity, patent registration number is very low compared to the other sectors. However, they are important in our studies, since these are one of those sectors, what were newly created after the millennial, at the beginning of the 21st century, and their popularity, attractiveness is just starting to rise nowadays.

5. Conclusion and Discussion

To sum up, in our research paper we studied and analyzed two very famous academic patent policies, the Bayh Dole Act and the Professors' Privilege. According to the American patent policy - the Bayh Dole Act - the legal patent ownership goes to the institution where the academic patent was registered. However, the classic European policy – the Professors' Privilege – says that the patent ownership right should go to the person or group of people, who created and registered the academic patent. We have analyzed the mentioned patent theories in four countries of the European Union – Denmark, Sweden, Austria and Hungary.

Also, we analyzed publications of famous and successful economists, publishers, researchers, who were working with this issue. We have divided them into two groups, the first group was created of scientists who claimed that the Bayh Dole Act theory effects and causes rise in the number of academic patents after the year of its implication (Innovation's Golden Goose, 2002, Perkins J. F., Tierney W.G., 2004, Zeebroeck N, Pottelsberghe B, Guellec D, 2008). In the other group of publications, we have included those researchers who said in their publications that the American patent policy (the Bayh Dole Act) has no effect on the rising patent registration number, and this rise is caused by the rising number of newly created sectors (IT, Biotechnology) (Geuna, Rossi, 2011, Sapalis and Pottelsberghe, 2003, Lissoni F, Llerena P, McKelvey M, Sanditov B, 2008, Mowery et al, 2001, Sapalis, Pottelsberghe, 2003, Lissoni F, Llerena P, McKelvey M, Sanditov B, 2008, Mowery et al. 2001).

We would like to say, that the first statement is correct, true according to our analysis. It means, that after the implicational year of the American patent policy in the EU the number of academic patent application was increasing. This rise was considered in ceteris paribus, what mean that we did not consider further factors, what could influence and cause the rise.

The second statement is also true according to our researches. With the help of Difference-in-Differences average comparing analysis, patent growth rate studies and sectorial analyses we got the results, that this rise is not caused by the implication of the American patent policy, but it is influenced by other effects, as the creation of new sectors or the rising trend of activity in patent registration in some sectors (IT, Biotechnology, etc.)
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We cannot claim 100% the inefficiency of the Bayh Dole Act theory according to our Difference-in-Differences average comparing analyses, since we have studied only four countries, and only one country which has implicated the Professor's Privilege. The small number of studied countries does not ensure and provide the possibility to create general statements, what could be considered as always true.

Finally, one of our goals was to compare the academic patent registration in two parts of the European Union, Northern Europe and Central Europe. We have analyzed two Northern European countries, Sweden and Denmark, and two Central European countries, Austria and Hungary. In our research paper we have evaluated small number of countries, only four, two from each group. Due to this fact, we cannot make a general statement, in which area, part of Europe is the academic patent registration activity more vital. In the case of Hungary, we observed that this Central European country was lying much below the Norther European average (Sweden, Denmark), however academic patent registration rate in Austria- Central Europe- was situated on the same level as Sweden or Denmark. We cannot say that, generally academic patent registration rate in Central Europe is lower than in Northern Europe, to achieve more punctual results we should do further analyses in other countries of the studied region.

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Determinants of shadow economy: A bibliometric approach

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Abstract

This paper performs a systematic literature review on the shadow economy and its determinants based on a bibliometric approach. Based on VosViewer and Web of Science, we identified various drivers of the shadow economy that we clustered into three categories: (1) economic factors, (2) political and institutional variables, and (3) social factors. In the last decades, the increasing role of social factors is significant for the flourish of the shadow economy. This analysis underpins the importance of recent shadow economy determinants such as immigration, cybercrime, happiness, culture, education, and religion – not enough studied and subjected to the public attention. It turns out that the determinants of the shadow economy depend not only on economic and political aspects such as unemployment, foreign direct investment, tax burden, or even the quality of government but also on social aspects such as happiness, culture, inequality, and religion. Based on these findings, the regulation of the shadow economy must be started by governments with reconsidering the measures and taking into account the social aspects, which can be a possible key to restrain this phenomenon. It is obvious that not all social drivers can be influenced by the government, but they can be promoted and deliberately focused with the help of grants or different social programs.

Keywords: shadow economy, Informal economy, Bibliometric Approach

Jel Codes: E26, O17, D69, H53, C23

1. Introduction

The shadow economy has been a highly debated topic for a long time. With the development of the shadow economy, the conceptualization has changed along with it. In earlier studies, the shadow economy was often described as the informal economy. On this basis, various studies of informal economic activities were developed, which determined further progress of research with the various approaches (Boeke, 1953; Lewis, 1954; Kaldor 1956; Cagan, 1958 and Engholm & Geetz, 1964). With the analytical work of Hart (1971, 1973) on the Third World in Ghana, the findings were taken to a new level. The first scientific steps in the field of shadow economy were made in various marginal areas, but mainly in the sociological and anthropological fields (Gërxhani, 2002). Results of the research showed that the shadow economy attracted the highest spread during the Second World War, especially in the United States (Tanzi, 2002).

Over the decades, a large body of literature has accumulated. In this paper, the wide variety of drivers and influencing factors of the shadow economy have been captured and analyzed in a systematic literature review. The literature review is underpinned by bibliometric literature and content analysis (Fetscherin et al., 2010; White et al., 2016; Paul & Benito, 2018; Paul et al. 2017). The bibliometric literature review will serve to summarize and pursue the following research questions: (1) What do we know so far regarding the shadow economy? (2) What are the known and possible lesser-known factors influencing the shadow economy? (3) What are the most known drivers of shadow economy in the literature (journals and data sources)? (4) What future research directions will focus and what are the knowledge gaps?

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2. Theories regarding the concept of shadow economy

There is no universally accepted and scientifically recognized definition. In order to understand the importance of the shadow economy, it is helpful to present the development with all its different views. For this reason, the existing definitions and explanatory approaches are presented and analyzed.

The conceptual basis of the shadow economy is found in a variety of contexts such as the informal economy, unemployment, and even in the context of crime. One of the well-known synonym used for shadow economy was mentioned for the first time by Arthur W. Lewis in 1955 through the term informal economy defined as underemployment in urban areas. The International Labor Organization underlined the fact that it is not about one sector, but about the whole economy (ILO, Geneva 1972). Another relevant definition for informal economy considered as the activity of those who were financially unsuccessful in the formal sector was mentioned by Hart (1973).

One of the most relevant definition of shadow economy was formulated by Medina and Schneider (2018). According to them, the shadow economy represents "all economic activities" that are "hidden from official authorities for regulatory and institutional reasons".

In the course of the previous work, a wide variety of definitions and explanations were discussed in the context of the shadow economy. Building on this, the effects will now be presented in a descriptive manner in the course of the article. Activities in the unofficial sector result in losses in tax revenues and social security, which the state incurs as a result of shadow economic activities (Buehn & Schneider 2007). As a result, a constant increase in country-specific tax rates is necessary to guarantee the country's budget. If tax revenues were not compensated by tax rate increases, this would lead to a deterioration in public services, and services and goods would be reduced or even discontinued. It would possibly result in an impairment of economic development and thus the prosperity of all (Schneider et al. 2010). In a study, Loayza (1996) found that the shadow economy in Latin America was associated with a decline in official economic growth. The basis of his work represents the reduced provision of public goods. Also, the use and associated efficiency in resources such as labor, capital, and the environment in the legal economy decreases significantly with the activities in the shadow economy and does not contribute to the overall economy (Schneider et al. 2010; Enste 2018). Additionally, crime associated with the informal economy is a hurdle. Activities in the informal economy undermine state institutions, which threatens political development (Enste 2018). The reliability and transparency of public statistics are also only of limited value when a not inconsiderable amount of economic activity takes place in the shadow economy. Policymakers may make inefficient and error-prone decisions based on these statistics and derive policies from them (Fleming et al., 2000; Schneider & Enste 2000; Tanzi 1999).

In science, there are countless terms that are supposed to be equal to the shadow economy. Probably one of the most meaningful and current studies is that of Williams & Schneider (2016), who have elaborated a total of 54 terms, divided into adjectives and nouns, which circumscribes the concept of the shadow economy. For an all-inclusive analysis of the synonyms of shadow economy used, we do not rely on the existing studies but conduct an analysis. We used VosViewer to collect all synonyms found in connection with the shadow economy in the literature between the years 1975 and 2021. It can be seen from **Figure 1** that in the literature, the terms such as corruption, money laundering, avoidance, tax avoidance, informal economy/sector, or even shadow banking are predominantly associated with the shadow economy.

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Figure 1. Keywords in relation with "shadow economy" 1975-2021.

Source: Author's own composition

3. Analysis of Shadow Economy

To illustrate the interest in the topic of the shadow economy, publications and citations were examined in more detail from 1975 to October 2021. There are a total of 2,564 publications about the shadow economy. The topics are widely spread from the economic, social to the legal sector. And so it is evident that there is a lot of interest in the topic of the shadow economy. A total of 20,120 articles were cited under the shadow economy and a total citation over 25,736 times.

In addition to the publications and citations analyzed, an H-index was calculated. The H-index reflects the productivity of authors based on their publications and citations (Hirsch, 2005). The H-index is based on the calculation of Web of Science and examined the authors associated with the shadow economy. It was possible to find an H-index above 68, which expresses a high activity and therefore a good quality of the authors.



Figure 2. Analysis of "shadow economy" in the title of the articles

Source: Author's own composition

Different publishers, conferences and journals are interested in making a scientific contribution to the topic of the shadow economy and thus provide space for scientific publications. In **Figure 3**, created with VosViewer, the journals that have published the most articles on the topic of shadow economy were shown. Particularly noteworthy and worth highlighting is the connection between the various journals, which is created by the citation. A special connection exists on the one hand between the journal "Sustainability" and different journals like "Economic

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Systems" or "Environmental Science and Pollution". Also the journal "Corruption, Fraud, Organized Crime, and the shadow economy" has a special connection to "Shadow Economy" or "Public Choice".



Figure 3. Journals in relation with "shadow economy" 1975-2021

Source: Author's own composition

During the period from 1975 to 2021, 1,007 scientific journals were interested in publications on the topic of the shadow economy. The ten journals with the most publications are described in the **Table 1**.

Journal	Publication	Citation
Corruption, Fraud, Organized Crime, and the shadow economy	17	454
Sustainability	17	1096
Baltic Journal of Economic Studies	15	253
Capitalism and the World Economy: The Light and Shadow of Globalization	14	424
Journal of Political Economy	13	401
Financial and Credit Activity – Problems of Theory and Practice	12	220
Russian Journal of Criminology	12	312
Journal of Cleaner Produciton	11	627
2018 IEEE/RSJ International Conference on intelligent Robots and Systems (IROS)	10	179
Environment and Planning A-Economy and Space	10	644

Table 1. Top 10 journals with publication about shadow economy

Source: Author's own composition

Note: The analysis period is 1975 - October 2021

However, in addition to the publisher of the scientific papers, the interest and thus the quality of the journal is also of great importance. The interest and the associated quality can be measured in terms of the number of citations. For this reason, **Table 2** lists the journals with the highest number of citations in the period from 1975 to 2021. By far the most cited journal is "Sustainability", which has reached 1,096 citations with 17 articles.

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Journal	Citation	Publication
Sustainability	1,096	17
Review of International Political Economy	712	8
Environment and Planning A-Economy and Space	644	10
Journal of Cleaner Production	627	11
Environmental & Resource Economics	549	5
Journal of Economic Literature	548	2
Urban Studies	539	6
Energy Economics	524	9
Journal of Developmental Entrepreneurship	513	4
Corruption, Fraud, Organized Crime, And the Shadow Economy	454	17

Table 2. Top 10 journals with most citation about shadow economy

Source: Author's own composition

Note: The analysis period is 1975 – October 2021

The previous analysis was always based on an overall period from 1975 to 2021. The figure below (Figure 4) represents the interest in the form of citation and publication over time. While there was almost no interest until 2005, both publications and citations increased exponentially. Especially in 2019 and 2020, publications and citation were at their peak due to their exponential progression. With this representation, it is clear that the interest has never been higher.



Figure 4. Times cited and publication "shadow economy"

Source: Author's own composition

In addition to the publishers presented and the associated citations and publications, the author plays an equally important role. In the following overview, the most active authors in the shadow economy are presented, and the connection between the authors is shown. It becomes clear that the authors Schneider, Williams, Saunoris, but also Achim, and Dell'Anno are the authors, who are very active researchers in the field of the shadow economy. Special

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connections exist between Schneider and Williams, but also just as between Schneider and Saunoris. The various other connections can be taken from Figure 5.



Figure 5. Bibliometric coupling of authors of "shadow economy" papers 1975-2021

Source: Author's own composition

4. Analysis of shadow economy determinants

There is a comprehensive variety of different influencing variables that have an important effect on the shadow economy. As part of the systematic literature review of existing publications from 1975 to 2021, a graphical representation of the factors influencing the shadow economy that have been studied so far was developed in Figure 6.



Figure 6. Determinants of shadow economy 1975-2021

Source: Author's own composition

We have grouped them into three categories: (1) economic determinants; (2) political and institutional determinants; (3) social determinants.

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4.1. Economic determinants

The economic factors influencing the shadow economy have been addressed and analyzed in a considerable sum of studies (**Table 3**). Of the three different areas, this is probably the one that has been studied the most.

Table 3. Economic determinants of shadow economy

Factors	Sign	Authors
Economic development:	-	Johnson et al., (1997)
GDP per capita, HDI		La Porta & Shleifer (2008)
		Yalaman & Gumus, (2017)
		Ateşağaoğlu et al., (2018)
		Kelmanson et al. (2019)
		Navickas et al. (2019)
		Wu & Schneider, (2019)
		Baklouti & Boujelbene (2020)
		Achim et al. (2021)
		Poufinas et al. (2021)
		Lyulyov et al. (2021)
Economic growth	-	Mara (2011)
		Borlea et al. (2017)
		Achim et al. (2021)
		Mara (2021)
Economic complexity	+	Le Thanh Ha et al. (2021)
Trade openness	-	Fedajev & Arsiæ (2017)
		Canh et al. (2021)
FDI	-	Huynh et al. (2019)
		Bayer et al. (2020)
		Canh et al. (2021)
		Lyulyov et. al (2021)
Inflation	+	Mazhar (2017)
Employment rate	-	Bordignon & Zanardi (1997)
		Remeikienė et al. (2018)
		Kelmanson et al. (2019)
		Poufinas et al. (2021)
Income	-	Goel & Nelson (2016)
		Canh & Tanh (2020)
Income inequality	+	Schneider & Enste (2000)
		Chong & Gradstein (2004)
		Winkelried (2005)
		Krstič & Sanfey (2010)
Welfare	-	Ruge (2010)
		Mara (2021)

Source: Author's own composition

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The most important catalyst of reducing the shadow economy is the continuous rise of economic development. Many studies comprise this determinant measured by indicators such as GDP per capita and Human Development Index (HDI). Achim et al. (2021); Poufinas et al. (2021); Lyulyov et al. (2021); Baklouti & Boujelbene (2020) and Kelmanson et al. (2019) investigate the impact of GDP per capita on the shadow economy. The results show a negative correlation, which means when GDP per capita increases, activity in the shadow economy decreases. Lyulyov et al. (2021) also confirms the results presented so far and clarifies the exact relationship by concluding that a 10 % increase in GDP per capita cause a 1.2 % decrease in the shadow economy.

In Baklouti & Boujelbene's (2020) work, a distinction was made concerning the relationship between GDP per capita and the shadow economy. The distinction was made between good and poor institutional quality. The study concluded that good institutional quality has a positive effect on the relationship between GDP per capita and the shadow economy, which means that it results in a smaller shadow economy. And in contrast, when GDP per capita increases, an institution with poor quality may favor the extent of the shadow economy.

Berdiev & Saunoris (2018) and Berdiev et al. (2018) find that economic freedom can play a major role. Economic freedom is a complex concept measured by the Index of Economic Freedom.

Looking more closely at GDP and thus productivity, Kelmanson et al. (2019) and La Porta & Shleifer (2008) found that an increase in productivity is also associated with a reduction in the informal economy.

Wu & Schneider (2021) found a negative correlation between GDP per capita and the shadow economy, but exclusively related to less developed economies. With the study, a U-shaped relationship was found, which states that the shadow economy increases as soon as the GDP per capita exceeds a certain limit. With this article, it was clarified that the GDP per capita can have both positive and negative effects on the shadow economy in the context of a less developed economy.

The employment rate also represents an important factor with a great influence on the shadow economy (Bordignon & Zanardi (1997); Remeikienė et al. 2018). Upon closer examination, the study by Remeikienė et al. (2018) reveals that the employment rate runs counter to the shadow economy, thus confirming a negative correlation. When the employment rate decreased by 1, increases the level of the shadow economy by 0.0345.

Similarly, Poufinas (2021); Canh et al. (2020), and Kelmanson et al. (2019) found a concurrent effect between the unemployment rate and the shadow economy, confirming a positive relationship. It can be concluded from this that the share of unemployed people would like to secure their financial income with the help of activities in the underground economy.

The interaction between income distribution and the shadow economy is also a much-discussed relationship influencing factor. The overwhelming view on this confirms the hypothesis that increased income inequality favors the size of the shadow economy (Chong & Gradstein, 2004; Winkelried, 2005; Krstič & Sanfey, 2010). A contrary view is taken by Schneider & Enste (2000), who believe that higher-income workers have to pay more social security contributions due to the existing social security system and therefore have a higher incentive to engage in activities in the shadow economy.

Studies (Canh & Tanh, 2020) on the level of income show that a high level of income minimizes activity in the shadow economy, creating a negative effect. The correlation between shadow economy and welfare is analyzed by Ruge (2010), Schneider & Williams (2013), and Mara (2021). In this context, as important determinants are considered wages, unemployment, and social protection expenditures. The findings suggest that welfare has a significant impact on the decline of the shadow economy. Comparable results are represented by Goel & Nelson (2016), who find a negative correlation between economic welfare and the shadow economy. The reasons for this are the unattractiveness of the shadow economy for economic prosperity in the context of the relationship between risk and potential gain.

The influence variable of foreign direct investment (FDI) on the shadow economy is discussed in a large number of studies. And a predominantly strong negative relationship of FDI on the shadow economy is found Canh & Tanh, (2021), Huynh et al. (2019), and Bayer (2020). Lyulyov et al. (2021) state that a 10% increase in FDI reduces the shadow economy by 0.5%. Canh et al. (2021) elaborate on their results by finding a negative effect in FDI inflows in the short run, but a positive effect in the long run.

When analyzing the impact of trade openness on the shadow economy, Canh et al. (2021) found an opposite effect. This negative effect holds in both the short and long run. The findings of Canh et al. (2021) were confirmed by other studies such as Goel et al. (2019) and Fedajev & Arsiæ, 2017. In addition to trade openness, the complexity

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of the economy is also an important factor for the shadow economy. The researcher Le Thanh Ha et al. (2021) deals with this topic and found a negative correlation. The influence of economic complexity on the shadow economy is mainly evident in the long run and for countries with high-income levels.

Inflation is another influential instrument in the shadow economy. Mazhar (2017) confirms a positive effect between inflation and the shadow economy.

Borlea et al. (2017) and Mara (2011) studied the influential relationship between the shadow economy and economic growth and found a strong negative correlation. Achim et al. (2021) and Mara (2021) found that higher development of the economy leads to a reduction in the level of the shadow economy.

4.2. Political and institutional determinants

A comprehensive number of studies analyze the drivers of the shadow economy (**Table 4**). And among them, in the context of policy conditions, institutional quality is considered as one of the most important factors (Dreher & Schneider, 2009; Torgler & Schneider, 2009 and Elbahnasawy et al. 2016). The countervailing influence of institutional quality on the shadow economy, and thus a negative correlation, is confirmed in various studies (Mara, 2021; Canh et al., 2021; Torgler, 2009 and Bovi & Dell'Anno, 2010). A long-term cointegration between institutional quality and shadow economy as well as a heteroskedastic effect has been identified (Canh et al. 2021). In addition, Canh et al. (2021) and Alarcón-Garcia et al. (2020) argue that the influence of institutional quality has a heterogeneous character. One explanation is that, in the short term, there is a negative interaction between corruption control and the rule of law. While in the long run, political stability has a negative impact on shadow economy.

Factors	Sign	Authors
1. Tax factors	-	Alm et al. (2006)
Tax morale		Kirchler (2007)
		Torgler (2009)
Tax burden	-	Ruge (2010)
		Huynh & Nguyen (2020)
Tax level	+	Mazhar (2017)
		Enste (2018)
		Lyulyov (2021)
Tax complexity	+	Rajeev & Nelson (2016)
Tax policy	-	Huynh & Nguyen (2020)
2. Government	-	Bovi & Dell'Arno (2010)
Quality public governance		Achim et al. (2018)
		Enste (2018)
		Baklouti & Boujelbene (2019)
Institutional quality	-	Bovi & Dell'Arno (2010)
		Torgler (2009)
		Alarcón-Garcia (2020)
		Canh et al. (2021)
		Mara (2021)
Rule of law	-	Alarcón-Garcia (2020)
		Canh et al. (2021)

Table 4. Political determinants of shadow economy

Source: Author's own composition

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Achim et al. (2018), Enste (2018), and Bovi & Dell'Anno (2010) confirmed a negative relationship between the shadow economy and the quality of public governance. Also, Baklouti & Boujelbene (2019) find that countries with low levels of political stability have significantly higher urges to work in the shadow economy.

With the help of a survey by Žukauskas (2018), the public perception on the reasons for illegal purchases was analyzed and evaluated. Results show that the high cost of purchased goods and services (89% of respondents) is listed as one of the reasons that lead to engaging in the shadow economy. It can be concluded that the price difference between the taxed goods and the non-taxed goods drives people to take the illegal route. This means that 89% of the respondents consider taxation as a driver for being active in the shadow economy.

Based on these much-studied influencing factors the shadow economy include taxation and all its related issues. In his study, Arsić et al. (2015) discuss that the biggest influencing factors in this area are the size and structure of the tax burden, the efficiency of tax administration, the complexity, and the related equality, and lastly the verification of compliance. There are several confirmations of the statement of Arsić et al. (2015). Some studies have found that there is a positive correlation between the tax burden and the shadow economy (Lyulyov, 2021; Mazhar, 2017; Enste, 2018). Lyulyov (2021) demonstrates that a 10% increase in the tax level results in a 1% increase in the shadow economy.

Rajeev & Nelson (2016) also examined the impact of tax levels on the shadow economy and found that it is predominantly the complexity of the tax code that is a driver of the shadow economy. They particularly emphasize that tax rates or the overall level of taxation are not the main drivers of the shadow economy, as is often erroneously assumed.

Mara (2011) and Torgler (2009) also cite tax morale as an important factor that is negatively related to the shadow economy. The literature has found that tax morale is strongly associated with the quality of the public sector. Taxpayers agree to pay taxes honestly if they receive a corresponding benefit from the public service. In scientific terms, higher tax morale is positively associated with tax honesty, resulting in less tax evasion, undeclared work or other financial crime (Kirchler, 2007; Alm et al., 2006).

When considering the policy factors influencing the shadow economy, Huynh & Nguyen (2020) find that the shadow economy is negatively affected by changing tax policies that are reactive and thus proactive, and positively affected by a passive tax policy. Authors like Johnson et al. (1997); Gërxhani (2004); Loayza et al. (2009) and Schneider & Enste 2000 also argue that the tax burden affects the size of the shadow economy. In particular, Huynh & Nguyen (2020) and Ruge (2010) find that the tax burden increases the activity in the shadow economy. A closer look at indirect and direct taxation reveals that the levying of indirect taxes exerts a stronger influence on the shadow economy than direct taxes.

Another interesting policy criterion is the hypothesis examined by Achim & Borlea (2020, p. 162) that a high quality of banking system soundness leads to a reduction in the shadow economy's size.

4.3. Social determinants

In addition to the aforementioned influencing factors, there are also influences from the cultural sphere on the shadow economy (**Table 5**). For example, according to Richardson (2008) and Schneider et al. (2015), religion can be identified as an increasing factor. In his study, Richardson (2008) examined the influencing factor of religion in more detail and found a negative correlation to the shadow economy. These findings can be confirmed by Stack et al. (2006). It was found that as religiosity increases, the shadow economy steadily decreases. This is due to the assumption that religion appeals to honest and trustworthy actions, thus promoting and demanding moral values.

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Factors	Sign	Authors
Gender men	+	Goel & Saunoris (2017)
Happiness	-	Schneider et al. (2004)
		Berheim (2007)
		Thießen (2010)
		Schneider (2015)
		Achim et al. (2018)
Religion	-	Stack et al. (2006)
		Richardson (2008)
		Schneider et al. (2015)
Inequality	+	Dell'Anno (2016)

Table 5. Social determinants of shadow economy

Source: Author's own composition

In addition to the influence of religion, happiness also represents an important factor on the shadow economy. Studies such as Achim et al. (2018); Thießen (2010); Bergheim (2007); Schneider (2015) and Schneider et al. (2004) elaborated a link between happiness and the shadow economy. When looking at the extent of the influence of happiness on the shadow economy, a negative influence can be found. The basic idea is that happier people are more likely to act honestly, which leads to a reduction in the shadow economy.

To complement research on determinants such as happiness and religion, Goel & Saunoris (2017) looked at gender differences in the propensity to work in the shadow economy. The results show that unemployed men are more likely to work in the shadow economy than unemployed women.

Lastly, we address inequality, which has been further examined through the work of Dell'Anno (2016). His work examined the impact of inequality on the shadow economy and found that there is a positive correlation, meaning that if the population's perception of inequality increases, activity in the shadow economy increases.

5. Conclusion

The main objective of this inquiry is to review the phenomenon of the shadow economy and to identify its determinants with great significance from an economic, political, and social perspective.

As bibliometric analysis revealed the shadow economy is highly debated in the last decades and many authors try to clarify the coverage of this concept. Based on this analysis we try to underline the importance of the determinants of the shadow economy to provide a starting point for future policies adopted by the governments in the fight against the shadow economy.

As a future direction for the study, we intend to realize an extended analysis of the consequences of the shadow economy considering the same economic, political, and social perspectives.

The map of terms correlated with shadow economy reveals some novel concepts such as immigration, education, and cybercrime. We can state in this context the necessity for deep analysis regarding these new facts and mapping the new trends of government policies in accordance with this.

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Declaration of Competing Interest

The authors of this paper certify that there is no financial or personal interest that could have appeared to influence the work reported in this paper.

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May intellectual capital influence innovation? A Worldwide empirical study

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Abstract

The aim of this paper is to try to catch the influence of intellectual capital on innovation. In order to measure the intellectual capital, there were considered three components as being three indexes through we have measure the Intellectual Capital: Human Index Capital, Education Index and the National IQ and Innovation was measured through Innovation Index. Three equations were constructed in order to see if there is an influence or an impact of each dimension of Intellectual Capital on Innovation. Our research was made over a period of 15 years (2005-2020) and the sample is composed by 186 countries. The relationship between Innovation and Intellectual Capital was studied using Panel Least Squared (PLS). The results showed us that in all three cases between Innovation and each component of Intellectual Capital there is a positive relationship.

Keywords: intellectual capital, innovation, education, human capital, IQ

Jel Codes: C1, J21, J25, O3

1. Introduction

Being a topic of major importance nowadays, the study of intellectual capital has become a very important topic in future or existing research. Since the time of its emergence, intellectual property has developed into a system of protection of the results of human creation. Thus, the interest for this has grown significantly and the interest for the economic aspect has become evident. Intellectual capital is considered as a key resource for expanding intelligence, as its name suggests. Over time, it has received a number of definitions, but in the present no consensus has been reached regarding its explanation. However, intellectual capital is the key to all organizations given that it is made up of all the knowledge, experiences, values, skills that an employee has in a company. The economic development is the point for any company and also for any nations since it always. It could be said to be a multimensional process that can involves changes (Omiunu, 2019). Nowadays being a top of major importance the study of intellectual capital has became a very important topic for the present and further studies. Since of it was mention it was very developed due to the fact that is was associated most of the time with knowlegde, experience, values, skills not only for the companies but also for the entire economy of a country and also for the entire world. In this way, the interest for this topic has grown significantly and interest for the economic aspect became obvious. But we can not stop by mention only the intellectual capital without the parts that compose it.

We need to know that also the human capital is an important part of this large topic. We say this thing due to the fact that without human force the world can't function. But also there are a lot of controversy because nowadays the technology is gaining more and more ground. But also we need no reiforce the fact that without people the technology wasn't able to be born.

Even if we talk about towns and organizations, there are still individuals and groups that are still trying to grow. In order to be more famous and also to gain profit, they try to grow in order to improve their situation. The concept of innovation, technology transfer, and competitiveness is an integral part of the modern economic growth process, which shows that a long-term sustainable growth can only be achieved through the continuous input of knowledge and research.Due to the endless possibilities of innovation, the world's nations have developed their own long- and medium-term growth strategies.

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2. Literature review

Nowadays, the new economy or the knowledge economy reflects that kind of economy which pass beyond the stage where knowledge represents the key and there are a lot of factors which influenced this, like: IT progress, the increase of the development speed of the new technologies, competition at global level and now we can mention that the phrase 'time is money' was replaced successfully with 'knowledge is power' (Achim & Borlea, 2013).

After a short literature review we found out that Intellectual Capital was launched for the first time in 1969 by J.K. Galbraith who said that the intellectual capital means all intellectual activity (Bontis, 1996). But also, we need to know that the concept of intellectual capital was defined and argued for the first time by another author Thomas A. Stewart. This concept is often used in accounting to refer to intangible assets that are also included in the calculation of financial statements. Even if this concept was not presented as such, it is still used since 1964 by Becker.

In trying to measure the national IQ, Lynn & Becker in the book The Intelligence of Nations, made a fictive study in order to estimate and compute National IQs but on fictional examples. The supposed to found two nations and form four samples divided in two, one named Utopia and the other named Dystopia. The all information was taken from NIQ- dataset, and named all countries alphabetical but with codes. In order to test their characteristics, they include information about the tests employed and their application for the mentioned sample. In this way, the first variable refers to the IQ-test which was used to measure the intelligence and the other refers to the test on which scale IQs was computed in NIQ-dataset, but we have to mention that both are identical.

After all, the uncorrected IQ-scores had to be adjusted because the 20th century expressed a massive secular increase in IQ-test scores in different countries, especially in Western or developed countries. This phenomenon was firstly found in 1938 by Merrill for a US- sample and after became the Flynn-Effect, named by Richard Flynn (Lynn &Becker, 2019, p. 33).

These effects conduct to the phenomenon of IQ or to the norm-inflation, which manifests itself as an overestimation of IQs if the norms applicated are older than the year of the measurement, or to an underestimation if the scores from a measure is an earlier year and was converted to IQs by using more recent norms (Lynn &Vanhanen, 2012). The final results give the number for the measure of IQ for each country.

The importance of intellectual capital is clear. A system that does not develop the necessary skills to effectively utilize knowledge can lead to the risk of unemployment. This is why it is important that we promote higher education. Being able to accumulate and use human capital is beneficial for many reasons. It can help boost productivity and potential gains.

In 2002, Meisenberg and Lynn conducted a study on the validity of national IQ tests in over a hundred countries. The correlation between the national IQ and the EA shows that these two measures can be used as equal measures of human capital (Lynn, 2010).

Human capital is linked to the economic growth. In 1998, Lucas construct a clear link between human capital and economic growth and explained that the combination of physical and mental capital is the main driver of the economic development. Human capital is considered as a vital part of economic growth. It can improve the productivity of workers and also contribute to the reduction of poverty.

The human factor is also the main driver of innovation. It influences the efficiency of any innovation process. The various factors that influence the innovation process such as technology and capital are also important in cultivating a healthy society. So, developing nations can attract skilled human capital by investing in education and research (Dutta & Landvin, 2014). The study conducted by Galovska in 2018 examined the link between the quality of education and human capital. The author noted that companies should start investing in education to improve their human capital (Galovksa M, 2018). One of the most critical factors that companies have to consider is the importance of innovation. Its positive effects on the company's profitability are numerous (Tseng & Goo, 2005). The innovation process is characterized by the complexity of its tasks and procedures, which can be attributed to the varying levels of knowledge required to carry out its tasks (Aramides & Karacapilidis, 2006).

Another paper made by Hayakawa et. al., aims to analyze how the dualities in and the inequality of human capital can be strengthened and sustained over time through a strategic choice model. We argue that this process is the result of the agents' decisions as they respond to the technological innovation that has brought about the accumulation of human capital. The dualities in human capital arise when people make choices that are bound to increase the productivity of labor and promote growth. This paper shows that if the poor are not able to obtain

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education, then the dualities may get worse with inflation (Hayakawa et. all, 2019). Being considered an important part of intellectual capital is also important in determining the capacity of a company to innovate (Broking, 1996; Edvinsson & Malone, 1997).

Like Kianto et al., mentioned in a study in 2017 "innovation in organizations is, first and foremost, a human issue. Since it is people who develop and implement ideas, innovation will depend on effective human resource management" (Kianto et al., 2017).

Other authors mentioned that "innovation is considered to be a source of competitive advantage" (Fonseca et al., 2015) and also innovation scholars have given attention to a lot of strategic factors that may affect the success of innovation activities and also R&D activities (Cassiman & Veugelers, 2006). Fonseca et al., in their study introduced an alternative perspective in what concern the human capital based on the tasks that are made by employees. The researchers analyzed the degree of abstractism and cognitive analytic tasks in order to study how these processes affect the innovation performance of companies. They also suggest that the tension between the innovation process and the organization could lead to the breakdown of it. In 2018, Hippe and Diebolt conducted a study to find out what the human capital of regions is contributing to the current regional disparities in economic development and innovation. They found that the past human capital is a key factor in explaining the current regional gaps in economic development (Diebolt & Hippe, 2018).

Guloglu and Tekin in 2014 examine the possible causal relations between R&D expenditures and economic growth in high-income countries. We find that the number of patents granted for technological innovations leads to higher economic growth. A reverse causality relation exists between the rate of economic growth and innovation. It shows that the increase in output accelerates the rate at which technological change occurs (Guloglu & Tekin, 2014).

A study conducted in 2011 by Winters examined the effects of higher education institutions and the human capital level on the quality of life within the US metropolitan areas. The paper revealed that the presence of higher education establishments greatly influenced the level of human capital within a region. Human capital and higher education institutions have the same effects, but they can also be separated by their quality of life measures (Winters, 2011). This study conducted in 2020 by Achim et al. explores the link between economic crimes and intelligence. For this study, they used a sample of 182 countries and time period 2012 to 2017.

Their study shows that intelligence has a significant impact on the level of financial crimes and economic crimes. It shows that intelligent people tend to respect the law and implement government policies in order to prevent these crimes. The results of the study reveal that for high income countries, intelligence is considered the main factor that influences the economic and financial crimes. For low income countries, intelligence is not considered the main factor that influences the crimes (Achim et al., 2020).

In 2009, Neagu et al. conducted a study on the evolution of knowledge based society and the knowledge economy. The paper aims to provide a conceptual framework for analyzing the various indicators related to knowledge-based economy. They found that the main difference between rich and less rich nations is the intangible assets that are related to knowledge (Neagu et al., 2009).

Higher education is an integral part of society, and its activities are influenced by the country's socioeconomic conditions and global trends. A study conducted in 2017 revealed that the efficiency of Ukraine's Higher Education System undermines the country's reform efforts. The authors introduce various theoretical and practical approaches for the formation of an organizational and economic structure for higher education in Ukraine. They discuss the various problems of the system and suggest various strategies and methods to improve its efficiency (Kumaiev et al., 2017). In order to reinforce our aspects mentioned before we will present a bibliometric map to show the relationships between our variables.

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Figure 1. Intellectual Capital and Innovation

Source: authors work

In order to make this map first we selected all the approximately 2000 articles published in Web of Science Core Correlation and then we had introduced the data into Vos Viewer. When we have selected the papers, we choose the titles which were on our topic but also the abstract because we wanted to show as well as possible the relationship between our variables.

3. Data and methodology

The sample used in this paper is constructed from 185 countries and the analyzed period is 2005-2020. The data we collected from World Bank but the values were refined to a common scale of 0-100 and then in order to make the empirical study we used statistical program Eviews.

3.1. Dependent variable: Innovation

One of the main factors that contribute to the nation's economic development is innovation. This concept has been widely used as a tool to add value and achieve competitive advantage (Dutta et al., 2018; Kaynak, Altuntas & Dereli, 2017).

Various indicators are used to measure and compare the level of innovation in different national economies. One of these is the Global Innovation Index, which is produced by the IBB, the World Intellectual Property Organization, and Cornell University (de Miranda et al., 2021).

So, following de Miranda et al., (2021) we saw a good way to measure the innovation at macroeconomic level through Global Innovation Index (GII), that's why we choose GII as being our dependent variable.

3.2. Independent variable: Intellectual Capital

In order to strength the results that found out other authors and to see if there is in an influence of the intellectual capital on innovation we have made a study where we used the variable National IQ (IQ), Human Index Capital (HIC) and Education Index (EI) as measures the Intellectual Capital.

In this way, we choose as independent variables: IQ, HIC, EI and the control variables are represented by: Corruption Perception Index (CPI), Technology Adoption (TA), Research and Development (R&D), Intellectual Property (IP), Number of Journals (JRN), Global Cyber Security Index (GCI) and Foreign Direct Investments (FDI).

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The relationship between intellectual capital and innovation is estimated through the following regression:

$\begin{aligned} \textit{Global Innovation Index}_{i,t} \\ &= \beta_0 + \beta_1 \textit{Intellectual Capital}_{i,t} + \beta_2 \textit{Control1}_{i,t} + \dots + \beta_6 \textit{Control2}_{i,7}\textit{C} + \varepsilon_{i,t} \end{aligned}$

Where intellectual capital is expressed as IQ, HIC, EI and HDI of the country i in year t; Innovation is expressed as GII; control variables are represented CPI, RD, IP, FDI, JRN, GCI and ta ; $[\beta_0, \beta_1, \dots, \beta_6]$ are the regression coefficients, and $\boldsymbol{\varepsilon}$ represent the error term.

In this way, our research hypothesis is:

'There is an influence of Intellectual Capital on Innovation?'

4. Empirical evidence

In order to run our regression and in the final our model, first, based on our results after running the Redundant Fixed Effects-Likelihood Ration tests and running the Hausman Test we selected between fixed and random effects the suitable effects for our modael.

We have used Panel Least Square in order to test our variables and the results are presented in next tables:

Table 1. Method Panel Least Square - Relationship between Global Innovation Index and National IQ

Variable	Coefficient	Std. Error	t-Statistic	Prob.
National IQ	0.227883	0.054906	4.150419	0.0001
Number of Journals	0.133099	0.121554	1.094976	0.2749
Corruption Perception Index	on 0.235529	0.067246	3.502478	0.0006
Technology Adoption	0.213744	0.075028	2.848857	0.0049
Constant	17.39109	3.470184	5.011575	0.0000

R-squared = 0.480247

Note: significant for any acceptance (10%)

Source: author's processing

Based on Table 4, all the probabilities are lower the significant acceptance level, 10% except the control variable JRN which will be taken put from our model. From the point of view of the model goodness-of-fit, the R-squared is equal to 0.4802 and indicates that the dependent variable GII depends in proportion of 48.02 % from the independent variable. In this way, the states researched hypothesis is accepted, meaning that the Intellectual Capital measured through IQ has an impact on the Global Innovation.

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Table 2. Method Panel Least Square - Relationship between Global Innovation Index and Human Index Capital

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Human Index Capital	0.317601	0.092702	3.426030	0.0008
Research and Development	0.006643	0.086044	0.077200	0.9386
Corruption Perception Index	-0.312825	0.118925	-2.630440	0.0096
Intellectual Property	0.294211	0.121371	2.424052	0.0167
Global Cyber Security Index	0.827157	0.039595	20.89033	0.0000
Number of Journals	-0.194938	0.093607	-2.082507	0.0393
Constant	-9.173366	4.721224	-1.943006	0.0542

R-squared = 0.798968

Note: significant for any acceptance (10%)

Source: author's processing

In what concern the table presented above we can see that also here the control variable RD that is not significant for our model HIC. It has a probability higher that our significant acceptance level, 10% and it has a negative coefficient. In what concern the negative coefficients we have negative values for control variable CPI and also for the constant term. But in this case, we can observe that the probabilities for these variables are lower that our significance level established being at 10% and this means that these variables are significant for our model. More than that, we can see that the lower probabilities are registered for control variable GCI (0.0000) and it has positive coefficients. This can lead us to a conclusion that the intellectual property and Global Cyber Security Index have an importance on human capital and its role in the world, fact reinforced by the value of R-squared (78,880%). Saying these things, the states researched hypothesis is accepted, meaning that the Intellectual Capital measured through HIC has an impact on the Global Innovation and the results are presented in the table 3.

Table 3. Method Panel Least Square - Relationship Global Innovation Index and Education Index

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Education Index	0.250491	0.047585	5.264096	0.0000
Number of Journals	0.060776	0.050719	1.198286	0.2315
Research and Development	0.270265	0.041762	6.471505	0.0000
Corruption Perception Index	0.192663	0.053840	3.578421	0.0004
Global Cyber Security Index	0.012885	0.016813	0.766415	0.4439
Technology Adoption	0.144298	0.052253	2.761514	0.0060
Intellectual Property	-0.019206	0.051020	-0.376435	0.7068
Constant	16.48154	3.459910	4.763575	0.0000

R-squared = 0.566715

Note: significant for any acceptance (10%)

Source: author's processing

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In the table 6 which presents the relationship between innovation and intellectual capital measured by Education Index we can see that we have three variables which have probabilities higher that our acceptance significant level (10%) and they are JRN GCI and IP. Variable IP also has a negative coefficient, so in this case the all three control variables will be taken out from the model. The lower probabilities are associated for the dependent variable, education and for research and development expenditures. This means that the higher the level of education is, the higher the degree of innovation will be. The R-squared is equal to 0.5667 and indicates that the dependent variable GII depends in proportion of 56.67% from the independent variable studied. In this way, the researched hypothesis is accepted, so this means that Intellectual Capital measured through Education Index has an impact on global innovation level.

5. Conclusions

Intellectual capital is considered as a key resource for expanding intelligence, as its name suggests. Over time, it has received a number of definitions, but at present no consensus has been reached regarding its explanation. However, intellectual capital is the key to all organizations given that it is made up of all the knowledge, experiences, values, skills that an employee has in a company. The assessment of intellectual capital capital can be performed for several situations, namely: in order to assess the value of the company, for the necessity of registering in the country or in other states, for the sale or purchase of the company or some components of the intellectual capital, in order to account for intangible assets, for combating piracy, attracting investors, etc. Thus, we observe the wide applicability of intellectual capital in both the economic sector and other related fields.

In our study the attention was focused on macroeconomic level. That's why we have research am we have out that there are some indexes which can help us to through Intellectual Capital can be measured. Human Capital Index, Education Index, National IQ and Human are the ones chosen by us in order to measure the IC. Human Index Capital was introduced by Human Capital Project and through it, was able to identify the productivity gaps in various countries and to encourage better investments in human capital. The goal of the Human Capital Index is to demonstrate how education and health outcomes for children are related to the productivity of the future generation. The National IQ was introduced by Lynn & Becker in the book The Intelligence of Nations, made a fictive study in order to estimate and compute National IQs.

We have focused the attention in our study on Innovation. First definition for this concept was given in 1934 by Schumpeter by also as IC it is in a continue development and in a continue trying to be found an unanimous definition. First we have made a bibliometric map where we selected approximately 1000-2000 articles for each concepts about we choose to discuss. When we have selected these articles we also choose to analyze the abstracts where were given the principal ideas and after graphics representations we saw that there is a relationship between our concepts. But of course, our results couldn't be based only on this maps. For true and correct results there was necessary an empirical study. In this way, we selected 186 countries and we construct four equations in order to catch the influence of intellectual capital on the economy. The model was tested through Panel Least Squared and all of these for equations show us that our models are viable and our hypotheses were accepted. Concluding all our findings we can say that Intellectual Capital measured through IQ, Human Index Capital Education Index influence the Innovation measured through Global Innovation Index.

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Youth travel in the COVID-19 context: The Romanian consumer's perspective

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Abstract

The tourism sector is among the economic sectors most impacted by the COVID-19 epidemic as a result of restrictions on travel and travel related activities and the fear of getting infected, which all diminished consumption. However, during past crises and epidemics, youth traveling has exhibited a higher resistance to shocks and higher adaptability. This paper explores the behavior of young Romanian consumers of leisure travel services during the COVID-19 pandemic in an attempt to find whether the consumption level was changed, if new ways for doing tourism have appeared and what has determined a different approach in consuming leisure travel services, thereby pointing out a different design of services that can be supplied in the segment. The research methodology is based on a questionnaire that has mainly revealed that young Romanians have still traveled since the COVID-19 outbreak, but have chosen transport, accommodation and dining options that ensure what they consider to be relatively safer sanitary conditions.

Keywords: youth traveling, COVID-19, consumption habits

Jel Codes: L83, Z3, D12

1. Introduction

Youth travel has been recognized as a distinctive sector in the tourism industry, covering an age segment between 15 and 29, as young adults have started to increasingly travel independently having spent over USD 333 billion in 2018, which equals 23% of international arrivals. (WYSE Travel Confederation, 2021).

Various opportunities for young people, such as education, language learning, work experience, and volunteering constitute an important determinant of the development of this sector (Richards, 2008). However, this paper focuses on leisure youth traveling, which is the main purpose of 50% of the young travelers (WYSE Travel Confederation, 2021).

Among the main characteristics of young tourists we find resilience, meaning that traveling does not diminish in certain circumstances, such as economic problems and epidemics, as WYSE Travel Confederation (2021) has concluded as a result of Ebola epidemic. Nor the consumption habits change particularly due to such situations.

Nevertheless, the COVID 19 has brought a new type of traveling conditions and restrictions that could have the potential to impact the traveling decisions to a greater extent even in the case of young adults. These restrictions imply not only higher costs but also the impossibility to participate in certain activities, for example cultural and artistic events, group gatherings of any purposes, museum visits and other touristic attractions, dine in restaurants, etc. according to local or national regulations. Moreover, for limited periods, since the virus outbreak, in many cases, national borders were closed for foreign tourists or certain restrictions apply when crossing the border. To that, adds the actual fear of getting infected which is particularly important to certain vulnerable categories of young people.

The differences in national restrictions from one country to another may be serious enough to impact the traveling plans even for categories which are more resilient to such situations. Closing the borders for tourism is especially expected to have a major impact. In figure 1 we can see the changes in COVID-19 travel restrictions from 2020 to 2021 (UNWTO Tourism Recovery Tracker, 2021). Based on this fact, bookings might be made within a short time in advance because consumers will naturally avoid making down payments for hotel reservations or even any kind of traveling plans before being certain about the possibilities to travel to specific destinations.

The international tourist arrivals have declined with 86% (YTD change) in Romania from 2019 to 2021 (YTD change), similar to the 85% global decrease, according to UNWTO Tourism Dashboard (2021).

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COVID - 19 RELATED TRAVEL RESTRICTIONS

• Complete Closure • Other Measures • Partial Closure

COVID - 19 RELATED TRAVEL RESTRICTIONS

Complete Closure
 Lifted
 Partial Closure
 Testing/Quarantine
 Jun 2021



Figure 1: COVID-19 Related travel restrictions

Source: UNWTO Tourism Recovery Tracker (2021)

In this paper, we start from the premise that young travelers are a distinctive segment of consumers in the tourism industry. Based on the empirical study of Čivre and Kolar (2014), who have confirmed that the consumers' need for uniqueness is present at a high level among young adults, we determine that this segment is worth being discussed separately.

Focusing on leisure youth traveling, the study originality relies on a threefold objective: (1) to understand whether Romanian consumers are reluctant to traveling or they rather adapted to the restrictions imposed in the context of Covid-19 and how they did, (2) to identify possible changes in the budget allocated to traveling and what would the main changes, and (3) to examine if there are preferences for a different type of accommodation and what conditions should the service providers fulfill in order to adapt to the new demands.

The paper not only explores changes in demand for youth traveling products, in the context of COVID 19 restrictions, but also emphasizes the opportunity of expanding innovative types of traveling, which can offer ideas for niched businesses in the field.

2. Literature review

Čivre and Kolar (2014) found that young travelers exhibit a high need for uniqueness, which is present in their choice of tourism services as well. But the demand for distinctive products is higher among young consumers who are better informed about tourism products. The mentioned research paper also concludes that travelers who

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organize their trips on their own have a higher need for uniqueness in comparison to people who make reservations through travel agencies. Therefore, these young consumers are considered to be less traditional.

Horak and Weber (2000, p. 38) appreciate that there is an even deeper originality attributed to this segment: "Young people today are the strongest trendsetters; they create the new attractions and directly help to establish new destinations."

Applying this type of concepts on a survey developed on the Romanian market, Botoş et al. (2014) observed that Romanian young travelers have shown loyalty to certain destinations (23%) and certain type of tourism, according to their destination (22%), while only 1.6% have declared to have chosen the same hotel, restaurant or transportation firm. Moreover, 27.9% of respondents considered that the variety of recreation is the most important criteria based on which they decide how to spend their holidays and only 2.4% consider that assistance throughout the journey is important. Among the reasons mentioned for returning to the same destination were the: new attractions, changes in the services that could be consumed in the same location and not being able to visit all the tourist attractions after only one visit.

Another important characteristic of young tourists is a high mobility. The fact that many of them dispose of more free time, since they don't have full time jobs, allows them to travel more and for longer periods of time (Horak and Weber, 2000; Richards, 2011). The willingness to learn and explore is another determinant of prolonged trips (World Tourism Organization, 2008).

Based on the flexibility of young travelers that has proved to distinguish them from superior age groups, we expect to find a similar characteristic of adaptability of young Romanian travelers in the context of Covid-19 restrictions and contagion concerns.

A study conducted on citizens from Turkey, Portugal and Egypt, belonging to generations Y (born between 1980 and 2000) and Z (born after 2000), has revealed that the subjects have generally accepted the restrictions imposed in their countries (Seabra et al., 2021). Within the sample there were certain differences from one country to another, but overall it indicates a general adaptability of these generations to the new context. We will examine if this also applies to Romanian young travelers and if the assumption is confirmed, it means that traveling plans shouldn't be completely suspended, but rather adjusted in order to comply with the regulations.

Based on a questionnaire distributed among a set of organizations from 73 countries activating in the tourism industry and specialized on products for young adults about how COVID 19 affected their business Richards and Morrill (2021) the following results were obtained: business specialized in youth travel have faced a smaller decrease in demand over the same period compared to non-youth travel (a decrease differing with 4 percentage points in Q1 2020).

Orîndaru et al. (2021), conducting a survey on Romanian tourism services consumers, found that the Covid-19 pandemic has had a serious impact on the consumption behavior, reducing the number of trips, having a preference for domestic and even local destinations, choosing among the safest services from a sanitary perspective. Differently from approach, this study did not focus on the youth travel segment, which is expected to have certain particularities.

Marin-Pantelescu (2021) has also deployed a research on Romanian tourists' behavior, but this time it was based on a survey applied to young travelers during the lockdown in spring 2020. The questions were referring mostly to intentions regarding traveling after the quarantine would have been lifted and found a high availability to resume journeys as well as some information about the budget they will be ready to allocate and what type of vacations they will go for.

All the previous results, prove that young travelers are looking for a certain degree of novelty in their vacations, have a high flexibility when conditions change, continue to travel when times get tough and find new solutions to pursue their plans. To complete the level of knowledge presented in the literature review, the present paper will focus on the youth travel leisure segment from a retrospective view over the consumption habits' adjustments when a year had been passed since the lockdown imposed in Romania. The combination of objectives proposed by this paper is also unique and because it is based on large variety of questions which are addressed to the respondents, it brings new information about the discussed issue.

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3. Methodology

The research aimed at unveiling the main changes in consumption behavior of young travelers in Romania, tests the following hypothesis:

H 1: Young adults have changed certain consumption habits for tourism services in order to prevent the contagion with COVID-19 or to comply with the regulations.

H 2: Romanian young adults' budget allocated to tourism services has changed due to certain issues determined by the COVID-19 pandemic.

H3: Young adults have discovered new traveling options that have appeared after COVID-19.

Based on the results, we should be able have some answers related to the resistance of the market segment of young travelers to shocks, such as COVID-19 tourism related restrictions, which introduce certain changes on the supply side. The results should be particularly interesting to tourism operators, delivering services to this segment, but also to tourism operators who might find an opportunity to adapt their offers in the sense of becoming more appealing to young consumers if we find a higher resistance to shocks attached to this segment. This type of business opportunity might worth considering even more if we think that we don't know the time horizon on which the pandemic will continue and the impact on the tourism industry, as one the most affected economic sectors.

In this context, we chose the survey as the main tool of the research because it allows for a large number of questions addressed directly to the beneficiaries of tourism services. So, their evaluation, feelings and opinions, as well as the information they share about their latest decisions about traveling in pandemic times, should be able to bring very fresh data that also unveils more profound aspects.

The questions included in the survey are mainly quantitative survey data, while some questions are open-ended because either the range of possible answers was too big (ex. "In what countries have you traveled?", either because we could not anticipate all possible answers or we did not want to limit the alternatives (ex. "What new types of accommodation units have you identified since the debut of the COVID-19 pandemic?").

The structure of the questionnaire is divided into four parts. The first one is related to the demographics of the sample and filters the participants who have traveled at least once since the outbreak of the pandemic. The following questions are addressed only to those who have traveled. The second section aims at evaluating if young people have still traveled or made reservations and also chose safer traveling conditions from a sanitary perspective indicating the level of adaptability to the new rules. The answers to these questions will also point out the type of threats that travelers identify to their health. The third section was focused on the changes that affect the traveling budget: price changes, new expenses necessary to ensure sanitary safety and the consumers' possibility to adapt to the new cost level. The fourth and the final section contains questions referring to what new types of accommodation services were identified with the purpose to evidence whether the young travelers are aware about the changes in supply and also questions about changes in consumption behavior that the suppliers should better adapt to.

All the respondents are aged between 18 and 25 to fit the target group. In older studies the age interval covered by the youth travel segment is: 16-29 (Seekings, 1995), 15-29 (World Tourism Organization, 1991; Méréo, 1992; Horak and Weber, 2000). Currently WYSE Travel Confederation defines the youth travel segment as applicable to a 15 to 29 age interval. We established the target group between 18 and 25 because the questionnaire was distributed among university students where there was accessibility. We also consider that after graduating university and become fully employed, young people enter a new social category and begin having different characteristics and different consumption behavior as a consequence (in line with Horak and Weber, 2000).

The questionnaire was distributed online in Google Forms in May 2021. It was answered by 136 persons, out of which only 114 declared to have traveled or have made reservations since the COVID-19 pandemic outbreak. In the demographics questions we found that 15 respondents where not only students, but are also employed and one works as a volunteer in an NGO, aside from being a student. In the message containing the invitation to participate in the survey, the subjects were informed that the questions will strictly refer to leisure traveling.

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4. Results

The results of each of three sets of questions, corresponding to each of the three hypothesis and explained in the methodology are presented sequentially.

(a) First, the set of questions conceived to identify how certain choices for tourism services or other general conditions were influenced by the concern for sanitary safety or the compliance with the legal restrictions introduced since the Covid-19 outbreak reveal numerous results.

The period in which reservations for traveling were made was determined by certain strict restrictions that were introduced in Romania. Between the March 16 and May 15 2020, a state of emergency was instituted (Decree no. 195 from March 16, 2020 issued by the Presidency of Romania), which equated with a quarantine period. At the question about when the bookings were made for travel services, only 8.8% of our respondents declared to have made traveling reservations in the spring 2020. The question was specifically referring to the moment of the reservation, not to the moment of traveling. Most probably the reservations were made for the summer vacation and the fact that such a small number of people, who were confident that the quarantine would be lifted, shows that Romanian young travelers had a very cautious behavior. After, the quarantine period, 41.9% made reservations during the summer vacation. The number of reservations is higher in summer and winter as it usually happens in a normal year because they are correlated to favorable weather conditions, specific activities that can be done in each season and university vacations. Based on the data presented in table 1, we computed a Pearson correlation coefficient of 0.176 between the number of vacation bookings made in a certain season and the number of newly reported COVID-19 cases (from spring 2020 to spring 2021 - winter 2019-2020 was excluded from the computation of the Pearson correlation because there were no Covid-19 cases in that period). Based on this data we can say that the number of cases is irrelevant to the traveling decisions. Other factors, such as the severity of restrictions might have weighted more.

Moment of reservation	Number of answers (the share out of a total of 136 persons)	Number of newly reported COVID-19 cases
Winter 2019-2020	29 (21.3%)	0
Spring 2020	12 (8.8%)	20286
Summer 2020	57 (41.9%)	73574
Autumn 2020	31 (22.8%)	414481
Winter 2020-2021	49 (36%)	316650
Spring 2021	36 (26.5%)	253747
Have not travelled	22 (16.17%)	-

Table 1: Respondents' answers on the season when they made reservations to travel at a subsequent moment and the number of newly reported COVID-19 cases

Source: The number of newly reported Covid-19 cases was sourced from WHO (2021).

The number of persons which booked vacations in all periods exceeds the number of respondents in the questionnaire because they were allowed to check several answers since many people traveled more than once. Because of this methodological aspect, there cannot be established a link between the answers given by the same person to this question and the next questions.

In the question for which the answers are presented in figure 2, the intention was to find whether there was a restraint in making reservations with a lot of time in advance due to a high unpredictability of the pandemic's evolution together with the associated restrictions. Indeed, most reservations were made to travel immediately (16.7%), in less than a week (34.20%) and in less than a month (46.5%). Based on these results we can only suspect a high correlation between the periods declared in the previous question for the moment of the reservation and the traveling period, but this correlation cannot be proved considering the research design.

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Figure 2: The share of respondents who have made reservations to travel immediately, in less than a week, in less than a month, between a month and three months and for over three months

Table 2 presents answers from three questions regarding the choice for several types of services that are consumed in any vacation: accommodation, food catering and transportation and one question regarding the preference for a certain group type to travel with. The answers exhibit the majority's choice for services which allow for a minimum interaction with people who are not in the usual circle of the respondents, such as the staff in the accommodation unit, restaurants or in the means of transport, or other tourists, but there doesn't seem to be any concern regarding traveling with friends or family members. For example, we can say that in the private residence where the host is not present, there is no interaction with people outside the group. In hotels, even if there is a high flow of people in the common spaces, these spaces are only transited. Moreover, hoteliers could be more trusted for implementing the sanitary safety rules. In a guest house, there might be other tourists accommodated at the same time but the flow is significantly smaller compared to hotels. There is a high preference for serving meals in various restaurants showing a little concern for contacting the disease in such an environment, but if we sum up the cases in which tourists have ordered food in the room, bought prepared food and served it in the room, cooked at the accommodation facilities or brought food from home, we can consider that there is a market segment that can be covered by catering companies, food delivery firms and accommodation units with a kitchen dedicated to customers. As for travel services, young Romanian tourists have traveled using the personal car in 72.8% of cases. For these questions, respondents were also able to check several answers. There are obviously several tourists which chose different traveling conditions. Since there isn't necessarily a constant behavior, perhaps the fear of getting infected with Covid-19 is less important than other factors, such as the general context, convenience, preferences of other group members (which have a high influence) and legal restrictions.

Choice of accomm	odation	Choice of serving meals		Choice transport	of ation	Selection of group	traveling
Hotel	52.20%	In various restaurants	75.40%	Airplane	22.80%	Large group	7.80%
Guest house	33.90%	In the hotel restaurant	18.40%	Train	26.30%	Small group of friends	75.00%
Private residence (the host being present)	7.00%	Order food in the room	26.30%	Bus	7.00%	Family	46.60%
Private residence (the host not being present)	44.30%	Bought prepared food and served in the room	10.50%	Personal car	72.80%	Alone	6.00%
		Cooked at the accommodation facilities	25.40%				
		Brought food from home	8.80%				

Table 2: Respondents' choice of various types of tourism services and the selection of the traveling group

In order to separate the motivation determined by the pandemic from other usual determinants which influenced the previously presented decisions, a matrix question was introduced allowing the respondents to appreciate the extent to which these choices were specifically determined by Covid-19. The results are presented in figure 3 as follows. The choice of the accommodation unit was mostly affected as there are 38.24% respondents who answered

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"to a great extent" and "a total influence", but also the same percentage was attributed to the following answers: "not at all" and "to a small extent". For the other choices, most people said that Covid-19 had no influence or a small influence: the means of transport (42.65%), the group (47.79%) and a destination close to home (49.26%). The choice of a destination close to a hospital was the least influenced by Covid-19, which shows that young travelers are not worried about a large impact that the disease could have on their health (52.51% of respondents said that the choice was not at all influenced and 22.79% said that the influence was small).



Figure 3: The extent to which the respondents consider that their traveling decisions were influenced by the pandemic.

From supply perspective, it is interesting to notice the appearance of these preferences for destinations close to home as a result of the pandemic. There might be a good opportunity to develop accommodation units close to urban areas. This preference is somehow confirmed by the fact that 60.3% of the respondents traveled only in Romania, only 9.5% traveled only abroad and 30.2% traveled both in Romania and abroad (most of the foreign destinations were in Europe). The new situation generated by Covid favors domestic tourism even for young travelers' segment.

(b) The next section contains questions related to the traveling budget and how this budget was affected by the new market conditions attributed to Covid-19.

The first questions relate to the changes in prices for tourism services in Romania and abroad, as they were perceived by young travelers. Based on the results presented in table 3 we cannot say anything about the actual evolution of prices because the responses are contradictory and there is also a high number of people who said that they don't know how prices evolved. However, we can observe that even if 34.7% of the respondents considered that domestic tourism services have become more expensive, there was an obvious preference for traveling in Romania, as presented in regard to a previous question.

Table 3: The respondents' perception on the evolution of prices for tourism services after the outbreak of Covid-19 in Romania and abroad

	Prices increased	Prices decreased	Prices did not change	I don't know the price changes
In Romania	34.7%	26.6%	6.5%	32.3%
Abroad	14.2%	38.3%	7.5%	40%

Regardless of the destination, young travelers have considered that due to the price evolution for tourism services, they were able to purchase services that had a better quality than usually (24.6% of respondents), weaker than usually (5.9%) and approximately the same (69.5%). In the next question, we attempted to find out if an eventual choice of services of the same quality was due to an adjustment in the budget assigned to traveling and why the budget needed to be changed. (Figure 4) The impact of Covid-19 on the budget for tourism services consumption was moderate until May 2021 since 20.59% of respondents have not changed their budget at all, 22.79% have significantly modified their budget and 29.41% have made average adjustments regardless of the determinants (changes in prices, in income or in the decision to save).

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In the next part of this matrix question (figure 4) the aim was to identify if young travelers have decreased their budget because either their income was negatively affected or they decided to save more as uncertainty rose. This should be an important information for the supply suggesting if there is a need to decrease prices if young travelers dispose of less money to travel. The answers denote income reduction only for a few people, but the number of people who decided to save more and spend less on traveling is more moderate, although 29.41% have not done this at all. However, savings seem to be a more important reason for decreasing the traveling budget rather than the income diminution. Extra costs needed to be employed in order to comply with the regulations instated in the pandemic's context (for example PCR tests) have had even a more moderate effect, meaning that it was a more important factor compared to the previous ones. One can infer that a destination that allows for comparatively lower costs associated to Covid-19 restrictions would be also preferred to an average extent. As an overall appreciation, the respondents considered that the total traveling costs have totally influenced the selection of certain tourism services only for 6.62%, to a great extent for 18.38%, while for 22.06% there was no effect and also for 22.06% there was a small effect. To conclude this part of the analysis, the changes in costs had a greater influence on the budget as compared to incomes and savings.



Figure 4: Respondents' appreciation of changes in traveling budget

(c) The final section consisted in questions related to the type destinations and accommodation units, with the purpose of detecting what new types of offerings appeared or attracted the attention of young travelers after the debut of the pandemic. Their specific demands related to the insurance of sanitary safety are outlined based on additional questions within this section to provide the suppliers a minimum set of information about the consumers' preferences.

The first questions provide answers about how the respondents make sure that the accommodation is safe from a sanitary perspective. 41.4% looked for a private accommodation space (that is not shared with people outside the group or has a private entrance) and the same percentage declared that they avoided crowded spaces. 56% of the respondents said that they tried to make sure that the accommodation providers respected the sanitary safety rules, while only 0.9% chose units which received only vaccinated people. Also 0.9% declared that they were not at all interested about this kind of aspects.

In respect to what was the main way by which they made sure that the accommodation unit respects the sanitary safety rules, 47.9% said that they gave more credit to the reviews made by other clients on the hotel website or on the reservation websites. 29.1% checked what kind of rules the accommodation unit declared to implement, 17.1% took into consideration their recommendation of friends or other people they know who have stayed in the same places. Only 5.1% went for recommendations made by tourism agencies and 0.9% answered that they were not interested by these aspects.

Figure 5 presents the answers to the following matrix question: "To what extent do you find yourself in one of the following situations?" The first thing that worth's mentioning related to new ways of spending vacations is that for some people working from home brought the possibility to travel more by being able to work from vacation destination. However, this was the case for only 11.11% to a great extent and 7.69% totally agreed while 31.62% consider that it was not the case at all. The next question offers a hint about what changes in consumption habits would mean. Spending more time in nature instead of staying inside reduces the contagion chances. This was solution embraced by a number of young travelers which is above average (36.13% said that they preferred

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destinations in nature to a large extent and 14.29% expressed a total preference). A more balanced set of answers was obtained for the question related to whether through the pandemic they have discovered new ways of spending vacations. This shows an average degree of adaptability, a moderate lean towards seeking solutions rather than completely giving up the opportunity to travel. It does not necessarily show a general appetite for the new in normal circumstances, but the flexibility of young travelers is confirmed by the fact that a similar view was expressed when asked if they will keep the new way of traveling after the pandemic will have passed. We can say that the openness to the new exhibited by young travelers can be translated more into accepting and adapting to new conditions rather than actively searching for new challenges.



Figure 5: Changes in consumption habits for tourism services after the pandemic's outbreak

When asked to name what new kind of accommodation spaces they identified after the Covid-19 outbreak, only one person mentioned more houses in nature, one person noticed that there are more offerings in exotic places, two respondents mentioned that they discovered the benefits of staying in private residences booked on websites such as Airbnb and one person invoked the benefits of five star hotels. All the other respondents said that they did not identify any type of offerings. The answers are not necessarily contradicting the ones displayed in figure 5. We might assume that there was little availability to answer to open questions, but we can also understand that if they did not identify any innovative listings does not exclude the fact that they prefer, more than before, a certain type of unit that existed in the pre-Covid period as well (such as destinations which allow spending more time in nature – based on the question in figure 5).

5. Conclusions

The COVID-19 pandemic determined the national authorities throughout the world to impose certain rules that restrict traveling and certain activities which imply social interaction. The tourism sector was highly impacted, as a consequence.

The main purpose of the paper was to explore, through an empirical analysis, whether the youth traveling sector is less impacted, based on the assumption documented in the literature that this sector is more adaptable to change and constraints. If so, the suppliers of tourism services would be recommended to focus their offerings on the young consumers sector, fulfilling their particular needs, which suffered certain changes due to the new context.

These changes are explored in the first set of questions, confirming the hypothesis that young adults have changed certain consumption habits for tourism services in order to prevent the contagion with COVID-19 or to comply with the regulations. There is a certain category of young travelers who prefer to serve the meals separately, who do not share transport with other people and who prefer to stay in accommodation units only with the group they came with or in larger units with the condition that they safe conditions to prevent contagion. Destinations which are closer to home are elected instead of the more remote by many people. Reservations are made within a short time in advance due to unpredictability of restrictions.

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The second hypothesis regarding budget adjustments has also confirmed for most young travelers, but in different proportions. A limit that occurs here is that the price elasticity of demand could not be tested by applying this methodology. This study cannot lead to accurate conclusions about the price elasticity of demand, but there are hints that young travelers have adapted well enough to the harder market conditions, such as costs' increases and introduction of additional costs as a consequence of certain restrictions. The tourists in this segment are not ready to travel less and are more willing to increase their budgets rather than increase savings. Their incomes were affected only at small extent so far for a small number of cases.

In the last part, we found that not all young travelers have discovered new traveling options that have appeared after COVID-19, which leads to a partial confirmation of the third hypothesis. Moreover, when asked to name new types of offerings for accommodation services, only a few respondents identified such things. Nevertheless, there was an interesting case that most travelers preferred destinations which allow being closer to nature.

Finally, there was a moderate availability expressed by young travelers for continuing to preserve their consumption habits acquired during the pandemic, after the situation will have been back to normal.

The motivation for this research was that businesses which address young consumers in the tourism sector would be particularly interested to deepen their understanding on the drivers and particular claims of demand in the perspective of this industry's revival. The paper provides a few insights and concludes that young travelers' segment can bring hope for the tourism recovery in Romania because these consumers adapt well to changes and restraints on the condition that services suppliers will know how to address their particular and continuously changing requirements.

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Income disparity in Indonesia during 2015-2019: A panel data regression analysis

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Abstract

Income disparity is a global issue in many countries that leads to economic inefficiency, weakening social stability and solidarity, and inadequate welfare in the long term. This study attempts to delineate income disparity across provinces in Indonesia with the Williamson Index. By utilizing panel data from 32 provinces during 2015-2019, this study discovers the conditions of income disparity in Indonesia and explains the determinant variables affecting disparity. From the Williamson index calculation, East Java province has the highest level of disparity, while Gorontalo Province has the lowest inequality. The findings reveal that regional revenue and expenditure budgets (APBD) and the open unemployment rate (TPT) have a significant positive effect on income disparities, whilst the human development index (HDI) has a significant negative effect. This implies that the escalate in the APBD will reduce income disparities, and the inclining in unemployment will also diminish income disparities. Furthermore, the lower HDI will drive the income disparity.

Keywords: income disparity, human development index, williamson index, regional revenue, expenditure budgets.

Jel Codes: E24, F63, F62

1. Introduction

Regional economic development is crucial to promote welfare, alleviate unemployment and diminish inequality between regions. The determinant factor of enhancement in a country is the existence of equitable development. Hidayat (2014) remarked that the economic development of a nation can be achieved when there is a growth in the economy accompanied by a reduction in income inequality. The Indonesian government has responded to the disparity issue by providing a regional autonomy policy as stated in the RPJMN 2019-2024. This program seeks to alleviate inequality problems and realize equitable development through regional development by managing growth and equity strategies.

The success indicator of economic development is often associated with economic growth. Expanding the gross domestic regional product (GDRP) to promote economic development will have substance when unbalanced with efforts to create an even income distribution. As a consequence, it will lead to a new problem of income disparity. According to Kuznets, income equality will be achieved when economic growth in a region is at a more mature stage. At the beginning of growth, the distribution of income will tend to be inequality.

Disparity or income inequality is a condition where income between regions still has a significant difference. In the long term, this will become a serious problem considering the goal of a country is the welfare of its people evenly. Inequality of income distribution has a close relationship with economic development. Thus, a strategy is required to achieve both growth and equality. For this matter, when income inequality is allowed to rise, it will drive to various complex problems, such as high poverty rates, insufficient levels of community welfare. Therefore, development policies can be appropriately implemented, and the community's welfare will be closer to success.

The topic of income disparity has attracted attention among scholars. For example, Lilis (2006) mentioned that income disparities generally occur in each country and region due to differences in the potential of available natural resources, the existence of investments, and central government policies that prioritize certain regions. Moreover, the human development index (HDI) dimension also affects income disparities in human resources. With a high HDI level, the quality of human resources in an area will be higher and play a role in alleviating income disparities, either directly or indirectly.

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In addition, open unemployment rates (TPT) are often associated with income disparity. A high TPT is assumed to burden a region and contribute to income disparities. Thus, inequality between regions can occur during the regional development process and be stimulated by several factors, such as differences in the potential of natural resources, human resources, capital flows, central government development policies that are less profitable for certain regions, and inappropriate regional planning (Lilis, 2006). Several research gaps on income disparity analysis and its causal factors have led to the need to study income disparity and what variables influence it so that income disparities can be realized and welfare distribution can be achieved immediately.

2. Literature Review

Economic development is a fundamental change in social structure, public attitudes, national institutions, accelerating economic growth and paying attention to reducing inequality and alleviating poverty. According to Todaro (2006:28-29), economic development has three main objectives, namely:

- 1. Increasing the availability and expansion of the distribution of various basic necessities
- 2. Improving living standards in the form of additional employment opportunities, enhancing the quality of education, and increasing attention to cultural and human values
- 3. The expansion of economic and social choices for each individual and the nation as a whole.

Boediono (2000) noted that economic growth explains what factors can determine the increase in output per capita in the long run, and an explanation of how these influencing factors can encourage a growth process. Additionally, Levine and Renelt in Dwiputri, Pradiptyo & Arsyad (2019) mentioned that investment takes a crucial role in affecting economic growth, while Dreher and Gassebner in Dwiputri, Pradiptyo & Arsyad (2019) pointed out that entrepreneurial activity drives economic growth.

Endogenous economic growth theory, often referred to as new growth theory, presents a theoretical framework for analyzing the growth process of Gross National Product (GNP) originating from a system that regulates the production process. Endogenous growth theory arises due to the unsatisfactory performance of Neoclassical perspectives in explaining the sources of long-term economic growth. Endogenous economic growth theory reveals that GNP growth is a natural consequence of the long-run equilibrium (Todaro, 1994).

Todaro also explained that through the endogenous growth model, the potential for high investment returns in developing countries where the ratio of labor-capital is inadequate and being eroded by the insufficient level of complementary investment in capital or human resources could be realized. This is mainly through the development of educational facilities and institutions, infrastructure facilities, as well as various research and development activities. This model advocates active government participation in the management of the national economy to promote economic development through direct and indirect investment in human capital formation and encourage foreign private investment in technology-intensive industries (Todaro, 1994).

Disparity or income inequality is a condition where income between regions still has a significant difference and harms the economy in the long run. Todaro (2006) states that income disparity has a positive impact to encourage and motivate disadvantaged regions to catch up, also has a negative impact in the form of economic insufficiency, weakening social stability and solidarity, and inadequate welfare. According to Williamson, there is a prosperity gap between regions in the early stages of economic development, but the gap narrows as economic development progresses. This is in accordance with Kuznet's opinion, which states that in the short term, there is a positive correlation between per capita income growth and income inequality, whereas, in the long term, the relationship between the two becomes a negative correlation. This observation is often known as the Kuznets' inverted-U curve hypothesis, which corresponds to the shape of fluctuations in the trend of changes in income distribution with the Gini coefficient of per capita GNP growth.

The Human Development Index describes how people can access development outcomes and obtain income, health, education, and other eligibility. According to Todaro and Smith (2004), one of the most significant

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advantages of the Human Development Index (HDI) reveals that a country can do much better at low-income levels, and large revenue enlarges can play a relatively small role in human development.

Investment is the formation of capital for making purchases and procurement of goods from within and outside the country for the long term. The Harrod-Domar Investment theory notes that the formation of capital or investment is an essential factor that determines economic growth. This capital formation can be obtained through the accumulation of savings. According to Harrod-Domar remarks that capital formation is not only seen as an expenditure that will increase the ability of an economy to produce goods and services but will also increase the effective demand of society. Investment has a significant negative effect on income inequality (Dwiputri et al., 2018).

Government expenditure is a budget proposed by the government to carry out its duties and benefit communities. Todaro (2000) states that to improve people's welfare and reduce income disparities, the government can allocate a larger budget for the public interest in the form of "transfer payments" and indirectly through job creation, education subsidies, subsidies, health, and so forth. Residents looking for work, residents preparing for a business, residents who feel it is impossible to obtain a job, and residents who already have work but have not started work. Dwiputri et al. (2018) revealed that unemployment has a significant negative relationship to income inequality.

3. Method

This study adopted a quantitative approach to provide a better understanding of this issue. The research used secondary data in the form of panel data, a combination of time-series data from 2015 to 2019, and cross-section data from 32 provinces in Indonesia. The data collection technique in this study used a documentary study technique, namely by taking data from the publications of Statistics Indonesia (BPS) both nationally and regionally covering 32 provinces in Indonesia. This study adopted the Williamson Index to measure income disparity, while to calculate the effect of the dependent variable on the independent variable, we involved panel data regression analysis with the Random Effect Model (REM) model. The Williamson index is aimed to determine the condition of income disparities in 32 provinces in Java with the following formula.

$$IW = \frac{\sqrt{\Sigma (Y_i - Y)^2 fi/n}}{Y}$$

Information:

IW = Williamson index

- Yi = GDRP city/municipality
- Yi = GDP province
- Fi = Number of residents in city/municipality
- n = Number of residents in province

Williamson Index values range between 0 - 1 (positive). The higher index value, the greater of income disparity level between regions. Conversely, the smaller the index value, the smaller the level of inequality in the region. High inequality occurs at index values above 0.50. Meanwhile, inequality is confirmed to be low when the index value is under 0.50. To measure the effect of the dependent and independent variables, this study used the following panel data equation.

$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + e$

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Information:

- Y = Williamson index
- a = Constanta
- b1-b7 = Independent variable regression coefficient
- X_1 = Economic growth
- $X_2 = HDI$
- X₃ = Domestic investment
- X_4 = Government expenditure (APBD)
- X_5 = Open unemployment rate (TPT)

This study followed several tests to select the best model. The Chow test was used to choose between the CEM (Common Effect Model) and FEM (Fixed Effect Model) models, while the Hausman test was used to choose between the FEM (Fixed Effect Model) and REM (Random Effect Model) models. Meanwhile, the classical assumption test was conducted covering the normality test, heteroscedasticity test, multicollinearity test, and autocorrelation test. Furthermore, the hypothesis test employs the T-test to determine the partial effect between each independent variable on the dependent variable and the F-test to determine whether there is a mutual influence between the independent variables on the dependent variable. The coefficient of determination analysis test (Adjusted R-Square) aims to determine the percentage of the influence of the independent variable as a whole on the value of the dependent variable.

4. Results and Discussion

4.1. Income Disparity in Indonesia

Indonesia has different geographical and typographical conditions in each province. This causes differences in the conditions of natural resources and human resources in each region. This circumstance also causes distinguish in income disparities in each province, as illustrated by the Williamson Index. The Williamson index of 32 provinces in Indonesia during 2015-2019 can be depicted in Figure 4.1.



Figure 4.1. Development of the Williamson Index in Indonesia 2015-2019

Figure 4.1 explains that the highest income disparity is in East Java Province with an average Williamson Index of 0.976, while the lowest income disparity is in Gorontalo Province with an average Williamson Index of 0.146.

Source: Data processed (2021)

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From the figure, it can be concluded that the provinces classified as low in inequality are Aceh, North Sumatra, West Sumatra, Riau, Bengkulu, Lampung, Kep. Bangka Belitung, Kep. Riau, DIY, Bali, West Kalimantan, Central Kalimantan, North Kalimantan, North Sulawesi, Southeast Sulawesi, Gorontalo, West Sulawesi, Maluku, North Maluku due to it has an average Williamson Index below 0.5. While the provinces classified as high inequality are Jambi, South Sumatra, DKI Jakarta, West Java, Central Java, East Java, Banten, NTB, NTT, South Kalimantan, East Kalimantan, Central Sulawesi, South Sulawesi, considering an average Williamson Index is higher than 0.5.

4.2. Determinant Factors Affecting Income Disparities in Java

Based on the estimation of panel data using Eviews 10, the model selection was provided through two tests: the Chow test and the Hausman test with results as shown in Table 4.2.

Test	Effect Test	Prob	Result
Chow	CEM-FEM	0.0000	FEM
Hausman	FEM-REM	0.0950	REM

 Table 1. Model Selection

Source: Data processed (2021)

The Chow test indices the value of the Prob Cross Section chi-square is 0.0000 (< 0.05 or 5%), meaning that the FEM model is suitable to be applied in this research. Indeed, from the Hausman test provides the value of the Prob Cross Section chi-square is 0.0950 (< 0.05 or 5%), then the REM model is appropriate to be used in this study. From the two tests previously, it can be concluded that the REM is the best model of this research, and the results of the regression analysis obtained can be seen in Table 3.

Coefficient	Probability
0.012	0.156
-0.013	0.008
0.010	0.457
0.295	0.000
0.014	0.026
-0.765	0.043
	0.236
;	0.211
	9.520
	0.000
	0.012 -0.013 0.010 0.295 0.014 -0.765

Table 2. Regression Analysis Using REM

Source: Data processed (2021)

Note: the model accomplishs the assumptions of normality, non-heteroscedasticity, non-multicollinearity, non-autocorrelation

Therefore, the equation model can be obtained as follows:

Y = -0.764979 + 0.011500X1 - 0.013055X2 + 0.009692X3 + 0.295365X4 + 0.014168X5 + e

The data analysis shows that panel data regression uses the Random Effect Model (REM), and the results show that the Williamson Index has a negative coefficient of 0.764979. This implies that when Economic Growth, HDI, Investment, APBD, and TPT are zero (0), then the Williamson Index is worth -0.764979%. Economic growth has a positive relationship and significantly affects income disparity at the 20% alpha level. Economic Growth

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increases by 1%, the Williamson Index also increases by 0.011500 %, and vice versa. Conversely, HDI has a significant negative relationship at the 5% significance level, meaning that when the HDI has increased by 1%, the Williamson Index has decreased by 0.013055% and vice versa. Investment has a positive relationship and has a significant effect on income disparity at the alpha level of 50%. This shows that when investment increases by 1%, the Williamson Index also increases by 0.009692% and vice versa. APBD has a positive relationship and has a significant influence on income disparity at the 5% alpha level, so if the APBD has an increase of 1%, the Williamson Index also increases by 0.295365% and vice versa. Then, TPT has a positive relationship and has a significant effect on income disparity at the 5% alpha level, implying that when TPT has increased by 1%, the Williamson Index also has increased by 0.014168% and vice versa.

The T-test indicates that Economic Growth has no significant effect on the Williamson Index because the probability value is more than 0.05 or 5%. Thus, the HDI variable has a probability of 0.0082, which can be interpreted that the HDI has a significant effect on the Williamson Index because the probability value is less than 0.05 or 5%. Additionally, the Investment variable has a probability of 0.4570, meaning that Investment has no significant effect on the Williamson Index (> 0.05 or 5%). Meanwhile, the APBD variable has a probability of 0.0000, which can be informed that the APBD has a significant effect on the Williamson Index (< 0.05 or 5%). The TPT variable has a probability of 0.0257, which can be interpreted that TPT has no significant effect on the Williamson Index because the probability value is more than 0.05 or 5%.

From Table 3, it can be seen that the F-count value is 9.519589 with a probability of 0.000000. It implicates that simultaneously Economic Growth, HDI, Investment, APBD, and TPT have a significant effect on the Williamson Index due to the probability value being smaller than 0.05 or 5%. Accordingly, the Coefficient of Determination Test, the R^2 value in this study is 0.236103. This means that the exchange rate level that can be explained by the independent variable is 23%, and the remaining (100%-23%) 77% is explained by other variables outside the model.

4.3. The Effect of Economic Growth on Income Disparities in Java

Economic growth has a positive relationship and has a significant effect on income disparity at the alpha level of 20%, if Economic Growth increases by 1%, the Williamson Index also increases by 0.011500 % and vice versa. The fundamental rationale is that increased economic growth followed by enhancing income inequality in Indonesia that can occur in the short term, the results of successful development cannot be perceived by the entire Indonesian. The distribution of development during 2015- 2019 is an early stage that cannot affect income disparities. Since the study has limitations in the research time, it may cause the effect of population growth on income disparities to be insignificant. On the other hand, in the long term, economic growth will have a negative impact on income disparities.

The decrease in income disparity is due to the fact that in the long term, economic growth will be sensed by the community optimally and comprehensively. This is in accordance with Kuznet's theory that economic growth in the short term will worsen income distribution, but at a later stage, income distribution will drive as economic growth increases. This theory is often known as Kuznet's "inverted U" hypothesis. It can be concluded that the initial stage of the "inverted U" hypothesis applies to the relationship between economic growth and disparity in Indonesia during 2015-2019. The results indicate that increasing economic growth will incline income disparities which supports a prior study by Masuri (2014) in his research entitled "Analysis of the Effect of Economic Growth, HDI, Tpak and Open Unemployment on Income Inequality Between Regions in Central Java Province in 2011-2014".

4.4. The Effect of HDI (Human Development Index) on Income Disparities in Java

HDI has a significant negative relationship at the 5% significance level, if the HDI has increased by 1%, the Williamson Index has decreased by 0.013055% and vice versa. The Human Development Index (HDI) is an index that describes health, education, and spending. Enhancing these three components will lead to the quality of human resources as a whole. Consequently, the high quality of human resources drives the community's productivity that is expected to reduce income disparities. Good human development will also improve the level of education, health, and public spending. On the other hand, the higher the formal education obtained by a community can

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shape labor productivity. This is in accordance with the theory of human capital, which remarked that education has an influence on economic growth and declines income disparities. The theory assumes that population growth can be determined by individual labor productivity. When everyone has a higher income as a result of higher education, the population's economic growth can be supported, with economic growth either directly or indirectly having a negative effect on income inequality. The result which states that HDI will diminish income disparity is in accordance with the theory put forward by Todaro and Smith, mentioning that there are factors that can overcome inequality, such as health and education. The results of this study are also in line with an early study by Masruri (2016) in his research entitled "Analysis of the Effect of Economic Growth, HDI, Tpak and Open Unemployment on Inter-Regional Income Inequality in Central Java Province in 2011-2014"

4.5. The Effect of Investment (PMDN) on Income Disparities in Java

Investment has a positive relationship and significant effect on income disparity at the alpha level of 50%, indicating that when investment increases by 1%, the Williamson Index also increases by 0.009692% and vice versa. Investment is the expenditure of investors or companies to buy capital goods and production equipment to increase the ability to produce goods and services available in the economy (Sukirno, 2010). The gaining investment followed by an enhance in income inequality in Java can occur due to the investors do not pay attention to how the income is distributed among the people. In investing, investors only consider infrastructure development, regional potential and things that support investment interests. This positive relationship between investment and income disparity is also influenced by the unequal investment allocation in the provinces in Java, which has an impact on the concentration of investment in a region and causes a gap in people's income between regions receiving high and low investment.

This finding confirms the theory by Harrod-Domar and a previous study by Haris Hidayat (2014). The study states that investment will have a direct or indirect effect on economic growth and along with the increase in growth it will affect income inequality. However, this is in contrast to research from Dwiputri, Arsyad & Pradiptyo (2018) which states that FDI can reduce income inequality.

4.6. The Effect of Government Expenditure (APBD) on Income Disparities in Java

APBD (Regional Revenue and Expenditure Budget) is one form of government expenditure that aims to improve people's welfare and reduce income disparities between community groups. APBD has a positive relationship and has a significant influence on income disparity at the 5% alpha level, indicating that the APBD has an increase of 1%, the Williamson Index also increases by 0.295365%, and vice versa. However, Todaro's statement contradicts the results of this study. The increase in the APBD followed by an increase in income inequality in Java can occur because government expenditures channeled to the community have not been fully reached by all levels of society. The control of the budget by solely small groups makes the high APBD a factor causing the high-income disparity. This means that government spending has not been able to reduce the level of income disparity in Java. In fact, government spending is a stimulus to achieve prosperity and income distribution in Java.

In addition, the issue of APBD needs to be considered in the amount of government spending for each region should be different. The government expenditure allocation strategy needs to be implemented properly to stimulate and accelerate economic growth and reduce income disparities between regions. In this study, government spending, which is one of the causes of income disparity, is assumed to be government spending that is getting higher, centralized, but not evenly distributed. Government spending in each region is unequal because it adapts to different regional conditions, both in terms of population and original regional income. Therefore, the formulation of the allocation of government expenditures for each region needs to be done properly to address the problem of income disparity.

The result, which states that government spending will reduce income disparities, is inversely proportional to the theory put forward by Todaro (2000), mentioning that the government budget is able to improve people's welfare and reduce inequality. This theory does not apply to disparities in Indonesia. The basic reason is that the time period used is relatively short, namely 2015-2019, while income distribution caused by government spending requires a long process and period of time. The finding is also inversely proportional to research from Dwiputri, Arsyad & Pradiptyo (2018) which remarks that government spending is able to reduce income inequality. This

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significant positive relationship between government spending and income disparity is in accordance with research conducted by Wahyuni (2014).

4.7. The Effect of TPT (Open Unemployment Rate) on Income Disparities in Java

TPT has a positive relationship and has a significant effect on income disparity at the 5% alpha level, indicating that when the TPT increases by 1%, the Williamson Index also increases by 0.014168% and vice versa. The TPT rate is the percentage of the number of unemployed to the total workforce. However, employment in urban areas is insufficient to accommodate the number of unemployed in Indonesia, leading to the escalating unemployment rate in Indonesia year by year. When the unemployment rate diminishes with the assumption that more people are working, productivity and income will rise and cause inequality reduction. The escalating number of people who work and receive income is expected to shrink the inequality of income distribution in Indonesia. The problem of unemployment caused by shortened employment opportunities can be overcome by launching labor-intensive entrepreneurship training to stimulate people to be motivated to become entrepreneurs. The results which state that the TPT (Open Unemployment Rate) will increase income disparities, are in line with the research of Sabda Imani R et al. (2013) entitled "Analysis of Factors Influencing Income Disparities in East Java Province in 2008-2011".

5. Conclusion

From the previous statistical analysis, income disparity conditions in 32 provinces in Indonesia during 2015-2019 are diverse and fluctuating. East Java Province has the highest income disparity with an average Williamson Index of 0.976, while the province with the lowest income disparity is Gorontalo, with an average Williamson Index of 0.149. This study classifies provinces with low inequality: Aceh, North Sumatra, West Sumatra, Riau, Bengkulu, Lampung, and Kep. Bangka Belitung, Kep. Riau, DIY, Bali, West Kalimantan, Central Kalimantan, North Kalimantan, North Sulawesi, Southeast Sulawesi, Gorontalo, West Sulawesi, Maluku, North Maluku. While the provinces categorized as high inequality are Jambi, South Sumatra, DKI Jakarta, West Java, Central Java, East Java, Banten, NTB, NTT, South Kalimantan, East Kalimantan, Central Sulawesi.

This research suggests factors that have a positive effect on income disparity are economic growth, investment, APBD, and TPT, whilst the factors that have a negative effect are HDI. Variables that have a significant effect on the 5% alpha level are the Human Development Index, APBD, and TPT. Accordingly, several suggestions can be taken into consideration for the parties concerned and for further researchers. The government is expected to control the rate of economic growth and HDI that makes the quality of human resources, and the Indonesian economy is maintained properly. The government should also pay attention to the allocation of domestic investment and APBD to shrink the gap between regions. The government is also forecasted to issue regulations regarding urbanization, labor-intensive entrepreneurship training, and create new job opportunities. In addition, future researchers are expected to adopt different and more comprehensive research objects.

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The relationship among macro environmental factors and the performance of small and medium scale enterprises: The case of Afghanistan¹

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Abstract

The subject of this study is the relationship among macro environmental factors and the performance of small and medium scale enterprises in Afghanistan. due to the importance of small and medium size of enterprises for the economic growth of the country, as well as the role they are playing in reducing poverty and unemployment, the result of this study is that besides small and medium size of enterprises, it is important for stakeholders like as government, researchers and investors. It is also expected that the study will assist entrepreneurs with poor business performance in formulating strategies to guide them. In this study, primary data were collected from SMEs in Afghanistan using a cross sectional descriptive questionnaire. Data were analyzed using descriptive and inferential statistics. In our research, Cronbach's alpha coefficient, which is one of the internal consistency analysis methods, was used as a reliability analysis method correlation analysis was used to analyze the relationships between variables. In this study the findings show the relationship between macro environment factors and the performance of small and medium size of enterprises in Afghanistan. According, it is understood that the political and legal environment, economic environment, social cultural environment, natural environment and technological environment are positively related to the performance of these enterprises, respectively finally, in this study the findings are interpreted and suggestions are developed for researchers and enterprises.

Keywords: macro environment, performance, SMEs, Afghanistan

Jel Codes: Q56, L25, M1

1. Introduction

The growth of a country's economy and competitiveness in international markets determine the economic power of globalization Countries that want to play an active role in creating this power must be effective in terms of entrepreneurial innovation and business management flexibility. However, building the country's economy from the bottom starts with local and regional industry. In Afghanistan, there are SMEs in the sector dominated by small firms without financial potential in this sector. For example, government (a policy carried out by the authorities) and EU aid programs for development, which is the result of the use of modern technologies, have an important share in the development of such companies (Anna Wiśniewska, S., et al. 2016).

One of the ways a group of economics and industry experts agree is to strengthen small and medium-sized industries. These industries play different roles in national economies. Among them, the high share of these industries contributes to employment, transfer of financial resources, elimination of monopolies, etc. can be connected (Vo Van, Dut, 2015). In terms of macroeconomic factors: economic growth and development, community consumption, inflation, current account balance and public finance, etc. (Jaroslaw, W., et al., 2017).

The environment is known to many authors as an internal and external factor and therefore has a direct impact on the innovation activities of the company. Therefore, the environment is seen as a key factor for corporate innovation. This is due to frequent changes in managing the value and quality of difficult goods and services that help stimulate new ideas, develop new products and services in the market (Xuhua, H., et al., 2016). The role of

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both internal and external factors of the company environment has been determined by many authors in innovation performances (Menguc, Auh, Ozanne, 2010). Various studies in the field of SME innovation have shown that environmental external resources (macro) are highly dependent on resource constraints in SMEs' innovation activities (Bojan Moric, M., Zoran, W., 2014). Given the high competition in the global market, the ever-increasing expectations of today's customers and the need for companies to meet these growing expectations, SMEs have no choice but to try to create innovative capabilities for companies. Considering the fact that communication companies are in the high-tech sector of SMEs and to compete in the private and global market in the communication sector, to transform your business and to survive, these are predominantly technology-oriented, where companies with a lively and internal competitive environment arise from short-term product cycles as well as rapid technological changes. They are in an environment. (Dragnić, D., 2014).

When the Afghanistan became a market economy after the US invasion in 2001, the private sector, 85 percent of which was small and medium size of enterprises (SMEs), became the engine of growth. However, the massive entrance of military aid and money has prevented the government from focusing on developing small and medium size of enterprises and facilitating their access to the market, which ensures the long-term sustainability of the economy. (Mujib, M., 2014). The Afghan government's current strategy for small and medium size of enterprises, which was not completed until 2009, sought to focus on target sectors that could provide alternatives to imports. At the same time, the major challenges facing SMEs raise these questions about their competitiveness, creativity and ability to sustain this transition. Uncertainty and unpredictability of the business environment, dependence on donor organizations, lack of energy at the industrial level, lack of a clear link between market access and the needs of the market and the education system are the main issues that barricade the growth of SMEs. (MOFA, 2016).

Small and medium enterprises (SMEs) have not performed well in Afghanistan and therefore have not played a vital role in Afghanistan's economic growth and development. Over the past years, the government has been trying to support entrepreneurial development at the local level, however small and medium size of business (SMEs) still has little involvement in economic development. (USAID, AFG 2018).

Despite large-scale studies of small and medium size of enterprises in developing countries, there is literature on business performance assessment, particularly in northwestern Afghanistan. Most of the empirical studies in developing countries, particularly Afghanistan, are mainly concerned with small and medium enterprises, but with the question of how environmental factors affect profit, sales and employment in small and medium enterprises. What is the effect? Performance evaluations in Afghanistan, on the other hand, have not been thoroughly studied. (MOFA, 2016).

Therefore, this study evaluates the performance of small and medium size of enterprises in Afghanistan, as well as the performance of macroeconomic factors, the performance of small and medium size of enterprises in Afghanistan, the effects on sales (income) and employment (number of employees). (MOFA, 2016).

Research Hypotheses of This Study Was:

H1: Policy and legal environment affect the performance of SMEs.

H2: The economic environment affects the performance of SMEs.

- H3: Social Culture environment affects the performance of SMEs.
- H4: The technological environment affects the performance of SMEs.
- H5: The natural environment affects the performance of SMEs.

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2. Literature

Small and medium enterprises (SMEs) have a significant share in employment and investment by creating more diversity with less investment than is needed for large companies. Complementing large companies, making them more flexible with economic fluctuations and changes, it forms the cornerstone of economic and social life in the world (BiLen, S., 2014).

Despite the importance of small and medium size of enterprises (SMEs) in terms of job creation and employment, most of the literature on (SMEs) shows that small and medium size of enterprises face greater barriers to external financing than large enterprises that development limits them. (Oya Pinar, A. et al., 2011).

Small and medium size of enterprises (SMEs) is an important part of the economy that creates significant job opportunities in developed and developing countries. Small and medium size of enterprises has a significant share in the development and industrialization of the country and creates dynamic economic power. (Turan, A. H. 2009).

Work is essential for the well-being of any society. Small and medium size of enterprises (SMEs) exists in all economic environments. Most of the people are wondering what are SMEs mean. But defining it is problematic. How it is defined depends on who defines it and for what purpose. Thus, there is no universally accepted definition of Small and medium-sized enterprises (SMEs) because the classification of enterprises as large, medium or small is relative (Saurabh, N., 2007).

Jobs in national economies often start out as small jobs, grow over time, reach medium size, and eventually become large jobs. Small and medium-sized economic growth companies guarantee economic development, political stability and social peace (Sönmez et al., 2009).

Small and medium size of enterprises (SMEs) are severely affected by the opportunities and risks of globalization. They had to avoid new developments and seize opportunities. With globalization, the need for small and mediumsized companies to follow competitive strategies emerged, and only small and medium size of companies were more successful in following the right competitive strategy. (TenekeciOğlu, 2003).

Small and medium-sized enterprises (SMEs) have a social dimension that affects families both in terms of employment and economics. Thus, it provides a more rational distribution of resources allocated from small and medium size of enterprises to these efficient and effective companies and facilitates access to stronger national economies. (Cemile Ç., Himmet K., 2007).

SMEs are of great importance for the socio-economic development of Afghanistan. They have an important function not only in the economic field but also in the social life. Since SMEs are spread over a wide area, they are extremely important in eliminating the level of interregional development. The desire of the entrepreneurs of SMEs to be successful and to take risks and act courageously ensures the continuation of stability in the economic field (Mohammad Sabir, S., 2014). The role of the finance, management skills, macro environment factors and infrastructure is seen as a vital element for the performance of small and medium size of enterprises. (Science, Kinyua, A. N., 2014). Small and medium size of enterprises (SMEs) are still at the front of the policy discussions in developing countries. (Abrar-ul-haq, M., et al., 2015). Small and medium size of industries provide employment to many people in Afghanistan. Entrepreneurs, on the other hand, provided jobs to other Afghans who served as support, technical and administrative staff. (ACCI, 2019). It has promoted self-employment for many young people in both rural and urban areas; the spirit of successful entrepreneurship has taken over the minds of Afghans who, instead of relying on government jobs, believe in themselves and their self-employment goals. In the phone retail and rental businesses, many youths and Afghans remained self-employed. Their businesses have reached the level of employing other unemployed people. It reduces reliance on government and large firms for salary employment as many companies are established to provide support personnel and employment to Afghanistan (MOIC, 2019)

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Table 1. Companies General Registration Report of the Ministry of Industry and Trade of the Islamic Republic of

 Afghanistan between 2008-2019

Total Business Registration since 2008	Numbers
Total Number of Business Types işletmeler	103
Total Rejestrations	121649
Total Active Businesses	37585
Total Inactive Businesses	84064
Businesses with Total Male or Female President/Vice President	2057
Total Female President/Vice President Businesses	614

Source: Ministry of Industry and Trade of the Islamic Republic of Afghanistan

After Shah Amanullah's declaration of independence, Afghanistan's executive powers were established and in the first government of this period Sardar Abdul Quds was elected as prime minister and Ghulam Mohammad Khan Wardaki was named minister of industry and trade. From 1938 to 1959 the ministry of industry and trade was known as the ministry of national economy. In the industry department, some new branches such as handicrafts management, machinery industry management, transportation management and material preparation, independent and tariff management, legal management, domestic market management, domestic and foreign trade statistics management, commercial department research and development management were taken into account. (1938) in this period, export and import management was established in the field of commerce (MOIC, 2018).

Over time, as and when necessary, the professional departments were gradually separated from the body of the Ministry of National Economy and began to operate as separate units, each of which was promoted to independent ministries. In 1939, the Indian Commercial Fire Department and later the Afghan Chamber of Commerce were opened in Peshawar. Between 1940 and 1977, the organization of the Ministry of National Economy remained the same as in previous years. No significant changes were made in the late 1949 and early 1950s there were changes in the composition of the Ministry of Economy (MOIC, 2018).

However, due to the growing need for other professional institutions and ministries, some departments from the Ministry of National Economy were separated and promoted to other independent departments and agencies. The country's administration has since carried out various business activities with its various organizations; currently the Afghan government has a "free market economy" and supports the private sector as the most effective way to prosperity. Afghan Happiness: The Afghan economy has grown unevenly, affecting most Afghans, especially those living in rural areas. Most of the people are unsure of the benefits of the free market, especially when faced with a rapid increase in prices and higher prices for most of the raw materials such as petroleum products and flour. Identify and capitalize on the country's private sector driven economic growth. This includes an increased commitment to mobility in small and large businesses and traditional and non-traditional industries, as well as increasing competition to ensure the private sector is efficient for all. The Ministry of Industry and Trade is the only key ministry where these goals can be achieved (MOIC, 2018).

Until 2009 and eight years after the presence of international forces in Afghanistan, the country did not have a clear strategy for the development of small and medium enterprises. The consolidation strategy was completed in 2009 and its implementation began in 2011. Within the framework of the Ministry of Trade and Industry, a Presidency was established under the name of the Small and Medium-Sized Enterprises Presidency. Initially, the presidency started with 12 employees, but a year later the number of employees had doubled. However, due to the volume of business, this division still does not have enough employees (MOIC, 2019). According to the Small and Medium size of enterprises Development Policy of the Afghanistan the Ministry of Commerce and Industry, it's come the companies that is with five to nineteen employees are orderly as small size of the companies.

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The Companies that is with twenty to ninety nine employees, they are medium size of companies and also the companies with less than five employees are orderly as a micro companies. (MOIC, 2018).

The Medium size of enterprises that is with twenty to ninety nine employees is the official face of the Afghanistan invention. It is highly organized and well-connected in several sectors, with a particular focus on manufacturing, transport and information and communication technology. They have good access to the government and the financial system. And also their large numbers and limited scope represent the imperfect middle ground of the Afghan private company system. The Small businesses with five to nineteen employees cover the same type of business, but focus on a more modern business with more complex results. While many of them are sole proprietorships, they include a significant number of companies. It has a large pool of trained manpower and technical skills, as well as improved access to banks. It has the highest growth potential through cultivation, capacity building and support. Organizationally, they are well represented by professional and business associations. When Afghanistan became a market economy after the US invasion in 2001, the private sector, 85% percent of which was small and medium size of enterprises (SMEs), became the engine of growth in Afghanistan. However, the massive influx of military aid and money has prevented the government from focusing on developing (SMEs) and facilitating their access to the market, which ensures the long-term sustainability of the economy. (Mujib, M., 2014).

Small and Medium size of enterprises (SMEs) in Afghanistan are turning to the problems. The importance of problem analysis is that it enables us to understand their impact on growth of the (SMEs), development and survival. Many of these issues are affect the level of business activity because they are largely out of the control of the industry. Therefore, as we focus on the development of small and medium industries in Afghanistan, it is important to understand their nature. (ACCI, 2019).

The Problems and Challenges Small and medium size of enterprises (SMEs) in Afghanistan, they face are:

- Raw Material Scarcity
- · Poor Management skills insufficiently competent staff
- Insufficient Infrastructure
- Financial Restrictions
- Market problems
- Problem of cheap foreign products
- Registration and renewal of licenses
- · Inability to effectively control costs

Business Performance

If we consider the linguistic form of the word, the oxford English dictionary performance means how good or bad you do, or how good or bad it works, the verb good or badly to work or study. Through the literature, scholars constantly insist that there is no standard or uniform definition of performance and argue that it is a multidimensional concept. (Âta G., et al., 2016). Performance is a concept that can be evaluated separately for individuals or units and used for different purposes. The capacity to do a job, the power of impact, durability and so on. The concept of performance, which is used to express different situations, can be defined as an indicator of approaching the results of a given level. (Küçük, 2011.). Many companies implement quality management programs as an effort to improve their performance. When an organization creates a quality program, it usually aims to improve the quality of the product and service. The main element of such programs is the direct participation of employees in the form of empowerment and participation in the decision-making process, as well as increasing the use of analysis tools and attention to organizational systems (Gardner and Carlopio, 1996).

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2.1. Business and Macro Environment

Macro environmental factors affecting business development are: economic, social, cultural, natural and ecological, political and legal and technological factors (Banahene, S., et al., 2016). In general, elements of the general external environment mean that all systems in which the system is located are studied in the area and the system interacts with them, in other words, affects the conditions. Impact on all systems in the workspace. When approaching entrepreneurship; In general, environmental factors affect economic, political, social and cultural factors that can be affected not only in business but also in other professions. For example, cultural, social, technological, legal and political, Natural environment are demographic elements. (Ontorael, R., et al., 2017).

2.2. Economic Environment

An economic environment is one in which goods and services that meet the needs of society are produced with limited resources at hand and then consumed by those who demand the product, and resources are divided into goods, services, and incomes. (Ülgen ve Mirze, 2004).

2.3. Social Cultural Environment

Constructed social reality is when people create a social framework for themselves and, as a result, transform it into an influential reality that shapes and influences the way they behave. Intention to Entrepreneurship. This makes it necessary to examine entrepreneurship against the business environment as it leads to new discoveries (Abdullahi & Zainol, 2016)

2.4. Political and Legal Environment

The political environment is a platform consisting of administrative systems and political elements in which the central and local officials of the countries in which the companies operate and the political officials of the affiliated institutions are used th provided.(Ülgen ve Mirze, 2004). The legal environment includes the laws and regulations of the countries in which the businesses operate. The legal environment is very important for businesses in terms of informing the rules of the business world. Every law that is passed, changed, or repealed carries special opportunities and threats for businesses. (Terpstra and Sarathy, 1994).

2.5. Natural Environment

There are a number of opportunities and threats that must be presented to businesses by the natural environment in which they are located. For this reason, businesses must constantly review the elements in the natural environment that may affect the business, try to seize the opportunities of the natural environment, and be prepared for threats in line with the predictions they make and the actions they take. Will take. The main threats and opportunities that the natural environment offers to businesses are grouped around four factors. These factors include raw material shortages in the natural environment, rising energy costs, and increasing environmental pollution, climate, and topographic conditions (Cutler and McDougall, 1985).

2.6. Technological Environment

Technology affects business activities in two different ways. The first is that technology enables businesses to produce new products to compete in the market. The second is that technology facilitates the day-to-day business of companies (Hoffman et al., 2003: 21-22). On the other hand, the technology environment can be defined as the context in which new products and marketing opportunities are created with new information created and activities that lead to improvements in products and processes are created (Cutler and Armstrong, 1991).Technological environmental factors increase the country's competitiveness by providing timely and effective information, taking advantage of opportunities to offer new business products, modernize the service system, ensure the appropriate level of quality and other measures based on innovation. And adapted technology (Barkauskas et al., 2015).

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3. Data and Methodology

In this research, primary data were collected from SMEs in Afghanistan using a cross-sectional descriptive questionnaire. Data were analyzed using descriptive and inferential statistics. In our research, Cronbach's Alpha Coefficient, which is one of the internal consistency analysis methods, was used as a reliability analysis method. Correlation analysis was used to analyze the relationships between variables. The findings show the relationship between the macro environment factors and the performance of small and medium size of enterprises in the Afghanistan.in this research, the sample size of participants was 300 and also the positions of 300 of the participants in the companies are given. 52.7% of the participants work as managers and 19.7% as assistant managers. 9.7% work in the marketing department and 5.7% work as a seller. 3% are teachers, 2.7% are administrative staff, 2.3% are financial managers, and 1.3% are accountants. 3% stated that they worked in other positions.

Table 2. Distribution of businesses according to their fields of activity

ACTIVITY AREA	n	%
Agriculture, Hunting, Forestry and Fishing	14	4,7
Mining and Quarrying	4	1,3
Production	81	27,0
Building and Construction	29	9,7
Wholesale and Retail Trade	45	15,0
Hotels and Restaurants	17	5,7
Transport, Storage and Communication	6	2,0
Financial Intermediation	4	1,3
Real Estate, Rental and Commercial Activities	8	2,7
education	26	8,7
Energy sector	6	2,0
The industry sector	23	7,7
Information Technology Sector	17	5,7
Food industry	20	6,7
Total	300	100,0

Source: Author's computation

In the table, the fields of activity of the companies in which the participants work are given. 27% of the participants operate in the field of manufacturing and 15% in wholesale and retail trade. 1.3% is in the mining and quarrying sector, and 1.3% is in the financial intermediation sector.

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Graph 1. Importance Given by Participants to Macro Environment Elements

Source: Author's computation

In the figure, the average score indicating the importance that the participants attach to the macro-environment factors is given. Participants think that the political and legal environment factor is the most important among these elements. After that, technological environment factor, economic environment factor, social cultural environment factor are given importance respectively.



Graph 2. Opinions of Participants on Business Performance

Source: Author's computation

In the chart above, the degree to which the participants agree with different statements about business performance is indicated. Accordingly, the participants mostly agree with the statement "Your situation in providing customer satisfaction is better than competitors". It is seen that the lowest participation is in the statement "The profitability of your business is better than the competitors". The level of agreement with all statements about the performance

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of the enterprise is above 3. The general average of the answers given by the participants to the statements about business performance is 3.24. This means that the participants' thoughts on business performance are positive.

Table 3. The relationship between the importance given to macro-environmental factors and business performance

		Political and Legal Environme nt	Economic Environme nt	Social Cultural Environme nt	Technologica l Environment	Natural Environme nt	Business Performanc e
Political and	r	1	0,552	0,314	0,348	0,201	0,260
Legal Environment	р		<0,001*	<0,001*	<0,001*	<0,001*	<0,001*
Economic Environment	r	0,552	1	0,486	0,419	0,369	0,242
	р	<0,001*		<0,001*	<0,001*	<0,001*	<0,001*
Social Cultural Environment	r	0,314	0,486	1	0,421	0,351	0,188
	р	<0,001*	<0,001*		<0,001*	<0,001*	0,001*
Technological Environment	r	0,348	0,419	0,421	1	0,372	0,122
	р	<0,001*	<0,001*	<0,001*		<0,001*	0,034*
Natural Environment	r	0,201	0,369	0,351	0,372	1	0,171
	р	<0,001*	<0,001*	<0,001*	<0,001*		0,003*
Business Performance	r	0,260	0,242	0,188	0,122	0,171	1
	р	<0,001*	<0,001*	0,001*	0,034*	0,003*	

Note *: p<0.05

Source: Author's computation

The table shows the relationship between the importance that the participants attach to the macro-environmental factors and their thoughts on business performance. Statistically significant relationships were found between all macro-environment factors and business performance (p<0.05). There is a statistically significant positive correlation between the political and legal environment, which is one of the macro-environment factors, and business performance (r=0.260; p<0.001). As the importance given to the political and legal environment element increases, positive thinking towards business performance also increases. There is a statistically significant positive correlation between the economic environment, one of the macro-environment factors, and business performance (r=0.242; p<0.001). As the importance given to the economic environment factor increases, positive thinking towards business performance also increases. There is a statistically significant positive correlation between the social cultural environment, one of the macro-environment factors, and business performance (r= 0.188; p=0.001). As the importance given to the social and cultural environment element increases, positive thinking towards business performance also increases. There is a statistically significant positive correlation between the technological environment, which is one of the macro-environment factors, and business performance (r=0.122; p=0.034). As the importance given to the technological environment element increases, positive thinking towards business performance also increases. There is a statistically significant positive correlation between the natural environment, one of the macro-environment factors, and business performance (r=0.171; p=0.003). As the importance given to the natural environment element increases, positive thinking towards business performance also increases.

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In addition to these findings, all macro-environment factors were found to be positively and significantly correlated with each other (p<0.05). An increase in one of the macro-environment factors causes an increase in other factors as well.

4. Conclusion

The findings show the relationship between macro environment factors and the performance of small and medium size of enterprises in Afghanistan. According, it is understood that the political and legal environment factor, economic environment factor, social cultural environment factor, natural environment and technological environment factor are positively related to the performance of these enterprises, respectively. This reaserch is draws the attention of management and policy makers to the urgent need for specific management practices to improve the effectiveness and sustainability of the impact of macroenvironmental factors on the performance of small and medium enterprises in Afghanistan. It can also help local entrepreneurs develop strategies to address poor business performance. Given the importance of small and medium enterprises in the growth of country's economic and also the role they play in reducing poverty and unemployment, the results of this study will be of great importance to major stakeholders including government, researchers and investors. They are also influenced by employees, managers, business consultants, financial analysts and consumers. Small and medium size of enterprises in developing countries are expected to contribute to the sub-sector development process and even in developed countries that share similar environmental macro factors that affect business performance.

Given the importance of small and medium size of enterprises for the growth of country's economic, as well as the role they play in reducing poverty and unemployment, the results of this study show that in addition to small and medium size of enterprises, shareholders such as government, researchers and investors. The study is also expected to help entrepreneurs with poor business performance develop strategies to guide them.

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Identifying corruption and public sector risks

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Abstract

Risk assessment goes through different stages, with risk assessment of individual elements being performed. The assessment is a method of identifying areas, conditions or events with a potentially high level of risk. In order to determine the amount of risk that can be taken or that is acceptable for the normal functioning of a system (institution), the level of preference in relation to the main objective should be determined. The overall risk management model aims to support the decision maker by reducing uncertainty and increasing the success certainty of this decision. The reduction of obscurity and uncertainty is done by collecting more data on possible risk events. The risk is always calculated from the perspective of a future event and is probabilistic. However, the assessment provides extremely important information to managers and decision makers whether it is worth taking a risk. The purpose of risk assessment is to improve management in case of a risk event and process assessment. Different ways of dealing with uncertainty are used to reduce risk. One of them is transparency, which has become a major weapon against covert practices of office powers abuse for personal advantages as well as the fight against crime.

Keywords: risk, corruption, public sector, analysis.

Jel Codes: P00, H00, F00

1. Introduction

Combating corruption not only nationwide but also on a global level requires coordinated efforts to engage both the state and its citizens, without excluding any sector of public life. Analysing the international experience, it can be pointed out that there is a great variety of measures to fight corruption worldwide; two approaches are possible: one is through development of internal structures at different levels, and the other relies on the adoption of specific legislative and disciplinary measures to be applied by already established authorities with various powers. Practice shows that the most effective way is to counteract by creating an internal structure for investigating corruption reporting.

Corruption itself is characterized by various manifestations and covers all aspects of life. Both the authorities (executive, legislative and judicial) and non-governmental organizations, media, business organizations, etc. are fighting corruption. Successfully combating corruption requires political will and action; economic reforms (transparent privatization, deregulation, fee simplification, budget reform; institutional reform; financial control and accountability; independent judiciary; civic will and exercise of civil rights. In this gradation, the position of the governing and implemented national policies is crucial. If there is a lack of political will and the necessary economic and institutional reforms are not carried out, if the judiciary remains vulnerable to political pressure and financial control is applied as a political sanction against the opposition, then there are no anti-corruption attempts.

2. Risk assessment

Ensuring security is mainly related to the implementation of the mandatory management functions of institutions, aimed at the effective implementation of security policy and ensuring compliance with the law. A mandatory element of a strategic management includes risk management in achieving the organization's goals.

Theory defines three different levels of risk management - strategic (related to the management of an organization), operational (related to the main processes and activities in any organization) and tactical (related to the work of

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each participant in the process) (2015). The necessary tools for security management include assessment and assessment of conditions and trends in the security environment and taking preventive action thereof. Respectively, risk assessment achieves an objective assessment of the identified risk factors and minimizes the effects of adverse events. Risk assessment, as an element of strategic management, can contribute to increasing the efficiency of various public organizations and preventively propose measures to reduce the negative effect in the security sphere and thus achieving the goals set. For effective, timely and, apt to the uncertainty, strategic security management of our country and for adequate prevention of adverse events, it is important to perform risk assessment and assessment as an element of the overall risk management process. As our society requires more clarity on the decisions concerning the future development of the country's security, risk management based on objective assessment, would lead to a change in the way of planning and development of the activities in an institution, organization or project.

The risk assessment should focus on the hindrances that might curb the implementation of the main task and achievement of the ultimate goal of the organization in this case - the protection of public order, crime prevention and protection of national security. Risk management is defined as a process of targeted treatment of risk to minimize it by: reducing the likelihood of occurrence; limiting the adverse impact of risk events on the expected results, while minimizing the cost of funds and resources. Risk assessment goes through different stages, with risk assessment of individual elements being performed. The assessment is a method of identifying areas, conditions or events with a potentially high level of risk. In order to determine the amount of risk that can be taken or that is acceptable for the normal functioning of a system (institution), the level of preference in relation to the main objective should be determined. The overall risk management model aims to support the decision maker by reducing uncertainty and increasing the success certainty of this decision. The reduction of obscurity and uncertainty is done by collecting more data on possible risk events. The risk is always calculated from the perspective of a future event and is probabilistic. However, the assessment provides extremely important information to managers and decision makers whether it is worth taking a risk. The purpose of risk assessment is to improve management in case of a risk event and process assessment. Different ways of dealing with uncertainty are used to reduce risk. One of them is transparency, which has become a major weapon against covert practices of office powers abuse for personal advantages as well as the fight against crime.

Another way to reduce the risk is to have the right strategy and applicable methodology. By analysing all relationships and potential risk events, a comprehensive model of system management in terms of risk is created. The risk assessment is performed according to a specific methodology, which measures the risk, depending on the identified values of the system and the probability of coercing threats using existing vulnerabilities. Any potential event that has negative consequences can be considered a risk. There is also a risk of non-fulfilment of the goals set, which will lead to predictable and inevitable negative consequences. The probability of damaging the values by implying a threat is determined. To minimize the risk, the areas with unacceptably high risk are first identified and most effective counteractions are selected, accompanied by calculating the extent of acceptability of any residual risk. By modelling and managing the risks, it is possible to show how the managing entities' attention is focused on different phases of the activity. The most important element remains the awareness of the risk related problems, their adequate assessment through proposed techniques, as well as the choice of informed solution for the action options. Responding to and counteracting potential adverse events before they occur is one of the basic principles of national security policy and the right way for prevention which can be achieved through risk management tools.

The latest ISO standard, the International Organization for Standardization ISO 31000: 2009, defines risk as "The effect of uncertainty on objectives". External or internal influence on risk is defined as a risk factor. A risk factor can be defined as a factor that increases the likelihood of corrupt behaviour, unethical behaviour or other behaviour that may have a negative impact on the goals of the public and private sector (Selinšek, 2015a). Figuratively speaking, risks and risk factors are two sides of the same coin and cannot be clearly distinguished because each risk is a consequence of or arising from one or more risk factors, which can be very different in nature and content.

Corruption risk factors are circumstances (at different levels) that can support, provoke or allow the existence of acts of corruption or unethical behaviour on behalf of public authorities. The factors could be divided into two types - those that contribute to the maintenance of corrupt practices - import of smuggled goods with poor control

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at the state border, violations of the Road Traffic Act and offering money to respective Ministry of Interior employee, who would accept it so as not to sanction the driver. Other risk factors are those that create a favourable environment for the emergence of corrupt behaviour, lack of opportunities to provide electronic documents related to registration or licensing regime, unclear rules for issuing various types of documents and more.

Corruption risks differ from other types of risks in the industrial, economic and social spheres, for example: healthcare, trade, etc. with their degree of public danger. Corruption risks are most often associated with intentional actions of the subjects, the risks of this category are not accidental. The result of a corrupt behaviour occurrence is targeted, affects a large number of people and has extremely negative consequences. However, it should be noted that a corruption risk can also be defined in case of "incorrect" training of the staff, "incorrect" management, as well as in case of insufficient payment for the work performed. These factors in themselves do not depend directly on the will of the person who is the subject of corrupt behaviour, they are external factors and the non-occurrence of the latter requires a purposeful policy of the state.

Risks of corruption can exist in almost all activities and functions in the public sector, but some business relationships, such as public-private partnerships, can also bring additional risks of corruption to a public sector institution (e.g. risk of conflict of interest, public procurements, etc). In this case, public sector organizations must manage not only their own initial risks, but also the risks associated with these public-private partnerships.

Corruption risk is the risk that can favour or facilitate corruption. Corruption risk is part of all institutional risks within a system or process. Risk is defined as factor in the likelihood of corruption multiplied by the impact of corruption. In general, risks can be divided into objective risks and subjective risks. The objective ones include - weak institutions, bad management, improper regulation of processes and others. Objective risks (weak institutions and regulations) are distinguished from subjective risks (tolerance to corruption, personal motivation, cost / calculation of benefit, previous experience).

Corruption risk is perceived as the difference between real and ideal systems.

The most common risks of corruption that may arise in any public sector institution, and it should be noted that there is no definitive or finite list of corruption risks as well as integrity and the risk factors that facilitate them, can be summarized as follows:

- risk of public official taking or demanding a bribe;
- risk of abuse of power or position for private interests;
- risk of abuse of public funds for private interests,
- risk of illegal or unethical external influence or pressure on public official;
- risk of illegal or unethical internal influence or pressure on public official;
- risk of conflict of interests.

To improve the management of a specific public sector institution (organization, ministry, agency, etc.) it is necessary to assess the risk of corruption. Assessment is inherently a preventive tool for identifying corruption and public sector risks. Therefore, corruption risk assessment is essential for identifying and managing corruption risks, which is crucial in the long run.

Corruption risk assessment is mainly a technical process and requires a certain level of sophistication and expert knowledge. If they are not determined and managed, the corruption risks will sooner or later lead to a breach of the integrity of an institution and to a loss of public confidence in the public trust and reputation of this institution, direct financial loss, cost of criminal justice.

Properly implemented, corruption risk assessment can become an important and effective integral part of anticorruption policy;

Proper and effective assessment of corruption risks leads to the prevention of corruption with significant benefits:

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- it keeps the corruption prevention;
- it enables identification of common risks across a given area;
- it enables sharing of knowledge and good practice on risk identification and, in particular, on risk mitigation measures within a particular sector or institution;
- it enables effective exchange of good practices and/or establishment of a centralized corruption risk register
- it can be a source of ideas and partnership support for reforms and good governance in the public sector.

However, it should be noted that risk assessment alone cannot replace good governance, good regulation of processes within the system, but still one of the key advantages of risk assessment of corruption is that it can provide - a clear picture of the state of corruption.

Corruption risk assessments can be used to determine the relationships between different risks and participants and to identify specific risk areas - for example, in case of poor organization of the activity, it is allowed to receive funds that are not followed by certain employees. When applying the risk assessment, an assessment must be made of the real-life processes and procedures that are followed in the organization itself. This facilitates the identification of gaps between regulations and practice. In addition to being a tool of proactive corruption risk management, corruption risk assessment helps to improve interaction between structures, the quality of management and provides an opportunity to assess the work process and helps to identify weaknesses. Last but not least, serves as a symbolic tool to strengthen devotion to integrity, ethical and governance standards in the public sector organizations and is a tool for improving work processes in this environment and for achieving its objectives.

There are several international standards that are dealing with the corruption risk. They are very different in content and extent. However, none of these standards attempt to implement a 'one size fits all' approach. Standards always include the following components:

- first, one has to establish the context,
- then identify the risks (what can happen, when, where, how and why),
- the third step is dealing with the assessment of these risks (i.e. determine the level of risk),
- in the fourth place, evaluate the risk and finally and most importantly
- taking action to limit the possibility of these risks to occur.

Significant experience in identifying corruption risks has already been built worldwide. Both the risk factors of corruption and their diversity have been identified. However, an objective risk assessment must be tailored to the specific environment in which it is performed. When looking for the most appropriate methodology for assessing the risk of corruption, it is necessary to analyse in detail the environment in which it will be applied - for example: bribery in different public sectors is carried out differently and involves assessment of the environment in which it takes place to minimize the possibilities for carrying out this action prohibited by law.

There is no international standard, mechanism or tool that could be applied universally for the corruption risk assessment in public sector. However, various documents or papers exist (mostly adopted or developed by international organizations or institutions operating on a global level) that contain useful guidance for the corruption risk assessment in public sector. As mentioned above, they are very different: some of them can be used for corruption risk assessment in public and private sectors (ISO standard 31000: 2009); some were developed for companies or business entities operating in the private sector (UN Global Compact Guide for Anti-Corruption Risk Assessment 51 and COSO Enterprise Risk Management – Integrated Framework 52). Their principles and methodologies can be adapted to the needs of CRA in the public sector, etc.

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Even if there are different approaches in performing the corruption risk assessment, the management of risk assessment process itself must follow several stages at the leading institutional level - in a ministry, agency, directorate, etc.:

Establishing a risk management framework.

- Making a commitment to risk management, i.e. the will of the management at the highest level;
- Designing organization's risk management framework by creation of risk management plans;
- Formulating organization's risk management policy who, how and in what way will perform the tasks set;
- Involving of teams in risk management, i.e. every employee should be involved in this process.

Application of risk management in the organization – staff rotation, prevention of unfair competition when applying for public services position, prevention of conflict of interests, etc. Allocation of resources for risk management at all levels in the organization, including senior staff from all areas of activity. Risk assessment cannot take place without interaction between all components involved in the process, which is why it is important to create mechanisms for internal and external communication of the individual units. A compulsory stage of risk management is the monitoring of this process to improve the organization's risk management. Before a corruption risk assessment plan is prepared, a number of actions need to be taken:

Identifying vulnerable areas in any organization, they may include negotiation, documents issuance, legislative activities, law enforcement, private sector relations, state property management, etc.);

Determining the factors that lead to vulnerability of individual systems, such as rapid legislative or internal changes, increased workload, disrupted relationship between management and employees, etc.

Assessment of the overall control system in relation to emerging corruption risks);

Assessment of deviations: it is necessary to analyse whether there is a good balance between the identified vulnerable areas and the control system, if such balance is absent, it is necessary to prepare a plan on how to manage the riskiest processes and what measures are required to improve the resilience of the organization against corruption risks. (Báger, 2011)

We will try to define some of the possible vulnerable processes on a national level, which affect the overall governance of the public sector:

- Relationship between government and the public / business
- Collection of taxes, import duties, excises, fees, etc.;
- Mechanisms for selecting public procurement participants;
- Payments, indemnities, allowances, grants, sponsorship, etc.;
- Issuance of permits, passports, driver's licenses, ID cards, documents for possession of arms, etc.;
- Implementation, supervision, control, inspection;
- Detection of crimes and implementation of criminal repression;
- Classified information related to national security, official documents, various types of cases and files;
- Management of public property;
- Payment in cash;
- Premiums, expenses, bonuses, allowances of public officials, etc;

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- Purchase, management and consumption of goods in the public sphere (stocks, computers, new cars, completion of current repairs, etc.).

An important part of the internal tools for corruption risk management is the application of integrity tests of employees. Integrity is a check on the integrity of the individual institution. It consists of performing an institutional assessment of corruption risk and is also a tool for self-assessment. The integrity / loyalty test is a strategic and operational process of development of an organization. This process is mainly aimed at:

- assessment of the degree of vulnerability or exposure of individual institutions in the public sector to corruption risks and other illegal or unethical behaviour;
- identification of risk factors for corruption and other illegal or unethical behaviour in certain sectoral areas of the institution;
- identifying measures to reduce, eliminate or control the identified risks and risk factors.

In order to implement the integrity tests, it is necessary to prepare an appropriate plan. The Integrity Plan can also address organizational culture and ethics in public sector institutions, which involves reviewing values, behaviours, and specific individual actions to identify a wide range of risks of corruption and integrity among employees.

In order to be effective in the long run, changes in the integrity plan must be monitored methodically and updated at institutional, regulatory and procedural levels. An important prerequisite for successful integrity is the provision of sufficient financial and human resources, as well as the necessary time to allow all people involved in the process to perform their duties professionally.

When preparing a plan for conducting integrity tests, its scale and extent should be assessed in the first place – will it be taking place in several directorates of a ministry or just in a small team of employees who have been reported to be under corruption pressure?

In the Republic of Bulgaria in the last few years there has been a will on behalf of the legislature and executive authorities to apply effective methodologies for assessing the risk of corrupt behaviour. In the present paper we will consider some of the legislative initiatives in this direction, for example: Anti-Corruption Law for Confiscating Illegally Acquired Assets provides that integrity test finds out if the inspected person performs his powers or duties honestly and in compliance with the Constitution and country's laws as well as is of benefit for the citizens and society. Persons with higher education who have successfully passed an integrity test after a competition could be appointed inspectors and directors with the Confiscation of Illegally Acquired Assets Commission. The inspectors and directors of the Commission agree to be subject to periodic and incidental integrity tests during their term of office. Failure to pass an integrity test may be grounds for dismissal. Within 6 months from the assignment, the employees pass an integrity test, and failure to pass an integrity test may be a ground for dismissal.

The Judiciary Act incorporates the right of the Inspectorate at the Supreme Judicial Council to conduct integrity tests in its attempt to disclose actions that may damage the prestige of the judiciary and those related to violating the independence of judges, prosecutors and investigators, also - to introduce effective mechanisms for internal control of the judiciary over the professionalism, motivation, independence and impartiality of magistrates, their responsible attitude, accountability and conduct in accordance with ethical norms.

The Inspectorates under the Law on Administration carry out inspections and assessment of the corruption risk and propose measures for its limitation based on approved methodology for assessment of the corruption risk.

Integrity tests are conducted at the Customs Agency, the Ministry of Interior, and the State Agency for National Security. In order to ensure integrity. The development of integrity tests, their validation and application have a significant preventive anti-corruption effect. This is an important signal - both to society and to respective administrations - testifying to the existence of systematic approach, ensuring the integrity of those working in public administration.

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3. Integrity in the Ministry of Interior

An ongoing process of risk identification, planning and implementation of adequate measures must strengthen the anti-corruption and ethical culture not only in a particular public sector institution using this model, but must therefore strengthen the rule of law and public confidence in the public sector as a whole.

Responsibilities for effective training and responsibilities of managers must also be defined. An integrity plan manager must be appointed with respective staff to implement it. According to the specifics of the organization, it is necessary to determine which methodology is recommended for application. Deadlines for conducting the test itself. Responsibilities in the exercise of the powers (including the competent authority for imposing sanctions if such measures are deemed appropriate and necessary). A very important factor for the successful implementation of the test is the commitment of the staff.

It would be appropriate to apply a single model and standards of integrity plans at the state level, taking into account, of course, the specifics of each institution. This would allow the country to create a national integrity registration in digital format. This will reduce the risks of inaccuracies in implementation, and will also create a general idea of the corruption risk among public sector employees, which will, to some extent, lead to a dissuasive and preventive effect on employees of these spheres.

The application of integrity tests is associated with a strict definition of responsibility. The delegated powers of the management of an organization include responsibilities regarding the loyalty of the employees to that organization. We believe that the responsibility for the proper organization and implementation of integrity tests depends entirely on the will and efforts of the institution management. The head is responsible for the statutory tasks of the institution, the organization of the activity, the personnel management as well as for the correct spending of the state funds. The manager responsibilities, including those of the security sector, include responsibility for policy making, work organization, leadership and risk management. Risks must be prevented, reduced and, if possible, eliminated through control and supervision measures. These measures also include an effective mechanism for checking the loyalty of employees, including full implementation, its ongoing development and regular feedback on the integrity plan issues with the organization's management and staff. All employees must be required to enlighten themselves with the integrity plan and to comply with it, with the relevant instructions of management or the employee designated as the plan director. In order to achieve the full implementation of the integrity plan in any institution, it is necessary for all employees to accept this plan as an integral part of the institution internal rules and their personal integrity in the work.

The implementation of a plan for establishing the integrity of employees is a continuous process that requires expertise and significant professional experience of employees in charge of its implementation, regular monitoring and updating. The integrity plan cannot achieve its goal if the responsible employees are careless and do not have the necessary expert potential of knowledge and skills. The same is true if the head of the organization has no commitment to the process.

As already mentioned, one of the main tools that can be applied in conducting a corruption risk assessment is the test of integrity / integrity of employees.

Another possibility is to assess the sectoral risk of corruption.

In contrast to the integrity plan, which focuses on systemic characteristics and the situation of a particular sector (e.g. energy, health, justice, customs, construction and infrastructure, etc.) rather than on individuals. While the integrity plan addresses specific organizational risk factors, job-derived processes, and individual risk factors, the sectoral corruption assessment focuses on systemic risk factors, e.g., risk factors relating to the public, the public procurement system, budgeting and pricing or human resource management.

Unlike the integrity test, a single model of assessment and evaluation cannot be introduced here, given the fact that the public sector is quite diverse in terms of activities. When conducting a sectoral risk assessment, the great influence of the private sector on the public sector should be noted. This type of assessment is a very useful tool, especially for sectors with a large public presence, i.e., sectors that are fully or partially regulated by the state or

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exploited by the government, or have major governmental influence on the decision-making process in (public) companies functioning in the sector - energy sector, transport, education, healthcare, etc.

The application of the sectoral approach can be combined with performing a test for the integrity of the employees of an organization from this sector. For example, a sectoral corruption risk assessment in the Ministry of Interior system can be performed, after which an integrity test for the employees in a regional Ministry of Interior directorate could be applied. In this case, the sectoral risk assessment should identify corruption risks at the macro level, while the integrity test should further extend them to the micro level, where very specific measures can be taken to avoid or mitigate certain risks.

If both approaches are used, the methodologies need to be harmonized. Measures within the scope of risk management must also be harmonized and complemented.

In fact, the application of this combined approach implies that, as a rule, the same categories of risks will be treated, but from different points of view. For example: the identified risk of bribing doctors will require at the sectoral level systematic measures in the work environment and conditions, awareness raising, a transparent system for offering public health services, a system for supervision or licensing of doctors, etc., and requires more specific work in individual health care institutions, identified as riskier than others in terms of, for example, bribery. The implementation of the integrity test can provide many different and specific questions from of internal environment point of view as well as working processes in the specific institution, which the sectoral assessment is not able to provide.

The sectoral corruption risk assessment should reveal the actual state of affairs in the sector as a whole. It is also an important orientation for the institutions working in the sector. The sector assessment requires sufficient financial resources, as well as a reasonable timeframe, allowing all persons involved in the process to do their work in a professional manner. Staff engagement and sufficient resources are also the necessary institutional prerequisites for an effective and high-quality sectoral risk corruption assessment. An obligatory condition here as well as in the application of the integrity tests is the expert potential of the persons performing the assessment. In particular, here the experts are part of the evaluation and assessment sector itself, which is why the possibility of a conflict of interest or other risk factors should be envisaged. Here you can also rely on expert staff from the private sector to assist in carrying out the assessment in order to avoid conflicts of interest.

4. Conclusion

A uniform methodology cannot be created for conducting this type of assessment, as the sectors it will be applied perform extremely diverse activities - for example, in the security sector some risks will be applied for assessment, while in the field of education and social sphere they will be completely different. Unlike the proposed uniform methodology for performing integrity tests, a similar one would not be possible in this case. We consider the creation of anti-corruption implementation plans for respective sectoral ministry, agency or directorate level be the most appropriate option.

Through their legally defined functions, the state institutions in the security sector pursue a common mission - to ensure the security of the state in full. In this regard, each institution has built internal mechanisms to achieve its objectives. By making an assessment of each of the main security risk factors, the institutions develop various normative documents related to the implementation of strategic management. For example, the Ministry of Interior has adopted the Risk Management Strategy of the Ministry of Interior, the Strategy of the Ministry of Interior for Road Safety (2021 - 2030), the Strategy for Crime Prevention 2012 - 2020, National Strategy in the Field of Migration, Asylum and Integration 2015 - 2020, Strategy for Counteracting Radicalization and Terrorism 2015 - 2020. Concept for Prevention and Counteraction of Corruption in the Ministry of Interior 2016 - 2020, etc (2021a). The strategies aim to provide framework underpins of reference and to synthesize the problems on which the government should focus when looking for the most effective solution to limit or eliminate the consequences of certain negative processes in society.

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Gender Development Index (GDI) and Gender Empowerment Measure (GEM) analysis in Malang of Indonesia

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Abstract

Gender equality has been a concern among the Indonesian government and other countries. Gender discrimination in achievement between men and women can lead to gender inequality. This study investigates the Gender Development Index (GDI) and Gender Empowerment Measure (GEM) in Malang of East Java in Indonesia. A descriptive analysis method was adopted to describe or present data acquisition results in an organized manner. Additionally, this study obtained secondary data from previous research and scientific journals. The data further were descriptively analyzed to provide in-depth information related to the topic of discussion. The findings indicate that the GDI is an indicator to calculate the achievement of the quality of human development divided into gender through economic, education, and health aspects. At the same time, the GEM focuses on how far gender equality has been built with women's participation in politics, economics, and decision-making. The study results note that GDI in Malang has remained stable during 2017 and 2020, while GEM shows an increasing trend from 2017 to 2020.

Keywords: Gender Development Index, Gender Empowerment Measure, Human Development Index, Woman's Participation.

Jel Codes: D63, F63, I24

1. Introduction

Gender inequality has raised the attention of both policy makers and researchers in various countries, including Indonesia. In general, the concept of gender is not interpreted as a distinction between genders but leads to differences in behavior, roles, attributes, and socially constructed activities in people's lives. In addition, gender understands the harmony in the roles of men and women in various aspects of life, such as social, political, and economic. In the past, men were considered more dominant than women, who were considered only worthy of household needs. However, it has experienced a shift in gender position. Women are increasingly showing their abilities in various aspects of life and calling for justice between males and females. Gender discrimination often occurs in various countries, and this shows how differences in achievement between men and women can drive gender inequality (Falk & Hermle, 2018; Ministry of Women Empowerment and Child Protection, 2020)

Many countries have glorified gender equality and women's empowerment. Gender equality and women's empowerment are the program's goals to enhance the welfare and sustainable development as provided in the Sustainable Development Goals (SDGs). As informed previously, the gender gap is a global issue. The globalization of gender inequality does not cause gender equality but is the result of the globalization contestation of democratic values. Like other nations, the Indonesian inequality problem has often been associated with patriarchal culture that has been ingrained since ancient times, which mentioned that men are more important than women. The patriarchal culture posits men as strong and responsible individuals for public roles instead of women who only need to dwell on domestic roles. In fact, the analysis of gender focuses not only on the roles and activities between men and women but also on the relationship between the two. It implies that when the status of women's roles changes, it can lead to pressure on gender relations (Ministry of Women Empowerment and Child Protection, 2019).

The Indonesian National Medium-Term Development Plan (RPJMN) 2015-2019 has explicitly required the position of gender equality in Indonesia as one of the primary considerations for formulating a development plan. Therefore, Human resources (HR) is placed as the leading supporter of the passage of national development. To

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measure the achievement of gender equality, the RPJMN suggested considering main components in the form of the Human Development Index (HDI): Gender Development Index (GDI) and Gender Empowerment Measure (GEM).

Human development based on gender equality can be proxied by GDI and GEM to understand how significant the achievement of gender development is in Indonesia. This estimation is proposed based on the achievement of women in access to basic capabilities and the extent of their involvement in decision-making processes or policy formation in the political and economic fields. The Indonesian government has been provided several policy plans to promote justice and gender equality. In fact, some areas in Indonesia are still facing gaping gender gaps and need to be given attention. Several regions where the GDI and GEM achievements are relatively insufficient, such as in Malang of East Java. Despite the fact that progress has been seen in most areas of gender equality, it notes that the GDI and GEM achievements have not increased in the Human Development Index.

2. Method

This research adopted a descriptive analysis method to gain comprehend results for the issues. As stated by Sugiono (2014), qualitative research is one whose research places the researcher as the vital instrument. Additionally, the descriptive analysis research methods are statistical results needed in analyzing data to describe the data obtained. In the descriptive approach, data is combined and calculated inductively to collect data sources studied regularly and rigorously, focusing on objectivity and carefully described. For descriptive analysis, it is necessary to understand the concept of the Gender Development Index (GDI) and the Gender Empowerment Index first as an object of research to be studied. Then this object will be elaborated and linked with related data findings in the form of paragraphs arranged in a specific context, specifically natural.

This study used secondary data from books, previous articles, theses, and relevant sources. Additionally, the secondary data were involved from the internet searches in the form of primary or original scientific reports, which are applied in articles or university journals concerned with gender-based development. This study is not based on direct observations from the author but rather from other authors who have previously conducted studies and observations on the concept of gender-based development.

Furthermore, this study adopted a descriptive approach for data analysis. The main benefit of using the descriptive method is that the researchers can attempt to present a straightforward way regarding the research results studied. Descriptive research describes an event, phenomenon, or symptom that has occurred at that time. Additionally, the researchers used the descriptive analysis method to describe the symptoms or phenomena and events before answering the existing problems. The data analysis technique is a way or method of processing data. The data is presented in a sentence structure that summarizes the information that aims to make the reader understand more deeply how to solve problems in writing.

3. Results

3.1. Human Development Index (HDI) and Gender Development Index (GDI)

The Human Development Index (HDI) is a concept that can describe how the population can reach the results or benefits of development, primarily in obtaining income, health, and education. The HDI achievement can be used as a parameter for accomplishing development in terms of the quality of Human Resources. Ministry of Women Empowerment and Child Protection (2020) stated three main dimensions of human development in measuring HDI in a country, including health, education, and the economy. First, the health indicator focuses on achieving a healthy life and a long-life using Life Expectancy, the average calculation of the number of years that an individual can live during his life. Second, education indicators consider knowledge through two data analyzes, in the form of Mean Years of Schooling (MYS) and Expected Years of Schooling (EYS). MYS implies the total average year that the community can relish. Gender-Based Human Development is concerned with accessing and taking formal education or schooling, while the EYS notes the estimation of how many years of education children of school age

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take, which is the total number of years of schooling that children of school age can expect. Third, the economic indicator refers to a decent standard of living, where this indicator is adjusted expenditure per capita.

GDI is a human development parameter consisting of three indicators and emphasizes gender status, especially for women to see basic abilities. The GDI figure is expected to explain the development program plan that adapts gender equality and justice. At the same time, life expectancy is a dimension of health, while MYS and EYS are a dimension of education and income contribution as an economic dimension where all three are indicators of forming GDI. The criteria used when the distance between the GDI values is getting smaller with the number 100 will show the balance or equality between the development of men and women. Conversely, when the distance between the GDI value and the number 100 is more considerable, the development gap between men and women is obtaining more serious. The number 100 is adopted as the basis for presenting the GDI value due to this number is included in the perfectly recognized ratio value. The female HDI growth rate value, which is lower than male, will diminish the GDI value and vice versa. With the existence of separate parameters between male HDI and female HDI, the analysis of the quality of life of each gender group can be provided either partially or separately (Ministry of Women Empowerment and Child Protection, 2019). The distinguish between GDI and HDI lies in the indicators borrowed. The human development index indicators are life expectancy, education level, and income, but the GPI also considers gender inequality between male and female (Darsyah & Sara, 2016).

The HDI in Malang of East Java had experienced a significant increase, from 80.65 to 81.45, from 2017 to 2020. The enhancement is also relevant to the HDI value in East Java and Indonesia that showing an upward trend. The HDI value in Malang even exceeds the HDI value in East Java and Indonesia. The detail of HDI in Malang, East Java, and Indonesia is illustrated in Figure 1.



Figure 1. HDI of Malang, East Java, and Indonesia 2017-2020 **Source:** Statistics Indonesia (2021)

In comparison, Malang has ranked in the second position after Surabaya during the period, followed by Madiun and Sidoarjo. The data of comparison between cities in East Java of Indonesia is presented in Figure 2.

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HDI 84 82 80 78 76 2017 2018 2019 2020 Surabaya City Madiun City Sidoarjo Regency

Figure 2. The HDI achievement of Malang compared to other regencies/cities in East Java 2017-2020 Source: Statistics Indonesia (2021)

Figure 3 explains the GDI between 2017 and 2020. In the beginning, the GDI value was 94.96, then slightly decreased in the next year by approximately 94.71 and remained stable in 2019. However, at the end of the period, the GDI in Malang reach almost 95.



Figure 3. GDI in Malang, East Java, and Indonesia 2017-2020 **Source:** Statistic Indonesia (2021)

Despite experiencing a slight fluctuation during the period, the GDI in Malang has exceeded the GDI value in East Java and Indonesia. This indicates that the GDI value of gender equality in Malang has been accomplished, and the gender gap is better than the position of East Java or Indonesia. Malang has generally ranked in the fifth position compared to other cities/regencies in East Java. The first position was achieved by Blitar, followed by Pasuruan, Probolinggo, and Tulungagung regency, respectively (see Figure 4).



Figure 4. The position of the gender development index in Malang and other cities/regencies in East Java 2020 **Source:** Statistics Indonesia (2021)

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Indicators to show the gender development index are Life Expectancy, Mean Years of Schooling (MYS), Expected Years of Schooling (EYS), and Adjusted Expenditure Per Capita. Life Expectancy is the estimated average number of years a person can live during his/her life. Figure 5 depicts the Life Expectancy by sex in Malang City between 2017 to 2020. Overall, life expectancy for both males and females has risen during 2017 – 2020. Precisely, Male Life Expectancy in 2017 was about 70.80 and continued to rise, reaching out 71.31 in 2020, whilst Female Life Expectancy has confirmed higher than male in which ranging from 74.62 to 75.13.



Figure 5. Male and female life expectancy in Malang during 2017-2020 **Source:** Statistics Indonesia (2021)

From Figure 5, it can be seen that the male life expectancy is lower than the female life expectancy. According to Sugiantari (2013), the factors that affect life expectancy are the infant mortality rate variable, the percentage of infants aged 0-11 months who are breastfed for 4-6 months, and the percentage of toddlers aged 1-4 years who are fully immunized.

Compared to other cities/municipalities, Male Life Expectancy in Malang in 2020 was more significant than East Java at 69.42 and Indonesia at 69.59. However, Malang occupies the fifth position out of eight cities in East Java. On the other hand, the female life expectancy in Malang in 2020 was approximately 75.13, which is above the average female life expectancy in East Java of 73.27 and Indonesia's 73.46. Indeed, Female life expectancy in Malang City also posits the fifth rank out of eight cities in East Java. The detailed data is informed in Figure 6.



Figure 6. Comparison of male and female life expectancy in cities in East Java 2020 **Source:** Statistics Indonesia (2021)

Expected Years of Schooling (EYS) estimate years of schooling for school-entry age children, the total number of years of schooling that school-age children can expect. EYS based on gender in Malang during 2017-2020 has experienced an upward movement. During the study period, the Male EYS had slightly risen from 2017 and reached nearly 16 in 2020. Meanwhile, female EYS in 2017 was 15.24, and to achieve 15.5 in 2020. In comparison, the male EYS is more remarkable than the female EYS (see Figure 7).
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EYS 15,81 15,8 15,78 15,79 15,5 15,25 15,26 15,24 2017 2018 2019 2020 Male - Female

Figure 7. Expected years of schooling in Malang during 2017 to 2020 **Source:** Statistics Indonesia (2021)

Figure 8 compares the EYS in several cities/municipalities, East Java and Indonesia, both male and female. The EYS index, both male and female in each city/municipality, almost has the same level. For example, the Male EYS in Malang in 2020 was 15.81, while the female was 15.5. In contrast to East Java and Indonesia, Malang has the highest level of EYS, followed by Kediri and Sidoarjo regency as the study object. However, Indonesia has the level of EYS for males and females 12.93 and 13.04, respectively.



Figure 8. position expected years of schooling by gender in 2020 **Source:** Statistics Indonesia (2021)

Mean Years of Schooling (MYS) is the estimated average number of years the population enjoys accessing and attending school or formal education. Figure 9 informs MYS by gender in Malang from 2017 to 2020. Overall, the males MYS during the study period has slightly greater than females. However, both male and female MYS remained stable during 2017-2020.



Figure 9. Mean years of schooling in malang by gender in 2017-2020 **Source:** Statistics Indonesia (2021)

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Figure 10 provides information about MYS in some cities/municipalities, East Java and Indonesia. From the figure, it can be seen that the female MYS level is lower than males in Indonesia in general. The highest MYS of the male was in Madiun and Sidoarjo regency being the lowest rate, while for female MYS was posited by Madiun also. In detail, Male MYS in Malang is ranked 4th in the regency/city of East Java Province. Madiun, Surabaya, and Mojokerto achieved the first to third ranks, respectively. However, the MYS is East Java being the lowest rate compared to Indonesia in general.



Figure 10. Mean years of schooling by gender in 2020 **Source:** Statistics Indonesia (2021)

Furthermore, adjusted expenditure per capita (IDR) by gender is informed in Table 11. During 2017-2020, both females and males had encountered a fluctuation. Either males or females faced a slight decline in 2019. Precisely, Male per capita expenditure in 2017 was IDR 19,295 and inclined in the next two years, but in 2020 there was a decrease to reach approximately IDR. 20,573. Meanwhile, female the per capita expenditure of females was IDR. 15,763 at the beginning of time and reach out to IDR. 16,327.



Figure 11. Adjusted expenditure per capita by gender in Malang during 2017-2020 **Source:** Statistics Indonesia (2021)

Figure 12 compares the adjusted expenditure per capita in selected cities/municipalities in Indonesia. In 2020, the position of male per capita expenditure in Malang 2020 was IDR. 20,573 is above than in East Java and Indonesia. The first position was achieved by Madiun, followed by Surabaya and Malang with a per capita expenditure of IDR. 22,213, IDR. 21,697, and IDR16,327, respectively. However, this adjusted expenditure per capita is larger than in East Java and Indonesia. On the other hand, Female per capita expenditure in Malang has ranked first in the Regency/City of East Java Province accompanied by Surabaya and Madiun.

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Figure 12. Adjusted expenditure per capita by gender in 2020 **Source:** Statistics Indonesia (2021)

3.2. Gender Empowerment Measure (GEM)

To measure the extent to which gender equality in the political aspect can be achieved through the contribution of women in parliament and the Gender Empowerment Measure (GEM) is applied. It can be seen from women that have positions as professional and economic workers as measured by the contribution of women's income. Despite both GDI and GEM can be used to calculate the achievement of gender equality, these two indices have different characteristics. GEM refers to extend to which gender equality has been created with the participation of women in politics, economics, and decision-making. Meanwhile, the GDI calculates the achievement of the quality of human development divided into gender through economic, education, and health aspects (Ministry of Women Empowerment and Child Protection, 2019).

Figure 13 illustrates the Gender Empowerment Measure (GEM) in Malang, East Java, and Indonesia. In general, GEM development in Malang from 2017 to 2020 showed an inclining trend. In 2017, it was about 70.76 and rose dramatically in 2019 to approximately 7 points. Nevertheless, in 2020 there was a slight decrease to reach 78.06; however, this situation also occurred both in East Java and Indonesia in general.



Figure 13. Gender empowerment measure in Malang during 2017-2020 **Source:** Statistics Indonesia (2021)

As depicted in Figure 13, The highest GEM achievement was owned by Kediri, followed by Surabaya, Mojokerto and Malang, respectively. However, The GEM of Malang in 2020 is higher than the achievement of East Java Province of 73.03 and Indonesia of 75.57.

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Figure 14. Achievement of GEM in East Java in 2020 **Source:** Statistics Indonesia (2021)

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Informing the GEM, there are indicators of women's involvement as professional workers, how women are in parliament, and how women's incomes contribute. In the political field, the position of women to make a policy or decision is crucial, and it will directly contribute to the opportunity to consider the interests, voices, and other needs of women in all aspects of life. On the one hand, women's aspirations are expressed when they can be used to inform and formulate policies or legislation related to gender equality in Indonesia. Therefore, the interests of women's representatives in politics will influence the potential, opportunities, protection, aspiration opportunities, and participation in obtaining the benefits of equitable and fair development. Thus, without women's intervention in the political aspect, it is possible for any process of making and making decisions or public policies to be difficult to realize because women's needs and experiences are considered more to be fought for and voiced by women who represent other women. For this matter, the percentage of women's involvement in parliament shows that in making decisions, women have a robust influence and can be interpreted as a sign of progress in women's empowerment in politics (Ministry of Women Empowerment and Child Protection, 2020; Klasen, 2006)

As informed in Figure 15, the accomplishment of female parliamentarians in Malang in 2019 rose from the previous years. In the initial year of 2017, it was 17.78% and reached the highest percentage in 2020 by 26.67. This achievement is more outstanding than East Java and Indonesia. In detail, the achievement of East Java Province was 15% in 2017 and obtained 18.33% in 2019. Likewise, with the achievement in Indonesia, in 2017 was approximately 17.32% and reached out 20.52% at the end of the period.



Figure 15. Women's involvement in parliament between 2017 and 2019 **Source:** Gender-Based Development Book 2018-2020

For the professionalism of women in the field of work, the Gender Empowerment Measure (GEM) component is applied to calculate women's participation in decision-making through the percentage of women as professionals in the legal field of work. The achievements of females as professional workers in Malang from 2017 to 2019 have slightly risen during the time. In 2017 the value achieved was 46.75%, then increased to 48.22% in 2018 and

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slightly decreased to 47.89 in 2019. Meanwhile, achievements in East Java and Indonesia from 2017 to 2019 had continued to increase (see Figure 16).



Figure 16. Females as professional workers in 2017-2019 **Source:** Gender-Based Human Development Book 2018-2020

To understand how women contribute financially, the GEM in the economic aspect is measured. In addition, the contribution of women's income also indicates the position of women in the field of work, whether or not it has been recognized and appropriately estimated in the fields of work they are involved. The contribution of women's income has proven that many women are economically independent and affect autonomous control capabilities and equal relations in the field of work (Ministry of Women Empowerment and Child Protection, 2020; PUG KP DJKN, 2018).

The accomplishment of women's relative income contributions in Malang had inclined moderately during 2017 to 2019. In comparison with East Java and Indonesia, Malang has the lowest rank. The achievement in Malang in 2017 was 34.10% and increased to 34.42% in 2019. Meanwhile, East Java's achievement in 2017 was above Malang, 35.63%, and increased to 35,68% in 2019. The detail of the data is presented in Figure 17.



Figure 17. Women's income contribution in 2017-2019 **Source:** Gender-Based Human Development Book 2018-2020

Women often acquire minor achievements for their income contribution. This condition is often motivated by a factor where gender inequality is one of the significant determinants of the gender gap in the economic sector. One component that allows the empowerment of an individual to be strengthened is economic autonomy. When a person is economically independent, making ideal decisions about his/her opportunities seems possible. Thus, to pave the way for the choices made in order to realize the best opportunities in an individual's life, economic strength is needed in this regard. According to the Ministry of Women Empowerment and Child Protection (2020), to properly consider the pace of the Gender Empowerment Measure (GEM), it is necessary to measure the contribution of women's income.

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4. Conclusion

The issue of gender disparities has become a worldwide topic of conversation among policy researchers. In describing human development based on gender equality, the Gender Development Index (GDI) and the Gender Empowerment Measure (GEM) can be adopted. The Human Development Index (HDI) achievement results can be used as a parameter for the success of development in terms of the quality of Human Resources. GDI is a human development parameter consisting of four indicators emphasizing gender status, especially women's competence. Life Expectancy, Mean Years of Schooling (MYS) and Expected Years of Schooling (EYS), and Adjusted Expenditure Per Capita are indicators in forming GDI. The Gender Development Index (GDI) of Malang had shown a slight change from 2017 to 2020. In detail, the GDI value of Malang was 94.96 in 2017 and reached 94.97 at the end of the period.

Meanwhile, Gender Empowerment Measure (GEM) is a measurement of gender equality through participation in politics. There are indicators in GEM, women's involvement as professional workers, how women are in parliament, and how women's incomes contribute. From the results, GEM development in Malang from 2017 to 2019 continued to increase. The contribution of women's revenue has proven that many women are economically independent and affect autonomous control capabilities and equal relations in the field of work; this can be seen in the picture of women's income sources in Malang in the last three years has increased.

Authors' contributions

Farida Rahmawati participated in the conception of the study, design of the study, statistical analysis, and manuscript preparation. Elmira Mufliha Camila incorporated statistical analysis and manuscript preparation. All authors read and approved the final manuscript.

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Does corporate governance may enhance the digitalization process? A panel data analysis

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Abstract

Digitalization of the economy has many benefits for the general well-being of the society. Economic entities through the economic activities carry out to contribute directly to the growth rate of the digitization process. The corporate governance of the entities plays the main role in the leading of the companies. It reflects in a transparent manner the state of a certain business, increasing the trust of the interested parties. That is why, for the current study our purpose was to identify how does corporate governance may boost the digitalization process among companies. The quality of corporate governance is measured using two elements extracted from the Global Competitiveness Index (GCI): Efficacy of corporate boards and Strength of auditing and reporting standards. To measure the Digitalization, three elements were considered: Individuals using the internet, Mobile cellular subscriptions, and Fixed telephone subscriptions, from the World Bank database, for the same period. A panel data analysis is conducted on a sample of 185 countries over the period 2007-2017. We obtain important evidence that show a positive impact on corporate governance quality on the process of digitalization of economy measured by Individuals using the internet and partially, using Mobile cellular subscriptions. A robustness checks using Digital Economy Society Index (DESI) as measures of digitalization also validate our results. The obtained results are important for public governance, investors, companies, governments to highlight the playing role of a good corporate governance for increasing the general well-being of the society within the digital economy.

Keywords: digitization, financial statements, corporate governance, audit reporting

Jel codes: G32, M11

1. Introduction

During the time, specialists have struggled to digitalize various processes that compose the business. At the same time, technologies have evolved and created the need to be synchronized with the interested parties' expectations. Thus, in a digital world, companies must keep the rhythm with all that is changes around them. Now, more than ever digitalization has reached the highest potential, and became a necessity for every company. It is a challenge for everyone since novelty was always seen with scepticism. Some adapt easier, some take longer. The Corporate Governance reporting is one of the important parts of the business. Various researchers have approached the impact of digitalization over the corporate governance reporting. Fenwick et al. (2019) concluded that, in terms of business models, and its implications (corporate governance), it cannot be a one-size-fits-all approach. They must be personalized. Also, Cheffi & Abdennadher (2019), have reached to the conclusion that executives members worry about the internet voting, in sense that it will lead to loss of control. In another study conducted by Fenwick (2019) the author has conceptualize a new perspective over corporate governance in terms of digitalization. Despite various approaches, there are still gaps to be filled. The novelty of the conducted study is the variables approached and tested, to see how they interconnect. Thus, in the current study we have set our focus over the impact of digitalization over the quality of corporate governance. In such a rush era, it is quite impossible to ban digitalization. We have used data selected from the Global Competitiveness Index (GCI), for the period 2007-2017, containing 185 countries.

To measure Corporate Governance, we have considered two elements from the database: *Efficacy of corporate boards and Strength of auditing and reporting standards*. For measuring the level of digitalization, *Individuals using the internet, Mobile cellular subscriptions, and Fixed telephone subscriptions* were extracted. The panel data analysis was the most appropriated for the selected sample. Among all the variables a direct and positive relation was found. On one hand, the strongest relationship is found between *Strength of auditing and reporting standards and Efficacy of corporate boards*. On the other hand, the weakest connection was found between *Strength of auditing and reporting standards and Efficacy of corporate boards*.

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auditing and reporting standards and Mobile cellular subscriptions. To validate the results, we have conducted a robustness test, for European countries, for the period 2015-2017. The results have validated the regression made through panel analysis. Meaning that the relationship between DESI and Strength of auditing and reporting standards, but also between DESI and Efficacy of corporate boards is strong. An increased in efficacy of corporate boards and strength of audit and reporting standards, will translate into an increased level of DESI.

The outline of the paper is as follows; in chapter two a brief literature review regarding Corporate Governance, and Digitalization was presented. In section three the methodology and data were detailed, followed by chapter four, where the results were described. In the end, the conclusion of the study was briefly presented.

2. Literature Review

In the following, a brief literature review regarding Corporate Governance and Digitalization were made.

2.1. The relationship between Corporate Governance and Digitalization

In the report published in 2017, OECD indirectly encounters the benefits of digitalization: "technologies, smart applications and other innovations in the digital economy can improve services and help address policy challenges in a wide range of areas, including health, agriculture, public governance, tax, transport, education, and the environment, among others" (Kirton, Warren, 2018).

The ideas about the digitalization process are divided in various opinions. Fenwick & Vermeulen (2018) underline in a realistic manner the fact that the stakeholders are various, and move in different directions, each at its own speed. In the context of a digital world, digitalization has made it easier to fulfil the duties as a stakeholder. More specifically, digitalization has made it simpler to prepare, participate and vote in the general meetings. It has made the relationship between the shareholders and company safer and more efficient (Jadek, 2019).

In the literature, it is specified the fact that when it comes to digitalization, the board of directors plays an important part of the process. It has impact over the company's performance and organizational behaviour. Board of directors is involved, and they influence different decisions that are to be made in a company (Bankewitz, 2016).

An insight perspective was made by Nambisan et al. (2017). In terms of digital management, it is necessary to implement various tools, processes and learning to manage them all.

Taking into account the quality of corporate governance, and digitalization, companies must give a great deal of importance over the Risk Management Committee. It is in the management team responsibility that this component will efficiently have establish the principles to follow. The case of Sony Pictures, with the cyber-invasion which have caused significant losses by revealing sensitive information. This matter has risen a lot of questions over the vulnerability of the companies to which are exposed through digitalization (Elkind, 2015).

An interesting overview was made between corporate governance and artificial intelligence, in the sense that, due to the recent studies, it is possible to efficiently be capable of selecting board members. The result would be a decrease of agency costs for the companies Fenwick and Vermeulen (2018).

The digitalization of corporate governance process increases the efficiency of companies, but it also comes with a great deal of risk. Due to the increasing of cyber-attacks, the Risk Management must overcome, as much as it can the possible breaches in the systems. It is an advantage, that can easily turn into disaster, if badly managed.

In the following, we have approach Audit, as a qualitative component in the Corporate Governance reporting, in relationship with Corporate Governance, as whole process. It was also explored the relationship between Digitalization, and Audit.

2.2. The relationship between Corporate Governance and Audit

Audit is a component in the Corporate Governance reporting. It is one of the elements that influence the quality of reporting. In the literature, it is considered that audit is a corporate governance mechanism, designed to identify

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and avoid potential misunderstandings between the interested parties and the management team (Carcello et al., 2011)

Wallace (2004) has highlighted the three roles of the audit process related to corporate governance:" *monitoring, information and insurance roles*".

An interesting perspective was mentioned in the article written by Baatwah & Qadasi_(2020) underlining the fact that several meaningful professionists have acknowledge the internal audit function, as the most important corporate governance mechanism, when addressing the agency problem.

Speaking of theories related that demonstrate the need of audit practices, related to corporate governance process, the most appropriate are agency theory and stakeholders' theory (Manita et al., 2020). Regarding this matter, audit is perceived as the solution of the agency issues. On one hand, the management team has the responsibility to have the overview of the financial information, and everything that happens in a company. On the other hand, stakeholders only know what is transmitted from the inside of the company. Here, the asymmetry of information can arise and be a problem. Managers will tend to follow their own interest and neglect the ones of the stakeholders. Thus, the audit is a mean by which the stakeholders are assured that the financial information is transparently transmitted (Manita et al., 2020). In the case of stakeholder theory, the managers must assure the satisfaction of all the stakeholders (customers, suppliers etc.), as a group. This being said, the auditors will ensure the interest of all the financial statement users (Manita et al., 2020). An interesting perspective was detailed by Widani and Bernawati (2020), regarding the relationship between corporate governance and audit. The results from their study, have shown the fact that corporate governance does not affect the quality of audit reporting, but rather the ownership concentration have strengthened the effectiveness of CG on the audit quality.

On the same note, Suwarno and Suwandi (2020) have shown the fact that the effectiveness of corporate governance is proxied by the audit committee, the number of board of directors, and institutional ownership. Ibadin and Ehigie (2019), in the conducted study, have demonstrated that an increase in the Board Composition (non-executive directors), Board Gender Composition (increased level of female gender) audit committee, companies have registered a reduction of financial statement fraudulent activities. Regarding the quality of the audit reporting, it is demonstrated in the literature the fact that the board of directors have found a way to control the managers' opportunistic behaviour. To do so, they issue a qualitative audit from external auditors (Gull et al., 2020).

Auditing process is a component in the corporate governance reporting. As the rest of the components, it is very important to follow the principles of auditing reporting. It was demonstrated, as we have also mentioned above some of the studies, in the literature the fact that a qualitative audit will automatically restore to a qualitative corporate governance reporting, which translated into a successful path of the company. Following the idea that the audit process is an important element in the Corporate Governance reporting, the relationship with the digitalization process was analysed in terms of literature review.

2.3. The relationship between Audit and the Digitalization process

Digitalization is expanding its scope more and more; audit being included in this sphere of impact. The world of fast connections between people and devices is booming. Through connectivity technologies such as platforms, collaborative software, communication applications or portals, huge amounts of information are traded between devices but also between people. Beyond the challenges of such technology, companies also have the opportunity to increase their transparency, risk assessment capacity and audit quality and to automate their processes. This connectivity makes it easier for companies to create an information environment that gives them in-depth knowledge of their operations, including auditing (Adiloglu, and Gungor, 2019). It is often a challenge for organizations to keep pace with this ongoing transformation of technology, but it provides an opportunity in public and private company auditing to increase transparency, improve risk assessment, automate manual processes, and ultimately, to increase the quality of the audit. (Babayeva and Manousardis, 2020) The financial audit that uses digital channels has three components: automation, data analysis and the experience delivered to the customer through digitization.

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The digital infrastructure is very important (platform, software, etc.) because it makes the connection between the members of the audit team and the connection between them and the audited company (Nezhyva and Miniailo, 2020). In the conditions of a permanent information from any device, it is self-evident the existence of a functionality that allows accessing the information from the mobile phone as well. The importance of a digital platform used for financial audit is demonstrated by the digitization of worksheets, the way information is stored, shared and accuracy, etc. Real-time updates on each step of the audit process allow the audit team and the audited company to exchange information quickly and securely (Manita et al., 2020). Companies can use the power of connectivity to benefit from a digitally transformed audit that enhances quality while driving value.

The benefits of transformation: use with the auditor the amount of structured and unstructured data collected; gain a deeper understanding of balance sheets and allow monitoring of fraud controls and improved reporting processes; facilitate information sharing and auditors' access to their own work systems. When information is shared securely and efficiently through a fully digital audit platform, the audit process will run more smoothly, and the quality of the audit will be improved. (Babayeva and Manousardis, 2020).

The digitalization of the audit process is an aspect that must be taken into considerations, even if we talk about the internal audit or external. The connectiveness between the available data and information communicated will make the process more efficient and easier. Also, it will ensure a safer processing of the data minimizing the human error.

Taking into account the literature, the following working hypothesis is stated:

Hypothesis: Does corporate governance may enhance the digitalization process?

3. Data & Methodology

3.1. Dependent variable- Digitalization

In our paper we measure digitalization using the following variables: Individuals using the internet, Mobile cellular subscriptions, and Fixed telephone subscriptions (Achim et al., 2021). The data are provided from the World Bank Group (2021).

3.2. Independent variable- Corporate governance quality

In order to measure the quality of corporate governance in different countries, we will use two important indicators (Achim and Borlea, 2020): (a) *Efficacy of corporate board* and (b) *Strength audit and reports*. Both indicators are calculated and reported in the Global Competitiveness Indicator (GCI) (2021), determined as a global tool for measuring national competitiveness for economies around the world. This score is provided annually by the World Economic Forum in the Global Competitiveness Report. Both indicators are between level 1 (the weakest) and 7 (the best), thus reflecting the efficiency of corporate governance within national economies.

3.3. Control variables- Economic development

According to Gomez et al. (2019) and Naumova et al. (2019) economic development is found one of the main determinants of the digitalization process. Gross domestic product measures the level of development of a certain country. Previous literature has demonstrated the fact that an increased GDP (Gross domestic product) translates into an increase in the digitalization process. We intend to investigate if a high quality of corporate governance may increase the level of digitalization. For this purpose, a panel analysis is conducted for a sample of 185 countries over the period 2007-2017. Statistical processing was performed using the program Eviews 10.0.

The general form of our model is:

$Digitalization_{it} = \beta_0 + \beta_1 Corporate \ governance_{it} + \beta_{(j)2} Controls(j)_{it} + C_i + \varepsilon_{it}$

Where,

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- Digitalization_{it} is the dependent variable for the country i and period t;
- Corporate_governance_{it} is the independent variable, namely Education of the country i for the period t ;
- *Controls(j)* is the control variable for country i in year t;
- β0 denotes intercept;
- β1 is the regression coefficient that will indicate the extent to which the independent variable Corporate+governancei is associated with the dependent variable Digitalizationit, if β1 is found to be statistically significant;
- $\beta_{(j)2}$ s the regression coefficient for the jth variable in the vector of controls; j denotes the ranges, for the vector of control variables;
- ε_{it} is the residual or prediction error for country i at year t.

4. Results and discussions

4.1. Descriptive statistics

Table 1 presents the summary statistics for our original variables, before rescaling them. As such, *Mobile cellular subscriptions* vary from 2,88 to 9,17, with an average value of 6.67% and a standard deviation of 0.852. Then, *Fixed telephone* subscriptions scores range from 0 to 8.5, with an average value of 5.76 points. *Efficacy of corporate boards* registers an average value of 4,64, with the maxim value of 6,34 and minimum 0. Furthermore, the average value of *Individuals using internet* is 38,38. with the maxim value of 98,26 and minimum 0,22. Nonetheless, the summary statistics on *Strength of auditing and reporting* show than on average 4,67% of our sampled companies have an audit committee.

Variabile	Mean	Median	Maximum	Minimum	Std. Dev.	Observati ons
Mobile cellular subscriptions	6.77	6.8400	9.1700	2.8800	0.85275	2009
Fixed telephone subscriptions	5.76	5.7700	8.56000	0.00000	1.02920	1979
Efficacy of corporate boards	4.643093	4.6200	6.34000	0.00000	0.65836	1513
Individuals using internet	38.38329	34.070	98.2600	0.22000	29.1378	1943
Strength of auditing and reporting	4.671874	4.6450	6.730	2.13000	0.87803	1510

Table 1. Summary Statistics on values

Source: Own processing

Table 2 reflects the correlation coefficients between the indicators: *strength of auditing and reporting, effectiveness of corporate boards, individuals using internet, mobile cellular subscriptions, fixed telephone subscriptions.* Correlation coefficients are used to measure the strength of the linear relationship between two variables. A correlation coefficient greater than zero indicates a positive relationship, while a value less than zero means a negative relationship, to determining the degree to which indicators contribute to the relationship by composing equations, regressions. Following the correlation matrix, it is observed that the strongest positive 0.797244 link is between *Strength of auditing and reporting* and *Efficacy of corporate boards*. The connections that stand out are

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those between landline and *Mobile cellular subscriptions* which also indicates value 0.779384, *Strength of auditing and reporting* and *Individuals using internet* and *Efficacy of corporate boards*, landline and individual. The weakest but still positive connection is between mobile and hearing. Overall, all links between the indicators analysed are positive.

Correlation	Strength of auditing and reporting	Individuals using internet	Efficacy of corporate boards	Fixed telephone subscriptions	Mobile cellular subscriptions
Strength of auditing and reporting	1.000000				
Individuals using internet	0.639149	1.000000			
Efficacy of corporate boards	0.797244	0.533982	1.000000		
Fixed telephone subscriptions	0.284809	0.413889	0.211685	1.000000	
Mobile cellular subscriptions	0.012378	0.041843	0.061922	0.779384	1.000000

Table 2. Correlation Matrix

Source: Own processing

To determine the connections or the lack of connections between the analysed indicators, regressions were created and thus we obtained the following conclusions. As a significant threshold for regressions, we chose 0.05 (5%), which means that a p value less than 0.05 is taken as evidence to reject the null hypothesis of a zero coefficient.

In table 3, the first regression shows that the *Individuals using the internet* as the dependent variable is affected by *Strength of auditing and reporting* and GDP. The independent variable and control variable are statistically significant, and the following equation is created.

Individuals using internet = 1.79 * Strength of auditing and reporting + 38 * GDP-110

When the *Strength of auditing and reporting* increased by one unit, *Individuals using the internet* increased by 1.79, and when the GDP increased by one unit, individuals using the internet increased by 38 units. The Adjusted R2 of this first model is of 76%, so str explains 76% of individuals using internet

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Table 3. Strength of auditing and reporting within Individuals using internet regression

Dependent Variable: Individuals using internet regression								
Method: Panel Least Squares								
Total panel (unbalanced) obse	Total panel (unbalanced) observations: 1448							
Variable	Coefficient	Std. Error	t-Statistic	Prob.				
Strength of auditing and	1.795045	0.583098	3.078463	0.0021				
reporting								
GDP	38.08420	0.806615	47.21484	0.0000				
С	-110.1516	2.292605	-48.04647	0.0000				
R-squared	0.769984	Mean depend	ent var	44.03004				
Adjusted R-squared	0.769666	S.D. depender	nt var	29.01192				
S.E. of regression	13.92374	Akaike info c	riterion	8.107137				
Sum squared resid	280142.9	Schwarz crite	rion	8.118072				
Log likelihood	-5866.567	Hannan-Quin	n critter.	8.111218				
F-statistic	2418.585	Durbin-Watso	on stat	0.106417				
Prob(F-statistic)	0.000000							

Source: Own processing

In table 4, the equation was formed using also statistically significant variables, between *Individuals using the internet, Efficacy of corporate boards* and GDP.

Individuals using internet regression = 5.16 * Efficacy of corporate boards +37.08 GDP-121

When the *efficiency of corporate boards* increased by one unit, *Individuals using internet regression* increased by 5.16, and when the GDP increased by one unit, it increased by 37.08 units.

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Table 4. Efficacy of corporate boards within Individuals using internet regression

Dependent Variable: Individuals using internet regression							
Method: Panel Least Squares							
Total panel (unbalanced) observation	ns: 1451						
Variable	Coefficient	Std. Error	t-Statistic	Prob.			
Efficacy of corporate boards	5.168338	0.625890	8.257586	0.0000			
GDP	37.08014	0.652826	56.79941	0.0000			
С	-121.9088	2.740240	-44.48838	0.0000			
R-squared	0.776822	Mean dependent var		44.02957			
Adjusted R-squared	0.776514	S.D. dependent var		29.00500			
S.E. of regression	13.71191	Akaike info criterion	l	8.076473			
Sum squared resid	272248.0	Schwarz criterion		8.087389			
Log likelihood	-5856.481	Hannan-Quinn critte	er.	8.080546			
F-statistic	2520.051	Durbin-Watson stat		0.117458			
Prob(F-statistic)	0.000000						
0 · · ·							

Source: Own processing

In table 5, having as a dependent variable *Mobile cellular subscriptions* and as independent variable, *Strength of auditing and reporting*, the significance threshold is increased which makes them statistically insignificant.

Table 5. Strength of auditing and reporting within mobile cellular subscriptions regression

Dependent Variable: Mobile cellular subscriptions									
Method: Panel Least Squares									
Total panel (unbalanced) observations: 1490	Total panel (unbalanced) observations: 1490								
Variable	Coefficient	Std. Error	t-Statistic	Prob.					
Strength of auditing and reporting	0.026337	0.029109	0.904787	0.3657					
GDP	-0.027116	0.040003	-0.677841	0.4980					
С	6.984585	0.114901	60.78783	0.0000					
R-squared	0.000553	Mean dependen	t var	7.003987					
Adjusted R-squared	-0.000791	S.D. dependent	var	0.707147					
S.E. of regression	0.707426	Akaike info crit	erion	2.147645					
Sum squared resid	744.1723	Schwarz criterie	on	2.158329					
Log likelihood	-1596.996	Hannan-Quinn	criter.	2.151627					
F-statistic	0.411483	Durbin-Watson	stat	0.011052					
Prob(F-statistic)	0.662742								

Source: Own processing

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Table 6 represented relationship between Mobile cellular subscriptions and Efficacy of corporate boards, controlling for GDP. The results show that only Efficacy of corporate boards is statistically significant what follows from the following equation.

Mobile cellular subscriptions = 0.111172975375 * Efficacy of corporate boards + 6.71224275134

When the *Efficiency of corporate boards* increases by one unit, it increases by 0.11, and when it increases by one unit, the GDP decreases by -0.059 units. GDP is statistically insignificant.

Dependent Variable: Mobile cellular subscriptions								
Method: Panel Least Squares								
Total panel (unbalanced) observ	Total panel (unbalanced) observations: 1493							
Variable	Coefficient	Std. Error	t-Statistic	Prob.				
Efficacy of corporate boards	0.111173	0.031614	3.516583	0.0005				
GDP	-0.059075	0.032669	-1.808268	0.0708				
С	6.712243	0.140335	47.83026	0.0000				
R-squared	0.008241	Mean dependent va	ar	7.002451				
Adjusted R-squared	0.006910	S.D. dependent var 0.707667						
S.E. of regression	0.705218	Akaike info criterio	on	2.141387				
Sum squared resid	741.0246	Schwarz criterion2.152054						
Log likelihood	-1595.545	Hannan-Quinn crit	ter.	2.145362				
F-statistic	6.190411	Durbin-Watson sta	ıt	0.013414				
Prob(F-statistic)	0.002102							

Table 6. Efficacy of corporate boards within mobile cellular subscriptions regression

Source: Own processing

In the table 7 the link between the dependent variable *Fixed telephone subscriptions* and the independent variable *Efficacy of corporate boards* is analysed, with GDP as control variable. The results do not show a statistical significance between *Fixed telephone subscriptions* and the independent variable *Efficacy of corporate boards*, but a positive and statistically significant relationship with GDP.

Fixed telephone subscriptions = 0.617986168617 * GDP + 3.53585177349

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Dependent Variable: Fixed telephone subscriptions						
Method: Panel Least Squares						
Total panel (unbalanced) observ	ations: 1486					
Variable	Coefficient	Std. Error	t-Statistic	Prob.		
Efficacy of corporate boards	0.028919	0.036005	0.803187	0.4220		
GDP	0.617986	0.037424	16.51326	0.0000		
С	3.535852	0.159761	22.13216	0.0000		
R-squared	0.202064	0.202064 Mean dependent var 6.034132				
Adjusted R-squared	0.200988	S.D. dependent var 0.89616				
S.E. of regression	0.801054	Akaike info criterion2.396241				
Sum squared resid	951.6237	Schwarz criterion 2.406949				
Log likelihood	-1777.407	Hannan-Quinn	criter.	2.400232		
F-statistic	187.7729	Durbin-Watson	stat	0.036824		
Prob(F-statistic)	0.000000					

Table 7. Efficacy of corporate boards within Fixed telephone subscriptions regression

Source: Own processing

Table 8 shows the link between the dependent variable *Fixed telephone subscriptions* and the independent variable *Strength of auditing and reporting* with GDP as control variable. As in the previous case, the results do not show a statistical significance between *Fixed telephone subscriptions* and the independent variable *Strength of auditing and reporting*, but a positive and statistical significant relationship with GDP.

Fixed telephone subscriptions = 0.634227786519 * GDP + 3.60862874311

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Dependent Variable: Fixed telephone subscriptions						
Method: Panel Least Squares						
Total panel (unbalanced) observ	vations: 1483					
Variable	Coefficient	Std. Error	t-Statistic	Prob.		
Strength of auditing and reporting	0.000179	0.033059	0.005429	0.9957		
GDP	0.634228	0.045435	13.95910	0.0000		
С	3.608629	0.131162	27.51266	0.0000		
R-squared	0.202943	Mean dependent	t var	6.035374		
Adjusted R-squared	0.201866	S.D. dependent	var	0.896476		
S.E. of regression	0.800897	Akaike info crite	erion	2.395853		
Sum squared resid	949.3258	Schwarz criterio	n	2.406578		
Log likelihood	-1773.525	Hannan-Quinn o	criter.	2.399850		
F-statistic	188.4155	Durbin-Watson	stat	0.036802		
Prob(F-statistic)	0.000000					

Table 8. Strength of auditing and reporting within Fixed telephone subscriptions regression

Source: Own processing

4.2. Robustness checks

To reinforce our results, we perform as robustness checks consists in considering an alternative variable for the dependent variable, digitalization. Therefore, we use Digital Economy Society Index (DESI) as an alternative measure of Digitalization. Digital Economy and Society Index measures the progress that Member States of the European Union carry them out in the direction of a digital economy and society. DESI is calculated annually and consists of five major areas: connectivity, human capital, use internet, integration of digital technology and services digital public. In order to determine the connections or the lack of connections between the analysed indicators, regressions were created and thus we obtained the following conclusions. As a significant threshold for regressions, we chose 0.05 (5%), which means that A p value less than 0.05 is taken as evidence to reject the null hypothesis of a zero coefficient.

Table 9 shows the link between *Digital Economy and Society Index* as the dependent variable and *Efficacy of corporate boards* as independent variable, controlling for GDP. The results show a positive and statistical influence of *Efficacy of corporate boards* on the level of digitalization measured by *Digital Economy and Society Index*. Also, the influence of GDP over the level of digitalization is positive and statically significant.

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Dependent Variable: Digital Eco	Dependent Variable: Digital Economy and Society Index							
Method: Panel Least Squares	Method: Panel Least Squares							
Sample: 2015 2017								
Cross-sections included: 28								
Total panel (balanced) observatio	ons: 84							
Variable	Coefficient	Std. Error	t-Statistic	Prob.				
Efficacy of corporate boards	7.928046	1.152939	6.876379	0.0000				
GDP	8.304445	2.989300	2.778057	0.0068				
С	-35.88318	9.916782	-3.618430	0.0005				
R-squared	0.669874	Mean dependent	var	42.27667				
Adjusted R-squared	0.661723 S.D. dependent var 9.009318							
S.E. of regression	5.239962 Akaike info criterion 6.185566							
Sum squared resid	2224.033 Schwarz criterion 6.272381							
Log likelihood-256.7938Hannan-Quinn criter.6.220465								
F-statistic 82.18052 Durbin-Watson stat 0.171919								
Prob(F-statistic) 0.000000								

Table 9. Efficacy of corporate boards within Digital Economy and Society Index regression

Source: Own processing

Table 10 shows the link between *Digital Economy and Society Index* as the dependent variable and *Strength of auditing and reporting* as independent variable, controlling for GDP. The results show a positive and statistical influence of *Strength of auditing and reporting* on the level of digitalization measured by *Digital Economy and Society Index*. Also, we find that the influence of GDP over the level of digitalization is positive and statically significant.

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Table 10. Strength of auditing and reporting within Digital Economy and Society Index regression

Dependent Variable: Digital Economy and Society Index						
Method: Panel Least Squares						
Sample: 2015 2017						
Cross-sections included: 28						
Total panel (balanced) observa	tions: 84					
Variable	Coefficient	Std. Error	t-Statistic	Prob.		
Strength of auditing and reporting	6.168407	1.070135	5.764139	0.0000		
GDP	11.70058	2.958371	3.955075	0.0002		
С	-41.24779	10.35615	-3.982926	0.0001		
R-squared	0.629241	Mean depender	nt var	42.27667		
Adjusted R-squared	0.620087	S.D. dependent	var	9.009318		
S.E. of regression	5.553084	Akaike info crit	terion	6.301645		
Sum squared resid	I 2497.776 Schwarz criterion 6.388460					
Log likelihood	-261.6691	Hannan-Quinn	criter.	6.336544		
F-statistic	68.73541	Durbin-Watson	ı stat	0.255209		
Prob(F-statistic)	0.000000					

Source: Own processing

It can be seen that after the two regressions the robustness test validates our results. The results are consolidated by the robustness test, it was used as a dependent DESI variable and as proxy variables.

We have aligned our results with other researchers, regarding the chosen topics. In the literature on one hand, Zerni 2012, Cahan & Sun 2015, have focused on the digitization of industries. On the other hand, the study conducted by Maghakyan et al. 2019, have shown the fact that an increase in the digitalization of customers helps auditors. More specifically, they have found that digitalization completely changes the business of acquisitions and offers auditors the opportunity to add value to working methods. An interesting approached was made by Bankewitz (2016), questioning whether the board of directors could be the key role to adapt the organization to new strategic changes. The researcher has partially answered, stating the there is a base on which digitalization could be introduced in a company trough the board of directors, leaving the question open for further researchers. On the same note, Manita et. al (2020), have studied the relationship between digitalization and audit as a governance mechanism. The authors have discovered a positive relationship, meaning that the digitalization of the audit function will increase the efficacy of corporate governance reporting.

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5. Conclusions

The present paper intends to identify how does corporate governance may boost the digitalization process among companies. For the current study, we have used a panel data analysis over a sample of 185 countries with data provided from the World Bank database and Global Competitiveness Index (GCI) index, for the period 2007-2017.

The quality of corporate governance is measured using two elements extracted from the Global Competitiveness Index (GCI): *Efficacy of corporate boards* and *Strength of auditing and reporting standards*. To measure the Digitalization, three elements were considered: *Individuals using the internet, Mobile cellular subscriptions, and Fixed telephone subscriptions,* from the World Bank database, for the same period. We obtain important evidence that show a positive impact on corporate governance quality on the process of digitalization of economy measured by *Individuals using the internet and partially,* using *Mobile cellular subscriptions.* To consolidate our results, a robustness test was performed and confirmed the results by using DESI index, as measure of digitalization. The obtained results are important for public governance, investors, companies, governments to highlight the playing role of a good corporate governance for increasing the general well-being of the society within the digital economy.

To keep transparency increased, in a digital world seems like an easy thing to do. Especially for the companies where there are several employees working for the growth of the business. Digitalization in the context of Corporate Governance efficacy, becomes more and more a must rather than an option. Especially in the pandemic times that we live in, the economy must go on, and find various ways to function. The Corporate Governance process must be qualitatively fulfilled. Thus, new strategies, processes starting from the election of the board members, annual reports, audit commissions, risk assessment evaluation and so on, should be rethought in terms of digital processes, so the well-being of the business will continue to increase. Digitalization will continuously keep setting new challenges, to which companies must adapt their strategies. It is very practical to see the fact that the digital aspects can be enhanced by the quality of corporate governance. It is valuable information for public governance, investors, companies, governments to increase the prosperity of the business in a digital world.

The research is limited primarily by the lack of measures the quality of corporate governance at the macroeconomic level. As a future direction for the study, we intend to realize an extended analysis of relationship between corporate governance and digitalization using both microeconomic and microeconomic analysis. In addition, for reinforce our results in the future studies to reinforce our results, we intend to add other control variables such as innovation, intelligence, culture.

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Impact of the Territorial Agenda 2030 in the Regional Policy of Bulgaria

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Abstract

The study presents current and debatable issues for the integration of the Territorial Agenda 2030 (TA 2030) in the strategic documents and public policies for regional development in Bulgaria. Some basic planning paradigms are considered, which are critically analyzed in terms of their practical usefulness and applicability. Based on a critical analysis of the regulatory, strategic and methodological framework for planning in Bulgaria, the prospects for the implementation of TA 2030 are presented. The main accents of the regional policy so far are presented and, on this basis, challenges are outlined in the context of TA 2030. Special attention is paid to the administrative capacity for conducting regional policy and views are proposed for its creation and development. Conclusions and summaries of scientific and practical nature have been made regarding the expected impact of TA 2030 for overcoming the unbalanced territorial development and the significant regional differences in Bulgaria. Economy Society Index (DESI) as measures of digitalization also validate our results. The obtained results are important for public governance, investors, companies, governments to highlight the playing role of a good corporate governance for increasing the general well-being of the society within the digital economy.

Keywords: Regional policy, Strategic planning, Territorial Agenda, Administrative Capacity

Jel codes: R58, O21, H83

1. Introduction

The TA 2030 (EU Ministers, 2020) is a strategic framework for regional development policy in Europe. It aims, on the basis of consensus, to address today's challenges facing Europe, such as social and economic inequalities, environmental risks, abandonment of sustainable development, challenges posed by the COVID-19 pandemic, and deepening imbalances. It is an instrument of territorial cohesion based on multilevel governance and the participation of all stakeholders. This is a relatively new moment, namely the broad participation in the implementation of integrated planning for territorial cohesion and territorial development. These ideas of cohesion are not new to EU member states. The projection of this policy has been traced since 1983 with the adoption of the Torremolinos Charter by the Council of Europe and the following five documents adopted by the European Commission as follows: The European Spatial Development Perspective (ESDP 1999), Territorial Agenda of the European Union (TA 2007), Territorial Agenda of the European Union 2020 (TA 2020) and the current Territorial Agenda of the European Union 2030 (TA 2030) (Henriques, Dragović, Auer, & Gomes, 2020). Continuity is a horizontal principle of European cohesion policy and 6 pilot initiatives for the implementation of TA 2030 are

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outlined on this basis. These initiatives reflect the growing importance and impact of public policies based on local development and initiated by the local community and their relationship to regional, national and pan-European policies for the knowledge economy and related growth in the three dimensions. The internships focus on the lessons learned, the transfer of good practices, joint decisions and working initiatives for the adequate implementation of TA 2030 at national and regional level. These pilot actions aim to improve the mechanisms for integrating the programme's priorities into different sectoral and cross-functional policies, mitigating the impact of the change in the organization of their implementation and contributing to greater efficiency. It is hoped that these actions will lead to concrete measures outlining a better administrative direction for implementation, enabling stakeholder training and, consequently, building the capacity of the administrations involved for better coordination and integration of policies both vertically and horizontally and last but not least for more adequate communication and monitoring of the implementation and reporting of public policies for regional and territorial development at various hierarchical levels. It is in this context that the current study makes a critical analysis of the existing prerequisites in Bulgaria for the implementation of the ideas and priorities of TA 2030 in the national documents framing the regional development policies, incl. and the capacity for their quality implementation.

2. Planning paradigms in the Territorial Agenda 2030 - Literature Review

Over the years, the EU has implemented various instruments and mechanisms to conduct an effective territorial policy for regional development to achieve convergence between the various territories in the Community. It is accepted that European integration as a process involves the gradual elimination of traditional national borders and related differences (Anderson, O'Dowd, & Wilson, 2003) (Nelles & Walther, 2011). A number of authors believe that this supports the growth of multilateral economic and social connections in the regions and in particular in cross-border areas, thus contributing to their economic recovery and sustainable development (Durand & Decoville, 2020) (Basboga, 2020). However, the unsatisfactory results so far call for a more flexible approach based on the local potential of a given territory. Barca defends such a thesis (Barca, 2009). According to him, local policy should be formed not on the basis of administrative borders, but on the basis of endogenous potential and opportunities for development on this basis of competitive advantages. Economic growth is negatively affected by existing legal and administrative barriers, despite the creation of the European Common Market and the Schengen area, for example (Camagni, Capello, & Caragliu, 2019). High levels of inequality in the Community hamper social mobility, threaten long-term prosperity and undermine political stability. The growing sense of injustice is creating a vacuum that is often filled by the populist rhetoric that divides Europe. In these conditions, the new paradigm of regional development based on integrated and strategic development initiatives and clearly defined competitiveness factors is becoming increasingly popular. This approach is based on compensatory actions in narrowly defined and nationally significant areas for discovering and exploiting the potential of regions in order to achieve the "critical mass" needed for further development.

The modern manifestations of the concept of territorial cohesion enshrined in the TA 2030 outline six priorities of the development policy of regions with different potential and challenges for their development. Like others of this type, TA 2030 is a non-binding document. However, through dialogue, it can become a guiding document for national and European policies, even if formally differentiated from cohesion policy instruments (Dallhammer, Gaugitsch, Neugebauer, & Böhme, 2018). The document emphasizes cross-border links and cooperation, the social dimension of cohesion and the spatial aspects of development, as well as the role of cities and functional areas. It includes recommendations for more effective implementation of EU policies, the spatial impact of these policies and their impact on the lives of Union citizens. TA 2030 identifies two areas for strategic action in Europe until 2030 - Just Europe and Green Europe with six driving concepts: environment, inequality, justice, sustainability, territory and transition. Their priorities are reflected at transnational, cross-border, national, regional and local levels.

In terms of the environment concept, the TA 2030 focuses on problems and risks, while some researchers believe that the approach to the environment is important to see more as an opportunity to unleash the potential to improve the quality of social and economic development conditions. However, there is a stronger emphasis on this priority area compared to previous versions of the document, which is an indication of awareness of its importance.

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The issues in the TA2030 related to inequality reflect the views in the Leipzig Charter, focusing on the problem of growing imbalances and inequalities in Europe. This aspect is seen as a territorial weakness, which needs to be addressed by the authorities at all levels by actively cooperating in the direction of integrated territorial development (EU Ministers, 2020). The creation of functional regions is part of the proposed solution in the document on tackling inequalities, thus considering that the conditions for social and economic development throughout the EU will be improved.

Manifestation of the operationalization of the place-based approach, which is the basis of the TA 2030, is the concept of territorial capital, which should be considered as a basis for the endogenous development of each territory. Territorial capital can be defined as a set of different resources that characterize a territory. This applies especially to the unique and inimitable resources, the use of which creates a competitive potential in the territory (Camagni, Caragliu, & Perucca, 2011) (Jakubowski & Miszczuk, 2021). Territorial capital increases regional growth in normal times, for authors such as Fratesi and Peruca, and acts as a factor of resilience during a crisis due to its structural nature. According to them, the structure of the regions is an important determining factor in how they cope with disaster conditions. More sustainable are those regions with less mobile territorial capital assets.

The unpredictability and challenges posed by the COVID-19 crisis inevitably posed problems for the world to solve. TA 2030 is no exception and also addresses the issue of the need for changes in the policy-making process and future development prospects, reaffirming the thesis of a strong interconnection between territories (Territorial Agenda 2030: a future for all places, 2020).

Henriques, Dragovic, Auer, & Gomes raise important discussion questions regarding the clarity and applicability of the actions set out in the TA 2030. They point out that the definition of the environment is less clear and therefore more difficult to operationalize than previous documents. According to them, the definition of inequality is vaguely formulated in an attempt to displace the concept of poverty. The TA 2030 identifies the lagging development of the regions, but the proposed means of overcoming are limited only to increasing competitiveness. The idea of Just Europe is not sufficiently convincing, the concept of sustainability - Green Europe does not consider the need for a strong regulatory orientation or funding of micro-level initiatives that are part of the arguments for violating the idea of transition to sustainability. These weaknesses will inevitably have an impact on the implementation of TA 2030 at national and regional level by the Member States, including Bulgaria.

The priorities set in the TA 2030 inevitably find their reflection in the Bulgarian planning practice. The Union's common views correspond directly to the main objectives of European regional development policy. The thesis of a number of researchers of regional policy in Bulgaria is that it is unstable both at administrative and operational level. The main reason is the incorrect goal-setting and functioning of the regional government, and the failure to establish an intermediate level of government is one of the serious deficits (Milkova & Dokov, 2017). In recent years, issues of change in the planning regions have been discussed in Bulgaria in order to increase their sustainability over time and create optimally separated geographical areas located along the main axes of development (Parashkevova, 2018). This change was supposed to provide a basis for the development and implementation of strategic documents, but in the end, it was not implemented. The interaction between the regions and the central authorities in Bulgaria is in accordance with the principles of subsidiarity, as the optimization of the territorial organization is important for the implementation of the regional policy.

Bulgaria is in a position where it is necessary to adapt relatively quickly and meet the requirements related to: implementation of the rule of law, transition to greener energy sources, reduction of social and economic inequalities, transition to a circular economy, etc. There is a certain reticence in certain groups of stakeholders regarding the possibilities of our country to transform its policy within the specified deadlines, such as the process of discontinuation of the coal industry. The decarbonisation measures set out in the Green Pact, corresponding to one of the main priorities in the TA 2030, as well as the rules for priority financing of green projects, provoke polar reactions in some member states, including Bulgaria. It is important for the regional development in the country to provide opportunities for targeted impact on the territory through tools and activities that highlight it as a national priority. In this context, taking coordinated planning actions in line with the European Community development priorities set out in the TA 2030 and other strategic documents for territorial development are fundamental.

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3. Research methodology

The research methodology is based on a standard scientific approach, which includes document content analysis, comparative analysis, Gap analysis, critical analysis. They outline the main challenges facing the implementation of TA 2030. Through the methods of deduction, induction and traduction, the main characteristics of the studied issues are derived in the context of its manifestation in the Bulgarian planning practice and discussion questions are outlined.

Stage 1. Preparation of the research. At this stage, current issues of planning practice have been studied, scientific literature and strategic, normative and methodological documents on the implementation of TA 2030 and the relations it makes with documents from different hierarchical levels have been collected. Basic scientific ideas and possible normatively substantiated and administratively feasible solutions for achieving integration between the strategic documents defining public policies have been studied.

Stage 2. Conducting the research. At this stage, the scientific literature is subjected to a critical analysis of the existing theses and research views in the context of European and national planning practice, and the lessons learned in previous territorial cohesion policies. The research issues are defined and the research strategy is chosen. The framework of the study is outlined and the appropriate techniques and sources of information about the framework and its dimensions are selected, in which TA 2030 is reflected in Bulgaria, as well as the regional aspects of the issue. A comparative analysis of the planning practice in Bulgaria in the two periods of membership 2007 - 2013 and 2014-2020 has been made and important challenges have been outlined, which are on the agenda. The opportunities for improving the practice of regional development planning and the administrative capacity for achieving balanced territorial development are analyzed.

Stage 3. Forming summaries and scientific conclusions from the research. On the basis of the identified opportunities and deficits, proposals have been made to improve the framework for implementation of TA 2030 in public policies, to ensure clearer integration and coordination between documents and institutions from different hierarchical levels and to achieve sustainable and balanced development stimulated by public authorities and with the participation of stakeholders.

The defined stages are indicative, as it is difficult to establish the exact boundaries of each. The lack of strict determination at each stage made the applied methodology flexible in relation to the research searches of the authors and allowed for repeated review and refinement of the results of each stage, return to the previous stage in order to fill information gaps and refine conclusions.

4. Framework for conducting regional policy in Bulgaria

4.1. Regulatory framework

In order to realize the main goals and priorities set in the TA 2030, each Member State individually, including Bulgaria, and the involved bodies at the sub-national level need to take concrete actions to ensure the transition from appeals to results. Although efforts have been made in the country and progress has been made in previous periods of membership, there are still many unresolved issues that need to be explored and, on this basis, to offer appropriate, concrete solutions to improve the legislation regarding the spatial planning and regional development so as to ensure that the vision of a Just and Green Europe is achieved.

The main law - the Constitution of the Republic of Bulgaria (Constitution of the Republic of Bulgaria, 1991), Art. 20 states that "the state creates conditions for balanced development of the individual regions of the country and supports the territorial bodies and activities through the financial, credit and investment policy". In particular, these productions are mainly found in the Spatial Planning Act (Spatial Planning Act, 2021) and the Regional Development Act (The Regional Development Act).

The main guidelines and principles of the spatial planning policy are regulated in the Spatial Planning Act. The law aims to cover the structure of both urban areas and those outside the settlements - agricultural areas, forest

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areas, protected areas, disturbed areas for restoration, areas occupied by water and water bodies and transport territories (Todorova, 2014). The law regulates the public relations in the field of the organization of the territory in observance and further development of basic constitutional principles from 1991. The main objectives of the law are regulated in Art. 1 of this normative act, namely: the territory of the Republic of Bulgaria is a national treasure. Its structure guarantees sustainable development and favorable conditions for living, working and recreation of the population. Priorities fully compatible with those set in TA 2030. The law also contains intentions related to the protection and reproduction of the environment, maintaining the diversity of living nature and the rational use of the country's natural resources; creating conditions for balanced development of the separate regions of the country while protecting the Bulgarian territory as a main national wealth; creating and guaranteeing equal legal conditions for economic activity, of a healthy and favorable environment for all citizens and legal entities. Therefore, it could be concluded that one of the objectives of the Spatial Planning Act is to ensure sustainable development of the country by creating conditions for high quality of life and favorable conditions for living, working and recreation of the population and thus to implement the priorities of TA 2030. The law has a wide scope, it is engaged in the development of all types of territories, which is why it regulates public relations in areas of different nature. It should be noted that a call for participants with a key role, such as Member States in the TA 2030, is to promote national processes of strategic planning and spatial planning. A peculiarity of the Spatial Development Act is that it regulates public relations that directly affect the physical environment of the territory to be developed, which in turn is carried out on the basis of spatial planning. The Spatial Development Act provides the main parameters of the concepts and schemes for spatial development and determines the objectives of the state policy for spatial planning for a certain period (Chapter Five of the Spatial Development Act). The law frames the planning of spatial development, which covers the development and updating of a system of spatial development documents at national and regional level, defining strategies for integrated spatial development, taking into account the territorial potential and the principles of balanced sustainable development. Spatial development plans are made in different territorial scope and have different degrees of detail. The general development plans have the character of strategic documents, defining the general guidelines in the development of the respective territories to which they refer. According to the requirements of the law, and in practice they are plans that determine the long-term development with a time horizon of 15-20 years and the relationship between all systems and their elements that affect the quality of the environment and population (Grozeva, 2021). Their purpose is to interconnect all resources on the territory, to outline their sustainable use or creation over time and to provide a reliable territorial basis for field, sectoral planning, their coordination and proper targeting. The general development plans determine the predominant purpose and manner of development of the individual structural parts of the territories covered by the plan (Art. 103, para 2). They are the basis for the overall organization of the territories of the municipalities, of parts of them or of separate settlements with their lands. The specific system of documents for spatial development planning, the scope and content, as well as the conditions and the order for assignment, elaboration, adoption and application of the concepts and schemes for spatial development are determined in the Regional Development Act.

The first Regional Development Act, adopted in Bulgaria in 1999, marked the beginning of the formation of regional development policy in Bulgaria. A special feature of the act at this initial stage is that it does not reflect the accumulated experience and traditions in the regulation of regional systems of socio-economic development, but rather creates and regulates new social relations that are important for Bulgaria's participation in regional policy of the European Union (EU) to achieve economic, social and territorial cohesion (Daskalova, 2020).

The main points of the next Regional Development Act of 2004 largely reflect the objectives and principles of Community regional policy. The implementation of the act leads to the creation of a working system of strategic planning documents in the period after the adoption of the law, such as: National Strategy for Regional Development (2005-2015), regional development strategies (2005-2015), regional plans for development (2007-2013) and municipal development plans (2007-2013). The next stage, immediately after Bulgaria's accession to the EU in early 2007 and the launch of operational programs as real tools for structural adjustment and development of the country objectively provoke changes, which are reflected in the third version of the Regional Development Act of 2008 and the regulations for its application. Changes have been made in the field of strategic planning, which strengthen the strategic nature of the applied instruments and have a leading role in determining

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the medium-term and longer-term goals and priorities of the monitoring, control and evaluation of regional development.

With the latest amendments to the Regional Development Act of 2020, a new type of documents is introduced, uniting the strategic and spatial planning of regional development for the period 2021-2027: National concept for regional and spatial development, plan for regional and spatial development of the regions from level 2 and a plan for integrated development of a municipality. The new documents are expected to improve coordination with other sectoral documents at the relevant levels, the latter in line with TA 2030. The use of the integrated planning approach requires that the goals and priorities of the municipal development plan be coordinated and envisage the interaction with the factors, conditions and potential for the specific spatial development of the municipality, the network of settlements, the individual sectors and levels.

In this context, in order to achieve sustainable development, it is important to take comprehensive measures and actions to improve governance through spatial planning of regional development, changes in the regulation framework, as well as the creation of joint initiatives for business development in a particular region (Bozhinova M. , 2019). It is necessary to organize a process of parallel synchronization and improvement of the legislation, both with regard to national strategic documents and the normative documents regulating the sectoral policies, because good coordination and cooperation between all stakeholders are needed in order to achieve the objectives and strategies of region as well as their periodic updating (Bozhinova & Georgieva, 2019). As indicated in the TA 2030, it is necessary in the forthcoming period of the normative acts to provide and guarantee more and more concrete actions that will realize the set goals and priorities. At present, such specifics and mechanisms are rather lacking.

It is necessary to provide a mechanism by which the provisions of the various territorial plans, which determine the general structure and the predominant purpose of the territories, the type and purpose of the technical infrastructure and environmental protection, and the objects of cultural and historical heritage, are coordinated with the priorities of the TA 2030 and to seek the relevant public policies for their implementation in the context of the required cohesion. It is necessary to implement working procedures related to the search for opportunities for expanding decentralization and sectoral integration in the management of regional development, and that the regional level is increasingly involved in the implementation of regional development policy. Issues could also be raised to compensate for the lack of "regionalization" and the linking of national strategies and programs, including co-financed by EU funds, with the needs and potential of regional and local communities and territories, in line with TA 2030 objectives. Obviously, the object of continuous, sustainable, integrated and timely improvement should be the legislation to establish the interrelationships between the strategies and plans for regional development and the programming documents (including TA 2030). Real interaction and compliance of the process of strategic planning of regional development and the process of spatial planning for synchronization and a clear territorial address of the goals and priorities of the regional development policy must be sought and achieved (Daskalova, 2020) Further efforts should be made to expand and strengthen the mechanisms for territorial coordination of sectoral policies and regional development policy, with a view to achieving more synergies, interaction, concentration of resources and better results for the regions.

The considered normative base gives grounds to conclude that the territorial plans are one of the main tools for conducting a perspective development policy, aimed at balanced development through utilization of diversity, as well as creating preconditions for achieving positive results. The strategic guidelines for cohesion of local and regional development, reduction of inequality of regions and sectors and creation of preconditions for healthy environment, circular economy and sustainable relations are regulated in the Spatial Development Act, the Regional Development Act, but also in the sectoral regulations, which also provides a territorial basis and guidelines for achieving the objectives of TA 2030.

4.2. Strategic framework

The TA 2030 sets the framework for the development of the strategic spatial planning, as well as provides specific guidelines. At the same time, steps are being taken to intensify the strengthening of the territorial dimension of sectoral policies at all levels of government. It aims to promote an inclusive and sustainable future for all places and to support the achievement of the goals of sustainable development in Europe.

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The local-oriented strategic approach, incl. to the conditions in our country, in the preparation of policies undoubtedly contributes to the territorial cohesion. It is based on horizontal and vertical coordination and integration in policy-making, as well as in territorial development itself. This approach to multilevel governance contributes to subsidiarity. It ensures cooperation and coordination with the participation of citizens, civil society, business entities, research institutions and knowledge centers. The implementation of the strategic approach in this form will contribute to the specific Bulgarian territorial potential related to our conditions-oriented local capital, knowledge and assets, and it will also be possible to consider the need for solutions specifically tailored to different types of territories. The development and implementation of European, national, regional and local strategies with a local-oriented approach will promote the long-term strategic development and competitiveness of the regions.

Recent studies, including those of ESPON, the European Commission, the European Committee of the Regions, the European Investment Bank, the World Bank and other international, national and regional actors, have found that Europe faces significant economic, social and environmental challenges, but in at the same time, it has significant potential to improve living conditions in all places and for all people (Implementing the Territorial Agenda 2030: Examples for a territorial approach in policy design and delivery, 2020). To this end, appropriate policies are needed that take into account the unique territorial dimension and also coordinated approaches that respect and exploit the diversity and specific characteristics of regions.

Changes in the socio-economic characteristics of the EU are accompanied by increasing inequalities, leading to deepening disparities between people and between regions. Many social groups and communities have the feeling that European and national goals and perspectives do not meet their concerns and capabilities. This is reflected in the debate on the "geography of discontent". The lack of progress on a number of social and economic disparities in Europe does require a focus on the territorial dimension - for example, segregation within cities and rural areas, in regions or countries, and within Europe. Increasing inequalities and disparities lead to significant diversity of prospects for the future (Territorial Agenda, 2020). With TP 2030, these challenges are highlighted and brought to the attention of policy makers. The strategic priority areas for action, resp. impacts are: Quality of life, Services of general interest, Demographic and social imbalances, Digitization and the fourth industrial revolution, Employment and economic development, Interdependencies between regions and Inextricable link with the global context. The projection of all this on the regional policy in Bulgaria for the period until 2030 is expressed in the creation of vital, economically strong and sustainable regions in response to the unfavorable demographic trends and deepening of the interregional and intraregional differences. The specific strategic directions include: overcoming the negative demographic tendencies and reducing the regional differences in relation to the population; increasing the economic growth of Bulgarian regions; stimulating balanced territorial development through a polycentric network of cities, supported by integrated investments.

Global challenges to sustainable development strongly affect local and regional development and living conditions in European countries. These are mainly issues related to climate change, environmental degradation and the transition to a climate-neutral economy. Political and public debates on the subject highlight the growing urgency of the need for effective action to tackle climate change, build resilience and move towards more sustainable development, as emphasized by the UN's 'Sustainable Development Goals'. These concerns are strategically covered in the EU agenda through the European Green Pact and country reports. The transition to sustainable development has different potential and diverse challenges for different rural areas, cities and regions (EU Territorial Agenda 2030 - Place-based development for a Just and Green Europe, 2020). Actions are planned in the following strategic areas: Climate change, Biodiversity loss and land consumption, Air, Soil and Water quality, Secure and sustainable energy at an affordable price, Fair transition, Value chains and Nature, landscape and cultural heritage.

Rising inequalities between regions and between people, as well as unsustainable development on a European scale, have already reached a critical level. There is a clear need for enhanced concerted action at all geographical levels and levels of government, in order to ensure a positive future for all people, communities and places in Europe. There is an urgent need for a deeper understanding of the territorial impact of sectoral policies and an adequate approach to it. The aim is to contribute to sustainable development and to the preservation of the unity of Europe by following the above-mentioned common territorial priorities for all European countries.

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In order to ensure a sustainable future for the local regions and people in Bulgaria through the regional policy, actions for development of the territory are needed, which are based on:

• a common understanding that development-related needs and impacts of future development vary from place to place in Europe, which can be enhanced by sharing knowledge and experience gained from specific solutions and related support schemes; as well as

• cooperation and coordination between localities, levels of government, policy sectors and groups in society aimed at overcoming complex problems and exploiting the diverse potential, including through cohesion policy, rural development policy, Interreg or other EU instruments for strengthening integrated territorial or local development (Territorial Agenda 2030: a future for all places, 2020)

Only in this way the regional policy in our country can successfully pursue the two main strategic goals - a Just Europe and a Green Europe, including six priorities for development in Europe as a whole, as well as in all places in it.

The priorities for a Just Europe focus on the contribution of the territorial dimension and spatial planning to achieving the main policy priorities. They include economic, social and territorial cohesion, the European Pillar of Social Rights, the 'Europe closer to the citizens' policy, inclusive, sustainable and integrated regional development, fair transition and territorial integration in Europe. The strategic priorities for a Green Europe focus on the contribution of the territorial dimension and spatial planning to achieving key policy priorities, such as the UN Sustainable Development Goals, the Convention on Biological Diversity, the European Green Pact, the Paris Agreement, the EU Biodiversity Strategy by 2030, the European Convention on Landscape and the EU Forest Strategy. Other priorities include the concept of Europe, readiness for the digital age, sustainable mobility and the full integration of the European transport network, the transition to a circular economy and the implementation of an eco-efficient systems approach.

The strategic framework presupposes the development of the regional policy in our country on the principle of "place-based approach" (location, place, region), in which the basis is the territorial unit with its unique features and needs. Thus, the implementation of the strategic goals will allow to support initiatives of local authorities and local communities, as well as the development of partnerships with them, to select the most important projects for the region and thus to use the existing potentials.

The most important characteristics are related to the topic of competitiveness and development of the regions, as well as the development of the local development, on the basis of the specific location and by addressing local problems and challenges. The expectations are that in this way the non-governmental sector and local communities will be widely involved in the formation and implementation of local policies. To expand inter-communal cooperation, as well as public-private partnership for joint implementation of infrastructure, social and cultural projects, as well as to facilitate and support contacts and initiatives of local businesses.

The strategic framework imposes a balanced, polycentric model of urban development. The idea is for the largest municipalities to develop as competitors of the capital, revealing attractive opportunities for investment, employment, education, recreation, career. Combinations of measures are needed to improve the infrastructure for economic activities and public services, energy efficiency, urban mobility, urban environment, tourism, modernization of educational infrastructure, etc., whose implementation aims to stimulate the development and strengthening of a culture of partnership of stakeholders at local and regional level.

The strategic framework is appropriate for the implementation of public policies in the context of TA 2030. Of course, it is possible to adapt and increase the flexibility of the instruments for developing the potential of places and bringing their competitiveness as a basis for local policy. This by no means that other directions of territorial development are being moved to. Rather, the strategic vision is relatively sustainable over time, and the tools for achieving it are being transformed on the basis of environmental challenges and adopted regulations and good practices.

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4.3. Methodological framework

When it comes to the impact of the TA 2030 in the regional policy of Bulgaria, attention should be paid to one very important part - the methodological framework for regional development planning. The current conditions presuppose the development of a methodological framework through which to clearly and concretely outline the concept for the development of the strategic documents and to specify the strategic planning of the regional development.

The Report of the International Bank for Reconstruction and Development related to the Regional Development Program 2021-2027 (World Bank, 2019) prepared in October 2019 on behalf of the Ministry of Regional Development and Public Works states the importance of adequate coordination mechanisms for effective implementation of development activities. In line with the adopted TA 2030 and the UN Sustainable Development Goals, the declared need for coordinated action at all geographical levels and levels of government, in order to ensure a better future for all people, communities and places in Europe, a working mechanism must be provided to synchronize the activities between the regional and local administrations and the managing authorities of the operational programs. The creation of economically strong and sustainable regions as the main goal of the TA 2030 is the direction that in synchrony with other strategic documents of the EU and the UN defines the goals of territorial development in our country and the declaration of national priorities according to EU policy. On this basis, the need for adequate methodological guidelines for regional development planning emerges, which will ensure continuity, consistency, coordination, giving guidance on what and how should be done in the development of strategic planning documents. During the previous planning periods, a number of methodological guidelines and manuals were developed, which to varying degrees supported the process of developing the planning documents.

The regional policy of Bulgaria, the instructions for development of the strategic documents, containing the goals, tasks, indicators, etc. for sustainable spatial development of the territory are in the context of the TA 2030 and are linked to the UN goals for sustainable development. The development and updating of a methodological framework plays a key role in tackling regional problems and achieving results in this direction. The Report on Strategic Consultations on the Regional Development Program 2021-2027 (World Bank, 2019), which aims to support the information planning process for the programming period 2021-2027, notes that stakeholders face difficulties in planning development measures due to a deficit of socio-economic data, which are key in the development of strategic planning documents and give a real idea of the situation in the territory. Some of the new integrated approach to territorial development indicate the need to develop uniform guidelines (at horizontal level) aimed at beneficiaries and a detailed implementation manual, including a unified methodology (at the vertical level) to ensure coordination and integration of strategic planning documents.

The methodological guidelines developed so far build on the implementation of the plans in the period 2014-2020, based on the analysis of the results, the progress reports on the implementation of the various measures, the conclusions. Such methodologies are: The methodical instructions for development and implementation of regional plans for development of the regions of level 2 for the period 2021-2027; The methodical instructions for development and implementation of Plans for integrated development of municipality (PIDM) for the period 2021-2027; Methodical instructions for preparation of regional schemes for spatial development level of the regions from level 3; The methodological guidelines for development and implementation of municipal development plans (MDPs) and integrated plans for urban reconstruction and development (IPURD) for the period 2021-2027. However, the good practices of other countries and the possibility for their application in our country are poorly represented.

The current methodological guidelines state that the integrated system for strategic planning of regional development for the period 2021-2027 observes the principles of coordination and subordination of the defined objectives of the EU regional policy and the objectives, development priorities and strategic initiatives of the regional policy in Bulgaria, applying the planning approaches "top-down" and "bottom-up". The guidelines are based on past experience and integrate approaches to the implementation of regional policy, through proposals for

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change in the system of documents for integrated strategic planning of regional and spatial development in the context of integrated territorial investments and place-based approach.

Despite the developed methodologies and the vision for an integrated approach to planning and development, we believe that there are some methodological weaknesses in the development of strategic documents which to follow and be coordinated with regional policy in the EU. At this stage, these weaknesses are in the process of preparation of documents for regional development, incl. and in terms of time lag, but this will also affect the process of their implementation.

The COVID-19 pandemic undoubtedly affected the process of strategic planning of regional development in our country and diverted public attention from the topic. Numerous reports and analyzes describe the consequences of the emerging and complex socio-economic situation, both globally and in Bulgaria. Important documents are still under discussion and updating. Such are, for example, the Integrated Territorial Strategies for the Development of Level 2 Planning Regions, which would slow down further work on the implementation of the priorities of TA 2030 and achieve faster and more balanced territorial development.

Another emphasis is the lack of experience and planning expertise at the institutional level for integrated territorial and regional planning, taking into account the priority areas and initiatives of the TA. This, in turn, highlights the need for detailed, clear and organizationally sound methodologies for planning and implementing public policies at different hierarchical levels.

5. Perspectives for the regional policy of Bulgaria in the context of the Territorial Agenda 2030

5.1. Progress in the regional policy of Bulgaria – highlights

Bulgaria's regional policy in the context of European planning policy and practice started in 2007, when the country joined the Union.

During the first planning period (2007-2013) Bulgaria as an EU member state laid the foundations of programming at the regional level. A system of documents for strategic planning of regional development was developed - a national strategy for regional development, 6 regional development plans, 28 district development strategies, 264 municipal plans were developed. Their implementation was subject to annual reporting and interim and ex-post evaluation. From the reports on the ex-post evaluation of the planning regions it is clear that for this first period (Ministry of Regional Development and Public Works, 2015):

• the macroeconomic situation in the regions is improving, albeit at a slower pace;

• five regions have unfulfilled GDP targets per capita, only the South-West region manages to reach the set target value (75%);

• there are strong interregional and intraregional differences;

• the demographic situation related to population decline and aging is deteriorating (except for the South-West region);

• good levels of coordination are registered between the institutions involved in the processes of regional development.

The reported progress from the interim evaluations of regional development planning documents for the second period of Bulgaria's membership in the EU (2014-2020) is not significant, and the problems in some areas are even deepening. The findings are related to (Interim report on the implementation of the National Strategy for Regional Development of the Republic of Bulgaria for the period 2012-2022, 2018, pp. 27-32)

• Clearly deteriorating demographic processes in five of the six planning regions, the population is not declining only in the South-West region. In some of the territorial areas of NUTS 2 and LAU 1, the population is under or

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to the critical minimum and from this point of view they will lose their administrative autonomy in terms of regional development;

• although there is a positive change in the values of key macroeconomic indicators, there are still significant interregional and intraregional differences;

• Improved coordination between the districts, municipalities, ministries and the socio-economic partners for effective and efficient implementation of the state policy on the territory of the separate regions is reported.

As a result of the insufficient progress in the regional policy and the continuing interregional and intraregional differences, the impossibility to realize the desired model of moderate polycentrism for development on the territory of the country, defined as the most adequate and appropriate in the National Concept for Spatial Development, is reported (Ministry of Regional Development and Public Works, 2020). The priority areas of TA 2030 have largely been present in the previous documents for regional development of Bulgaria, and not only. Their reflections stand out in a number of sectoral documents. However, this only comes to show that the chosen approaches and methods for intervening and achieving goals have not given the expected result so far. This finding is in the context of two key points outlined in TA 2030 (EU Ministers, 2020, p. 2)

• The individual territorial units within the EU are different. For each of them, its specifics must be identified and policies implemented that may differ from those appropriate for another region;

• encouraging participation, partnership and coordination between the widest possible range of stakeholders. The synergy of their work has the potential to solve existing problems, to optimally develop the potential of the territory and to contribute to the achievement of the desired results.

Bulgaria is an active participant in the processes of planning the European agenda and the development of strategic documents at the EU level. However, there are still many factors that prevent the fulfillment of the commitments, including at the regional level, the achievement of the set goals and indicators, including in terms of sustainable development. During the 2007-2013 planning period, the global financial and economic crisis had a strong negative impact, leading to a decline in the initial positive accelerated growth rate. In the period 2014-2020, undoubtedly the strongest impact on the world, the EU, Bulgaria, individual regions and settlements was exerted by the pandemic of COVID-19. Its negative effects and its long-term impact on individual locations have yet to be systematized and calculated.

Efforts at European level are aimed at identifying measures for overcoming the consequences, for recovery and development. The program addresses two significant issues of growing inequalities between regions and between people; unsustainable development and emphasizes three recommendations for enhanced concerted action at all geographical and government levels; a deeper understanding of the territorial impact of sectoral policies; sustainable development and preserving the unity of Europe. Targeted and well-argued actions at national and regional level, active participation of competent, knowledgeable and capable politicians and experts, mobilization of resources in order to develop and use the potential of the territory and to achieve the set goals are necessary. Emphasis should be placed on targeted interventions to achieve balanced territorial development, reduce interregional and intraregional disparities, establish a polycentric model of spatial development, integrate the widest possible range of stakeholders in the process of formulating and implementing public policies, promoting cooperation and coordination between institutions, building and developing partner networks not only in the country but also abroad, sustainable development, etc. These emphases need to be embodied in concrete instruments that, based on place-based approach, ensure the real implementation of the ideas of TA 2030 to promote an inclusive and sustainable future for all regions and help achieve the goals of sustainable development in Europe. (Territorial Agenda 2030: a future for all places, 2020)

5.2. Challenges for the regional policy of Bulgaria

Obviously, achieving the goals of the Territorial Agenda by 2030 is a challenge, not only for Bulgaria, but also for the entire European Union. The successful implementation of the envisaged mechanisms is highly dependent on the level of regional development of the specific regions, on the administrative capacity, the involvement of the society and other factors that do not give an equal start to the EU member states. Although the TA was announced

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at the end of 2020, there are already authors who question some of the issues addressed in it on the equality of all affected persons in the new program (Montanari, Jacobs, Haklay, Donkor, & Mondardini, 2021). According to the authors, there are 5 possible factors that can lead to the exclusion of individuals from the new measures: the possibility of demographic discrimination; geographical exclusion; administrative constraints (political, institutional, legal, budgetary); socio-economic reasons; potential risks of crises. The full involvement of stakeholders in the process is critical to achieving the objectives of the TA 2030. Judging by the experience of Bulgaria so far, where the involvement of communities is in most cases partial and insufficient, this raises many concerns about the future integration of the objectives of the TA 2030. Other authors see many barriers to Bulgaria in achieving sustainable development and the price to be paid for achieving it (Ivanov, 2021). Serious training of national and supranational institutions and mobilization of public and private resources is needed, as limitations in the administrative capacity of the bodies and individuals responsible for this goal are often observed. At the same time, barriers from economic and financial, trade, social, innovation, institutional and political, etc. nature are reported, which further call into question the achievement of sustainable development and the implementation of the TA 2030 in Bulgaria.

When analyzing the regional development in the EU in relation to the goals and priorities of the TA 2030 (Atlas for the Territorial Agenda 2030, 2020), it is noticeable that Bulgaria, as a peripheral region in the EU, faces many deepening problems and many potential challenges. While for some countries the transition to achieving sustainable goals will be accompanied by small changes and efforts, this is not the case with Bulgaria. In terms of achieving the goal of a Just Europe with an emphasis on a Balanced Europe, it is impressive that among the first places in the negative trends in the number of emigrants are the countries of Eastern Europe. Countries such as Bulgaria, Poland and Romania are leaders in this regard. On the positive side, along with the highest number of emigrants, there is a tendency for some of them to return and a growing wave of immigration in these countries. In terms of the number of people employed in labor relations (70% of the population), Bulgaria is in the EU average and maintains a steady downward trend in the number of people employed in the industrial sector. Our country has made progress in the levels of youth unemployment for the period 2013-2019 by nearly 9%, as in less populated cities and urban areas the decline reaches 15%, and in rural areas - up to 13%. Nevertheless, in the peaks of youth unemployment, Bulgaria still occupies the first places (30%) among countries such as Italy and Greece. Regional differences in the labor market between cities and villages are deepening, both in Bulgaria and in Greece and Romania. In achieving the goal of a Just Europe with priority Functional Regions, there is a traditional lag of Bulgaria due to a number of factors, such as quality of life, but also deepening regional imbalances. The growth of GDP throughout the period is encouraging, but it still does not reach the EU average of 5,000 points and for 2018 there is a significant difference of 15,000 points in GDP between the least developed and the best developing region in Bulgaria. The purchasing power of the population is below 50% of the EU average, which ranks us among the poorest countries in Europe. These conclusions once again support the statement that the changes made in Bulgaria are unbalanced and insufficient. An optimistic trend is formed in the realization of the goal of a Just Europe with priority Integration beyond Borders. The existence of common characteristics between the regions is an appropriate basis for common regional initiatives, but it is their differences that underlie innovation and lead to increased innovation efficiency. On the other hand, the creation of cross-border cooperation makes it possible to explore the strengths and weaknesses of the interaction, which can become a long-term strategic partnership (Knickel, et al., 2021). Bulgaria has experience in the development of 150 cross-border Interreg B projects. The thematic areas of the Interreg A projects, in which Bulgaria participates, are mainly aimed at environmental protection and increasing the efficiency of the use of resources, followed by projects with social orientation and improving the quality of education. For the period 2014-2021 Bulgaria participates in 44 international projects in the platform of the European Regional Development Fund (INTERREG Bulgaria, 2014) (as of November, 2021), as 55% of them are aimed at Green Europe and the creation of a Healthy Environment, but only two of the projects are with a leading partner from Bulgaria. The leading partner of the project idea to provide support for clean energy transformation in the EU regions with intensive use of coal is Stara Zagora, Agency for Regional Economic Development. A synergistic effect in achieving several of the objectives of the TA 2030 is also present in a project on "Joint digitization of natural and cultural heritage" with a leading partner Euroregion Pleven-Olt, which achieves many priorities in the Green Europe goal, helping to build a Healthy Environment, Sustainable Connections and digitalization. However, despite the experience gained and the relative prior readiness to achieve the priority of Integration beyond Borders, the fact that Bulgaria is not the main initiator of these international

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projects in most cases is worrying. This is an unfavorable indicator of the lack of political, institutional and public commitment to the pursuit of national regional goals and the search for international cooperation. Extremely worrying is the fact that cross-border projects to improve the efficiency of public administration are very limited, although our country has a strong need to improve its capacity, especially since administrative capacity is a key factor in making progress in regional development in the country. Therefore, it is not surprising that the capacity for climate change management in Bulgaria is among the lowest in the EU. The imbalance in the developed projects and the predominance in the ecological orientation of the international projects can be seen as a potential for easier achievement of the goals of Green Europe in terms of priority Healthy Environment. In Bulgaria, 85.5% of the country's territory is covered by Natura 2000, which ensures compliance with the standards for protection of territories in the EU. In addition, between 40-80% of the potential for the creation of green infrastructure and change to green urban areas has been identified in the predominant territory of the country. Although we have limited investments in green electricity, by 2019 on the territory of the country there is a concentration between 500 and 1000 units installed wind turbines (in Northeastern Bulgaria), which for the size of our territory is a good indicator, but insufficient. Globally, however, there are major challenges and barriers to moving entirely to green energy, as the cost of producing such energy is too high. Along with the positive trends in the quality of water sources in Bulgaria (97% of the water is of very good quality), there is a deterioration of air quality in some more urbanized areas. In achieving the goal of a Green Europe with a priority Circular Economy and Sustainable Connections, both positive and worrying indications are also observed. Europe can identify 9000 companies that apply a circular economy, but nevertheless, the percentage of workers engaged in a circular economy, even in the leader Luxembourg is 4%. On the other hand, Bulgaria is already involved in the development of a project aimed at the circular economy, although not as a leading partner, which ensures increased entrepreneurship of SMEs in the circular economy of the agricultural food chain (leading partner is a local development organization in Central Macedonia). This partnership puts Bulgaria at the moment (November, 2021) on an equal footing with most of the EU countries with less than 0.5% of workers engaged in a circular economy, but there is a risk that the lack of initiative at this time will deepen in the next period. Although the use of the Internet on a daily basis in Bulgaria has doubled (from 30% in 2009 to 60% in 2019), it is noteworthy that in Bulgaria and Romania there are still many people who have never used the Internet in their life. This is due to the fact that access to the Internet in cities is guaranteed, while there are very serious differences in the digital capabilities of rural areas in Bulgaria (20% difference between large cities and villages), along with countries such as Poland, Lithuania, France, Spain, Greece, Romania and Croatia. It is noteworthy that digitalization in Bulgaria is at the level of low-tech and catching-up technology; while worldwide there is talk of a digital revolution and Industry 4.0. The whole local analysis in the Atlas on which the TA 2030 is based, as well as the indicated comparative characteristics and tendencies are before Bulgaria and the world to face the crisis caused by COVID-19 and the consideration of its long-term effects. In addition, the current political uncertainty in Bulgaria and the unsystematic nature of the decisions taken call into question whether the administrative capacity will cope with the forthcoming changes and challenges.

In order to overcome the potential barriers during the development of the TA 2030, the introduction of pilot actions is envisaged (Implementing the Territorial Agenda 2030: Examples for a territorial approach in policy design and delivery, 2020), which aim to inspire, demonstrate, research and propose the development of practices related to the achievement of the objectives of the program. The aim is to share knowledge, good practices, develop approaches to progress in implementation or joint working groups. The potential opportunities for achieving the goals of the TA 2030 are outlined, through the studied experience from the introduced in 2014-2020 in some of the European countries (14 EU member states express a desire to implement this instrument, but subsequently 4 of them refuse - Bulgaria, Austria, Denmark and Estonia) new Integrated Territorial Investment (ITI) Mechanism (Council of European Municipalities and Regions, 2015). It is noteworthy that there are many differences between countries, which directly depend on the degree of urbanization, administrative capacity, cultural differences, fiscal constraints and other country-specific characteristics (Ferry, 2019). In countries such as Finland, Belgium, the Netherlands and the United Kingdom, advance preparation in the development of such policies is crucial and they are the first to organize the implementation of ITI, while countries such as the Czech Republic and Romania lag behind. In each Member State, there has been an improvement in the effectiveness of regional policy since the introduction of ITI. However, along with the positive effects of using a horizontal funding principle, which allows access to several priority axes of one or more operational programs, in order to provide an integrated strategy for
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a given territory, the main problems of its implementation can be outlined and are divided into three levels: at the level of strategy, at the level of building partnerships and at the level of implementation (Garcia-Ayllon, 2018), (Kociuba, 2018), (Ferry, 2019). *The problems at the strategic level are related to:* complexity and integration of the planning process; delayed development of the strategic and regulatory framework; administrative capacity is crucial for the success of the mechanism; lack of experience and skills for developing complex projects; problems related to the involvement of stakeholders in the process, difficult attraction of beneficiaries, etc. *The main barriers at the level of establishing partnerships for ITI are:* formation of formal partnerships, solely for the purposes of funding; lack of long-term partnerships; limited administrative capacity, which leads to individual decisions being made by the lead beneficiary; conflicting partnerships with different economic and environmental goals; difficult communication between partners. *The problems at the level of implementation of ITI projects are related to risks of:* unbalanced regional development due to lack of beneficiaries on all operational axes; institutional burden; administrative burden; difficult assessment of the impact and sustainability of ITI projects, etc.

In Bulgaria, this mechanism will be implemented in the new programming period 2020-2027 and although we have the opportunity to gain experience in the direction of more effective application of ITI from other countries, it is impressive to repeat the problems already identified at the strategic level. Bulgaria does not yet have all the necessary strategic and regulatory documents for launching ITI (November, 2021). The reasons for this are the complex nature of the planning, the implementation of the bottom-up and top-down approaches and the insufficient administrative capacity, which further slow down the process. In compiling the ITI strategies, there is a weak activity of the stakeholders, despite the efforts of the municipalities, as well as problems related to the communication program of the regional development policies. Without an analytical study of the experience from the previous programming period, there is a great risk of repeating mistakes, problems and deepening of existing ones, but also creating new imbalances in our regional system. If we manage to overcome the obstacles related to attracting beneficiaries, forming partnerships, as well as evaluating and implementing ITI, the integrated territorial approach to planning has a huge potential to lead to the desired synergy effect and integration in the regional development of the goals. of the TA 2030.

Achieving the goals and priorities of the Territorial Agenda until 2030 in Bulgaria requires a radical change in national policies, administrative capacity and public commitment to the territorial and sustainable development of the country, but also highly dependent on external factors, especially the deepening Covid-19 crisis. Bulgaria, as a peripheral region in Europe, shows serious imbalances and lagging regional development from the other member states. It is important to turn the focus to a balanced coverage of the entire territory and society in achieving the set sustainable goals. Overcoming barriers of economic and financial, commercial, social, innovation, institutional, political characteristics etc. ensure the progress towards sustainable development and the implementation of the TA 2030 in Bulgaria. The implementation of the new mechanism for integrated territorial investments is a potential whose success depends on overcoming a number of obstacles, but it is a powerful tool for accelerated achievement of the set goals and priorities, as well as the achievement of balanced and integrated regional development. The administrative capacity to formulate and implement public policies along with lessons learned from the past and the transferred foreign experience are the main factors for the success of the policy on territorial cohesion and balanced development until 2030 in the context of integrated territorial investments.

5.3. Administrative capacity to conduct regional policy in the context of the Territorial Agenda 2030

Overcoming economic, social and territorial inequalities is enshrined in the Treaty of Lisbon, but they are a basic principle written down in the Treaty on the European Union. However, the results are quite disappointing. It would not be an exaggeration to say that the European Union's widely proclaimed cohesion policy has failed and that is why it is not the strategies and treaties that speak, but the concrete results. Bulgaria firmly ranks last among EU member states in the values of the indicator "Relative volume of GDP per capita", which is 45% below the EU average, followed by the candidate countries Montenegro, Serbia, Northern Macedonia, Bosnia and Herzegovina and Albania. Perhaps it is only a matter of time before one or more of them soon overtake it, if the country's economic development is moving at the current pace. However, this is not only the fault of the "big ones" in the EU, but also of ourselves.

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The price level index shows that prices in Bulgaria are 51.1% of the average European price, but in neighboring Romania, which has a higher GDP per capita, prices are even lower or 49.9% than the average European price. Other countries, such as Poland and Hungary, which also have higher GDPs than Bulgaria, have similar price levels. This has an impact on the volume of individual consumption, which in our country is also the lowest - 61% of the average for the European Union. This means that countries with greater economic potential have lower or similar prices, which leads to a higher share of consumption. In other words, the relatively high prices in our country lead to lower consumption, respectively to poverty.

As for the interregional differences between the six planning regions in our country, they are also deepening, instead of overcoming. These differences between the poorest and richest regions for Bulgaria and 20 countries in Europe are shown in the next figure. It shows that the richest Bulgarian region has GDP per capita levels as much as the poorest in a number of countries. The differences between the richest Bulgarian region - the Southwest, and the poorest - the Northwest, remain large in all key indicators (See Table 1.)

Table 1. Differences between the levels of the indicators GDP, GDP per capita and GVA between the South-West and North-West planning regions in 2020

Region	North-West	South-West	Difference rate
GDP (million BGN)	7703	60534	7,86
GDP per capita (BGN.)	10477	28850	2,75
GVA (million BGN)	6649	52251	7,86

An implicit recognition of the unsatisfactory results so far is the adoption of the new model for spatial planning "The Territorial Agenda. A future for all places", also called Territorial Agenda 2030. It aims to achieve integrated regional development through integrated spatial planning. Unlike sectoral planning, integrated planning is a process that brings together different types of sectoral planning at different levels so that strategic decisions can be made and a common vision for resources and their allocation can be reached. It serves as a starting point for institutional initiatives and the allocation of resources. Within integrated planning, all economic, social, environmental and cultural factors are considered jointly to guide decision-making on urban planning, land use and public works, transport connectivity, environmental protection and the promotion of sustainable territorial development.

The new regional program of the European Union and the requirements for integrated planning require relevant competencies of the competent authorities that must implement them, i.e. the existence of a certain administrative capacity. The new priorities set by the Union for the period 2021-2027 in the field of territorial cohesion show in which areas this capacity should be developed, and they are:

1. Focus on achieving five political objectives: 1. a more competitive and smarter Europe; 2. a greener, low-carbon transition to a zero-carbon net economy; 3. a more connected Europe through increased mobility; 4. a more social and inclusive Europe; 5. Europe is closer to its citizens by promoting the sustainable and integrated development of all types of territory;

2. Priority of the goals related to climate change - investments for environmental protection, mechanisms for climate adjustment;

3. Empowerment of local, urban and territorial authorities in the management of funds - a special objective of the policy implemented through strategies for territorial and local development;

4. Simplification: The new cohesion policy introduces a set of rules for the eight funds and significantly reduces the amount of secondary legislation.

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This includes in particular:

• Easier and more frequent reporting;

• Lighter controls for programs: sharp reduction of management checks, "single audit principle", proportional audit measures;

- Faster delivery: enhanced ability to use simplified cost options (SCO) and non-cost-funded financing;
- End of the Commission's approval of major projects;
- No more designations of management and control bodies;

• Creating the conditions for success: streamlined and clear enabling conditions to be met throughout the programming period to recover funds from the Union budget;

• Flexible programming, adapted to new challenges and emerging needs: allocating the amount for flexibility only after a medium-term review of the socio-economic situation and possible new challenges;

• Provisions for increased visibility and communication: requirements for beneficiaries and operations of strategic importance (European Commission, 2021)

Following the listed priorities, it is not difficult to formulate the main competencies that should be possessed by the bodies and specialists authorized to conduct the entire regional policy and integrated planning. In our opinion, they are at least the following ten competencies:

1. Competence 1: To know and handle the legal framework related to regional development and integrated planning;

2. Competence 2. To be able to organize and participate in the development of development plans, considering all economic, social, environmental and cultural factors and setting goals for urban development, land use and public works, transport connectivity, environmental protection environment and to promote sustainable territorial development;

3. Competence 3: Have the skills to coordinate sectoral strategies, programs and plans developed at regional level in the fields of economic development, health, education, science, social services, transport, water sector, energy, broadband, tourism and the environment and considering their regional specifics and their territorial dimensions;

4. Competence 4: To be able to work with large databases and use them for analysis, forecasting and planning of local development;

5. Competence 5: To know what are the appropriate methods for forecasting and planning, the weighted possibilities and limitations;

6. Competence 6: To be able to implant the principles of sustainable development in all planning documents and to implement them in practice;

7. Competence 7: To have flexible programming skills, adapted to the new challenges and emerging needs of the main "players" represented in a given territory;

8. Competence 8: To be able to effectively control and monitor the achievement of the set goals and concrete results, on the principle of reasonable confidence, without unnecessary complications of the procedures;

9. Competence 9: To ensure the transparency of activities in the formation and implementation of regional policy and to have the skills for effective communication with all stakeholders in a given territory.

10. Competence 10: To be able to constantly monitor and effectively control the implementation of regional policy.

The list of competencies shapes the competence of a person. Competence is defined by Ellström as 'the potential capacity of the individual (or team) to cope successfully with a particular situation or to perform a task.' (Ellström,

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1997, vol. 21, n. 6). In public sector organizations, competences and skills are what managers and experts in public administration need to know and can do in order for organizations to achieve their goals in the most democratic, transparent, accountable, efficient and effective possible way.

The list of competencies that a specialist must have is called a **competency model**, which is 'a set of all competencies or competency profiles organized in a way that is appropriate for the organization. The competency model creates a framework and structures the processes of performance management through a system for introduction, measurement and development of competencies, leading to the improvement of organizational results and the achievement of the defined organizational goals.'

Close to this definition is the one written in the Methodologies for Human Resources Management in the State Administration (Council of Ministers, 2013), namely, 'a set of competences organized in a common matrix in a way that meets the needs of a particular organization, describing all competences and their distribution according to certain criteria'.

The stages of creating a competency model, according to the cited Methodology, are the following:

Stage 1 'Preparation for creating a competency model'

1. Providing support to the top management.

- 2. Selection of a leader meeting the following criteria:
- at least three years of experience within the organization;
- practical experience in project management;
- has authority;
- is motivated to manage the project for creating a competency model.
- 3. Setting goals determining the need, scope and areas of application:

• determining the need to create and implement the model (why?) - what organizational need imposes it and what are the desired benefits;

• determining the scope of the model (where?) - which are the target units in which the competency model will be introduced;

• application (how?) - in which human resources management processes the competency model will be applied.

- 4. Designation of a working team, from 5 to 9 participants, meeting the following criteria:
- knowledge of the subject, experience with creating / implementing / using competency models;
- knowledge of the organizational culture, principles, rules and procedures in the particular administration;
- ability to analyze and synthesize large amounts of information;
- skills for effective teamwork;
- skills and experience in change management.
- 5. Selection of a type of model according to the following criteria:
- implementation objectives;
- number and functions.

6. Defining guiding principles in the creation of the model, providing information about the style, goals and number of competencies that need to be included.

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Stage 2 'Creating a competency model'

1. Information gathering:

• review of basic documents (normative, strategic, etc.) for deriving all components of the competence profile - knowledge, skills, attitudes, mandatory for the successful performance of the position;

- analysis of the existing competence model (competence framework);
- 2. Generation of work competencies:
- preparation of a list of registered knowledge, skills, behaviors, personal characteristics, attitudes;
- classification (clusters);
- removing categories in which there is no data;
- name of the categories;
- compiling a list of acquired work competencies;
- setting a work definition for each competency;
- compiling a comprehensive list of work competencies.
- 3. Establishment of a specific competence profile for the position.
- 4. Editing of work competencies: name, definition, exemplary behaviors.
- 5. Determining levels of proficiency on the basis of a five-point scale.
- 6. Forming a well-structured and easy to understand final model.

Stage 3 'Verification of the competency model'

1. Verification of work competencies.

2. Clarification of competencies.

3. Validation of competencies in focus groups with the participation of line managers and experts to whom they refer.

- 4. Preparation of a final version of the competency model.
- 5. Presentation recommended in two stages:
- presentation and management training;
- presentation to the entire organization.
- 6. Testing of the competence model.

The Methodological Guidelines of the Bulgarian Chamber of Commerce essentially propose the same steps for the creation of a competency model, with the difference that a fourth stage is envisaged - implementation (See Figure 3).

Although the two methodologies for creating competency models are relatively recent, the Institute of Public Administration and European Integration at the Council of Ministers of the Republic of Bulgaria and the Open Society Institute have developed requirements for professional competence of public administration employees since 2004, as a result of a study on 'General minimum requirements for administrative competence'. (Institute of Public Administration and Open Society Institute, 2004). It was carried out in support of the introduced mandatory competitive procedure for selection of civil servants and it defined clear, realistic for the Bulgarian conditions,

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measurable and adequate to the respective positions, requirements for general administrative competence of the candidates for competitive position.

1. Preparation	2.Creation	3. Verification	4. Implementation
1.1. Selection of a project manager	2.1. Conducting communication	3.1. Verification of competencies	4.1. Changing processes
1.2. Selection of a sponsor	2.2. Information gathering	3.2. Verification of the implementation process	4.2. Changing the management approach and culture
1.3. Setting objectives of a competency model	2.3. Modeling (ready competencies and evaluation scale)	3.3. Verification of the communication	
1.4. Determining the target group	The competency model is ready	3.4. Testing (pilot implementation)	
1.5. Selection of a working group	2.4. Development of application guidelines		
1.6. Review and selection of the type of competency model			
1.7. Defining guiding principles of the competency model			

Figure 1. Stages of creating a competency model

Source: Methodical instructions for design, approbation, testing and verification of sectoral and company competency models and maps for assessment of the competencies of the BIA workforce, Sofia, 2011

The leading understanding is that the general administrative competence includes knowledge of the nature, structure and functions of the administration, the principles and rules of its effective operation, as well as skills to perform the functions of the respective position, to orient in the directions of modernization of the administration requirements for increasing the administrative capacity. These methodologies can be successfully applied in the development of a detailed competence model of the specialists, forming and implementing the regional policy in our country, on the principles of integrated planning.

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6. Conclusion

Territorial Agenda 2030 is a strategic document that directs the decisions of the member states in a medium-term period of time and in one direction. Its democracy enables it to adapt and find the appropriate instruments and policies that can best meet local societal challenges related to balanced and sustainable regional and territorial development.

The analysis of the regulatory, strategic and methodological framework shows that there are still areas for intervention in order to create a more favorable environment for integration and implementation of the principles and priorities of TA 2030 in the planning practice of Bulgaria. Lessons learned and unlearned are factors that to one degree or another influence decision, especially at the local level, and significantly affect the effectiveness of the implementation of ITI and place-based approach.

The key issue in the context of the integration of TA 2030 in the Bulgarian planning practice and in the system of documents is the administrative capacity of the public institutions at central level and the decentralized bodies in charge of elaboration of strategic decisions and their practical application in the process of local regional development management. The opportunities for overcoming deficits presuppose an in-depth institutional analysis at all hierarchical levels and the development of a functional model for coordination and subordination of management decisions for regional development with broad participation of local stakeholders. These issues are beyond the scope of the present study, but they outline an area of scientific interest that is still poorly explored and which provides guidelines for future searches in the direction of improving the framework and environment for planning and implementation of public policies useful for the individual territories.

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Education-A Right, A Process, A Result

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Abstract

The research analyses education as a right, a process and a result. It is enshrined in the Constitution of the Republic of Bulgaria. It also considers opportunities the education provides for social inclusion of every individual, including children with special educational needs.

Keywords: right to education, socialization of children, children with special educational needs

Jel codes: I20, P00

1. Introduction

Education is a process through which the society transfers knowledge, skills and values accumulated by now from one generation to another. In its broadest sense it includes any action or experience that shapes one's mind, personality or physical skills of a person. Education has a fundamental impact on the abilities and potential of an individual and the society to achieve development and social and economic success. It is one of the key factors for the development and strengthening of capabilities of people. Education provides the necessary knowledge and information and also contributes to improving a sense of self-esteem and self-confidence and to realizing their potential.

Education itself is a human right, but it is also a necessary means of realizing other human rights. The knowledge gained through education is empowering and the learning process is a major driving mechanism through which economically and socially marginalized adults and children, as well as those with special educational needs, can overcome poverty and receive the means to participate equally and fully in life and governance of their communities. In general, education is also a significant factor in stimulating the development of human rights and democracy.

Education as a process that takes place both individually – at the level of each person, and globally – at the level of community and humanity, which never ceases to participate in the educational process, is a social and historical category. Helmut von Hentig emphasizes this and reminds us that education is an action, a process and a result. In his essay, "What is Education?", He asks, "What does one learn?" And answers, "Everything." Hentig asks several important questions: "What education do we want?", "What education should there be?" etc. These questions force us to acknowledge the complexity of education. Various forms of human actions and activities have appeared in the history of mankind, which are recognized as learning, knowledge or education. Life itself is potentially cognitive in nature and it introduces us to countless situations and new experience (Halima Sofradzija, 2021a).

2. Education as a right

The system of value orientations of modern society is determined by the concept of human rights. Every state has an obligation to respect and observe these rights. With the adoption of the Universal Declaration of Human Rights (1948), the European Convention for the Protection of Human Rights and Fundamental Freedoms (1950), the Declaration of the Rights of the Child (1959), the International Covenant on Civil and Political Rights (1966), the International Covenant on Economic, Social and Cultural Rights (1966) and other international acts, an individual becomes a subject of national and international law (The right to education as a source of educational relations, 2021b).

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The right to education is one of the human rights of the second generation. These rights are formed in the process of improving the economic situation and cultural status of the lower classes and are designed to "soften the conflict between rich and poor." The rights of the second generation are called positive and form status positivus, in contrast to the rights of the first generation, which form status negativus and are recognized as "negative" because they deny conditions "which completely exclude the possibility of a dignified human life". The rights of the first generation are absolute and presuppose the freedom of a person from everyone, including the state, interference in their personal life, interests and beliefs. The positive meaning of the rights of the second generation is that they do not aim to deny the lack of freedom, but to ensure a dignified existence and achieve freedom for self-determination, self-expression and realization of creative abilities. John Dewey emphasizes that "education is to social life what nutrition and reproduction are to physiological existence". Thus, education and self-improvement are the natural state of an individual, a condition for a fulfilling existence in society. Accordingly, the right to education based on the freedom of education is "as natural as the right to life".

The history of Bulgarian education is rooted in the distant past. Saints Cyril and Methodius are the founders of writing and literature, and their students continued their noble work. The cell schools are the first "public" form of education in our country. In 1835 Neofit Rilski opened the first secular school in Bulgaria in Gabrovo and this marked a new stage in Bulgarian education. Only a few years later, Atanas Ivanov opened a similar school in the town of Stara Zagora. The education process in these schools was conducted according to the Monitorial system, or Bell-Lancaster method, also known as mutual instruction. The method was based on stronger pupils helping the weaker ones. Accepted and criticized, good or bad, yet thanks to this method and the enthusiasm of teachers, the number of educated Bulgarians was growing.

In 1846 Naiden Gerov opened the first modern type school in Koprivshtitsa, and in 1850 – the second one, which is located in Plovdiv. It is believed that modern Bulgarian education was considered as fully developed only in 1881, when on the basis of the Higher Pedagogical Committee founded in 1888, Sofia University was established, which marked the beginning of higher education in Bulgaria. A few years later, the Bulgarian Academy of Sciences was opened.

According to international and Bulgarian standards, basic general education is compulsory, because without it the normal socialization of a person in modern society would be impossible. This right is enshrined in the Constitution of Bulgaria and is one of the basic constitutional rights of the citizens of Bulgaria. Article 23 of the Constitution states: "The state shall create conditions for the free development of science, education and the arts and support them. It shall take care of the preservation of the national historical and cultural heritage."

Article 53 of the Constitution goes: "(1) Everyone has the right to education (2) School Education is compulsory until 16 years of age. (3) The primary and secondary education in the state and municipal schools shall be free of charge. Under the conditions determined by law, education in public universities is free of charge. (4) Higher education institutions have academic autonomy. (5) Citizens and organizations may open schools under the conditions and in the manner prescribed by law. Education there must meet state requirements. (6) The state shall promote education by establishing and financing schools, supporting talented pupils and students, creating conditions for vocational training and retraining. It exercises control over all types and levels of schools."

However, the right to education will remain only a theoretical principle if freedom is not transformed into an effective social or cultural law. In modern conditions, the realization of the right to education depends on a number of social conditions, which predetermines the relativity of this right. Thus, in practice, the right to education can be realized with the help of the educational system designed to ensure the educational process. Within the existing educational system, a person chooses a form of education, an educational institution (organization), joins the educational process and as a result realizes his/her basic rights and freedoms. At the same time, the right to education is a source of educational relations by entering which the person can fully realize this right. Thus, the struggle to improve the economic situation and raise the cultural status of the poor formed the right to education. (Human rights education in the school system in Europe, Central Asia and North America: a collection of examples of good practice, 2021c).

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3. Education as a process

Education is a process that takes place both at the personal level of each human being and at the global level of all humanity, which has always been and continues to be in the educational process. Education is the development of potentials: intellectual, psychological, moral, physical, aesthetic, cognitive and active opportunities. In the process of acquiring knowledge and skills, socialization has its place, as well as the development of institutional education in schools. Pedagogy is considered a science of teaching that studies education as a phenomenon and concept. There is a whole range of disciplines that relate to pedagogy, from docimology to didactics (in Greek διδακτική $\tau \epsilon \chi v \eta$ teaching skills). Helmut von Hentig, who is also an educator, has made valuable contributions in the field of didactics, school reform and the humanization of the school as a whole, pointing out the contradictions between theory and practice. His discussion of the "feeling of happiness" as a measure of "true education" connects and recalls the idea of original happiness, eudemony (Greek Εὐδαιμονία). By pointing out the connection between education and the feeling of happiness he wanted to make one think about striving for education that is worth its purpose, meaning and existence. Therefore, education is a process that must provide results that are worth the effort, because happiness would accompany real education. School is a place where one lives; it should not be a poorly maintained place where everything comes down to listening and does not involve active participation and knowledge. The humane school must cultivate curiosity about the world and life. Hentig tried to describe an educated person or at least to present the ideal type of one. According to Hentig it is a person who left behind animal egocentrism, is interested in "what the world looks like in the eyes of others"; their sense of self-esteem is strong, they are not afraid to appreciate others or to appreciate themselves, they often speak the language of science without being overwhelmed by it (Hentig, 2008).

4. Education as a result in the field of inclusive education

The right to education is only one side of the coin. The question of the opportunities that education provides for the inclusion of every person in society is equally important as every society exists only if its members follow its recognised values and norms of behaviour. In the process of socialization, a person becomes a personality and thanks to this he/she acquires the ability to perform social functions. Some scholars understand socialization as a lifelong process and associate it with a change of residence and surrounding people, with marital status or with the beginning of old age. However, socialization is not limited to this. It presupposes the development, self-determination and self-realization. At the same time, such tasks are solved both spontaneously and purposefully, by the whole society, by institutions specifically created for the purpose and by the person himself (Education Law. Education Legislation, 2021d). This purposefully organized process of socialization management is a complex social and historical phenomenon with various points of view and aspects.

Education as a special field of social life is a process of transfer of knowledge and social experience that is turning into a business for people who work in the sphere of education and teaching. Education as a social way of inheriting culture, personal development and ability to socialize appear together with the beginning of a society and develops simultaneously with the development of labour, thinking and language.

Education as a social phenomenon is above all an objective social value. The moral, intellectual, scientific and technical, spiritual, cultural and economic potential of any society directly depends on the level of development of the educational sphere. However, education, being of social and historical nature, in turn is determined by the historical type of society that performs this social function. It reflects the tasks of social development, the level of economy and culture in society, the nature of its political and ideological attitudes, as teachers and students are subjects of public relations.

Education is one of the most complex institutions for socialization. Through education society ensures its development. An important part of this process is socialization through the education of children with special educational needs (Human rights education in the school system in Europe, Central Asia and North America: a collection of examples of good practice, 2021c). The very term "child with special educational needs" is relatively new. It appears in all countries of the world during the transition to an open civil society, when members of the

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society realize the need to reflect the changing attitude towards children with disabilities, as well as the new understanding of their rights in their language.

"The lexeme has replaced the previously used terms "abnormal child", "child with developmental disabilities", etc.), which since the end of the twentieth century are perceived by society as words with negative connotations." (Goncharova, 2019).

In the modern sense, a child with special educational needs is a child who needs special conditions for learning and upbringing for their best possible development, introduction to the culture of the community and the family. The topic is extremely delicate. In addition, strange as it may seem, it is delicate for both children with disabilities and conventionally healthy children.

Education as a social phenomenon is a relatively independent system, whose function is to teach and educate members of society who strive to master certain knowledge (mainly scientific), ideological and moral values, abilities, skills, norms of behaviour, the content of which is determined by the social, economic and political structure of this society and the level of its material and technical development.

The importance of education is beyond doubt. It is more important to give a person the right to choose and find their individual path that is suitable specifically for their child, parent, group of children, class, school, city and country. Above all, children with special educational needs and healthy children shall be able to find ways of mutual understanding! Only in this way can education fulfil its leading role and mission in the process of socialization and realization of each person and this gives additional value to education as a social phenomenon. The development of the society must rely on the mutual understanding, acceptance and, as a consequence, self-acceptance. In the last 20 years, in general, the infrastructure and legislation in Bulgaria for raising and educating children with special educational needs are generally ready. The participants turn out to be much more unprepared. Paradoxically, psychological readiness for acceptance of every member of society by every member of society. It can be noted that the extremely strange correctional between reform and ordinary schools, healthy and unhealthy children recede into the background. By providing tools of choice, we do not only contribute to the child`s development, but also create the opportunity for different ways of development for them. And there is nothing more important than the choice of alternatives for the development of a personality. In a certain sense, this is freedom.

5. Conclusion

Education is a social and historical category and as such it is an indispensable resource for all societies and deserves special attention. The claim that education is an action, a process and a result in itself points to the complexity of this issue. Since education is an enrichment of knowledge, skills, art and understanding, it can generally be argued that education is an attempt to promote the desired transformation to a better society. The concept of education is changing in many ways for various reasons. There is no doubt that the pandemic has created a new social reality that significantly changes human actions at all levels, including in the field of education. And despite the increasing spread of technology and the irreversible digitalisation of society, it has led to the transformation of education and the way knowledge is transferred. But they also have retained and even further upgraded its role and significance, as the most humane way to overcome differences and barriers between members of the community and society as a whole.

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Contemporary parallels of education and enlightenment in Bulgaria

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Abstract

This scientific report attempts to make a historical parallel of education and enlightenment in Bulgaria, looking for suitable examples with other nations and countries. The interpretations are related to the enlightenment pursuit in Bulgaria and its modern dimensions. The author makes logical connections between events and personalities, trying to make generalizations and conclusions in this special mission of cultural identity, education and science.

Keywords: education, enlightenment, modern dimensions, Bulgaria

Jel codes: I20, P00

1. Introduction

Enlightenment is part of the development of a society, yet when and how this happens makes the difference that forms its identity, strength and opportunity for growth. This hardly happens in an instant or results from a specific action, but is rather part of the path of growth. A road which is both different and the same for each nation. A path that we, the Bulgarians, have walked. With our own steps, quests and achievements.

2. Contemporary parallels of education and enlightenment in Bulgaria

Whether we are looking for and where we find our enlighteners today is a complex question that may have many and ambiguous answers. History gives us sufficient reason to believe that in far more difficult and tumultuous times, the educational pursuit had survived. Moreover, it is the force that has given impetus to a number of events. And if today we explain prosaically that "the world is big and salvation lurks around the corner", then the truth about salvation is somewhere hidden or covered with dust... Stefan Komandarev and Yuri Dachev are looking for an answer to this question in a different and interesting way in thier movie of the same name. They offer us not just an interesting story, but a version of the one who can wake you up - with an outstretched hand and a way to yourself. Alex's story - a young man who, with the help of his grandfather, rediscovers the world after a severe accident. A child of emigrants forced to flee to the West in the 1970s loses his parents in a severe accident, and he himself loses his memory. Then his grandfather comes to him - the only connection between past and present, between memory, family and homeland. These two strangers, yet sharing this archetypal memory of a common past, take the road home. A road that brings back to Alex not just his memory but also the desire for life. So, a seemingly not very education-related scenario focuses on memory as a symbol and meaning of what we have been, what we are and what we will be. Thus the "enlightener" acquires the human measure of a person who has led you out of darkness into the desire for you to be.

The desire for a meaningful and creative life is the important thing we have to look for and find, because otherwise we will get lost in the sense of meaninglessness. And if this is predominantly a problem of life and morality, then the enlightenment itself is important both for the individual and for the whole society. Sometimes these people go unnoticed because of the storms that strike us and because of the prosaic problems that accompany our lives, yet their feeling is so strong and important to all of us.

Thus, if we look back to the educational work of one of our most prominent scientists, Prof. Dr. Asen Zlatarov, and read the words written about him shortly after his death in 1936 by Goncho Belev, we will get an answer about that sacred mission and importance of one of the most significant Bulgarian educators at the beginning of the last century.

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If public life of Asen Zlatarov gets X-rayed, no point of dishonesty would be found. His personality, which stood out as a pole in our society, will for a long time be an example to those who will follow his path. Asen Zlatarov was a rare man who combined the spirit of the people of the Renaissance, the feeling of the populist writers with the progressiveness of the modern intellectual. In Asen Zlatarov's mind, the alarm signal of a clear conscience was always set and as sensitive as an antenna. He never backed down from the front line of the struggle for human justice.

The Bulgarian people is still to feel the great loss with the death of Asen Zlatarov. For a long time his place will remain empty. Because he was the only popularizer of science, and so clear that everyone could understand its achievements.

It seems to me that in certain aspects Asen Zlatarov is comparable to Alexander Blok. He has also foreseen the outlines of that great sun that millions of people have been longing for... This was published in The Hour newspaper on December 30th , 1936.

There is no way to confuse and change this work, which has left a deep mark on our development, and today we, the followers of these iconic personalities, must seek and find the desire that leads and encourages individuals like them to do worthy deeds. And if the list of educators is long enough, including names like Paisii Hilendarski, Neofit Of Rila, Sofroniy Vrachanski, Neofit Bozveli, Lyuben Karavelov, Hristo Botev, Vasil Levski, Georgi Rakovski, Ivan Vazov, Dobri Chintulov, Hadji Dimitar, Stefan Karadzha, Lyuben Karavelov and many, many others, then the mission they had and still have as educators, writers, defenders and freedom fighters, has contributed to defining our national identity, to forming our capacity and maturity as a nation.

And if the point of the action is to create an impetus for certain processes that will change the world and ourselves for the better, and if this has happened over time, then their enlightenment and educational work has not been meaningless and in vain. We are to follow the example and dedication to enlightenment. An example in this direction is a study carried out by Silva Vasileva, Genoveva Gencheva and Hristina Vezireva on the presence of Lyuben Karavelov's writings in the personal library of Acad. Mihail Arnaudov, presented at Arnaud Readings venue in Rousse (Vasileva, Gencheva, Vezireva, 2020). The study seeks and finds the place of the two awakeners and their current presence, as preserved in the funds of the Lyuben Karavelov Regional Library in Rousse.

The personal library of each artist is in itself a personality. It carries many references both to the one who created it - to their ideas, searches and aspirations, and to a kind of pantheon of images "born" as a result of their research and scientific developments. One such personified library is stored in the funds of the Rousse cultural institution and this is "Acad. Mihail Arnaudov" collection. Partially donated in 1973 on the occasion of the scientist's 95th birthday and supplemented in 2016 with a donation from his relatives, today the collection respects researchers with the variety of authors, problems and topics related to the rise of our national cultural and literary ideas. The rich treasury keeps many documents collected during the long-term scientific activity of the books were donated by the authors themselves, as evidenced by the preserved autographs and dedication words inside. This kind of archive reveals Arnaudov's scientific interests and has important research significance for Bulgarian history and culture.

Relying on what is stored in the library's collection itself, and in particular - in Acad.Mihail Arnaudov's personal library, it can be grasped how two of the colossi of Bulgarianness - Lyuben Karavelov and Mihail Arnaudov - complemented and developed each other; what place Karavelov's personality occupies in the scientific research of the Academician and how the scientist studied the work of the writer and the revolutionary. The significance of each one is part of our history, part of the awakening which raises the spirit not only of the individual, but of the nation as a whole.

In addition to the monumental work on Lyuben Karavelov, Mihail Arnaudov published his research on this Revival figure in various other publications. The book Deeds and Testaments of Notable Bulgarians, published in the National Council of the Patriotic Front in 1969, stored in the collection, contains the article "Lyuben Karavelov. Life Path and Ideological Development (1837 - 1879)", where in the paragraph in which the Academician compares Rakovski, Botev and Karavelov, an interesting manuscript correction is preserved, namely: "He (Lyuben

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Karavelov) has political ideas, scientific interests and literary assets that form a transition from the era of national incitement to the era of true revolution", where the word "incitement" is replaced by "awakening". The collection also keeps his article about the Revivalist, published in the Bulgarian Thought magazine from 1929, vol. 2.

Proof of the breadth and depth of Mihail Arnaudov's scientific interest in Karavelov's work are the research papers of other scientists preserved in his personal library. The oldest documents are two prints from Collection in Honor of Iv. D. Shishmanov from 1920. These are the articles" Lyuben Karavelov as a Folklorist" by Toma Atanasov Teoharov and "Lyuben Karavelov and Ukraine" by Dmitry Sheludko.

In Karavelov's biography by Ivan Klincharov, published in 1925 in the Court Printing House (Sofia), Arnaudov studied in great depth the places where the emotions and experiences of the poet after Levski's death were revealed. A more detailed quote by the scientist will follow: "Levski's death had a devastating effect on Karavelova's spirit, and from February 1873, when the Deacon hang on the gallows rope until the cessation of the Nezavisimost newspaper, a constant, if not chronic, sense of despair gripped the Bulgarian writer. This event could not have had another consequence for a person like Karavelov, who was born primarily to be an Academic and then, a wrestler". Special attention is paid to Chapter Nine "Literary Views of Lyuben Karavelov - Lyuben Karavelov as a Critic and Linguist."

Especially rich in notes is the study of Boyan Penev "Lyuben Karavelov. Life - Personality - Writings", published in 1936. This edition keeps many clarifying notes concerning Karavelov's work in comparison with other Bulgarian authors such as Botev, Chintulov, Vazov, P.R. Slaveykov and others. Analyzing the texts, the researcher came to the conclusion and noted on the title page that the book was written in 1919 and not in 1936. Proof of the vast knowledge of the scientist is evident from the notes, which point to the relation between the work of Boyan Penev and other authors who wrote about Karavelov.

Another possession of the library of Acad. Arnaudov is Tsvetan Minkov's title "Lyuben Karavelov. Life and Creativity", published in 1937, vol. 3 of the Literary Papers Library. The notes refer mainly Karavelov's poetic work and translation abilities and correspond to the already mentioned critical remarks of Arnaudov about the influence of Shevchenko and Heine on Karavelov. They are a proof of the scholar's in-depth study of the text.

Similar references to Karavelov being compared to other artists one can see in the book "Lyuben Karavelov: Worldview and Creativity" by the Russian scientist Lev Vorobyov, published in 1963 in Moscow. An Arnaudov's note preserved points to a comparison of Karavelov's Song for Rakovski with the poem Freedom by Nikolai Platonovich Ogarev, a close friend of Herzen's.

Information about Karavelov's political views Mihail Arnaudov also drew from Vasile Hristu's book Lyuben Karavelov about the Federation, published in 1948, paying special attention to the Program of the Bulgarian Revolutionary Committee.

The role and importance of Acad. Arnaudov as Lyuben Karavelov's researcher is evidenced by the dedicative annotations of his students and followers, preserved in the books donated by them to the scientist. It is with two of those dedicative annotations that we would like to complete our report on the presence of the Revivalist in the personal library of the Academician. On the title page of her research "Lyuben Karavelov. Literary Positions" Tsveta Undjieva wrote "To Prof. M. Arnaudov, with deepest respect. 14.VI.1968." The dedication of Ivan Popivanov in his book "Lyuben Karavelov" is filled with respect and gratitude; there we read: "To Acad. Mihail Arnaudov with great respect for his great scientific and creative work and for his research of Lyuben Karavelov's activity". Signature. 11.VIII.75."

Let me finish with an inspiring quote by Lyuben Karavelov: "History teaches us that only then a nation is lost when there are no more ideas to excite it..." We believe that Karavelov's messages will not allow us to get lost as a nation.

Usually we, the Bulgarians, have always put in the foreground the archetypal value of education by guiding and encouraging our children to get a better education. Even a bit misinterpreted nowadays, this deeply-rooted family tradition exists and is part of our existence. We all want our children to get a good education, but our displaced

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value system puts us in a far from advantageous position to push them to do so abroad. This, in one way or another, constitutes the worldview and value system of the young person and his society. Undoubtedly, the accumulated knowledge and experience are of unquestionable value, but they will be even more useful and important for the Bulgarian society - if they were applicable here, in Bulgaria. Thus, when we have fateful decisions to make, go through crises or revolutions, we turn to that peaceful part of our society, which is the bearer of innermost ideas, wisdom and strength - to draw energy and move forward.

Francois Voltaire says that "Great deeds are always accompanied by great obstacles," which best describes the age-old desire to move forward. And perhaps he is right that all this will happen in a difficult and painful way, which is not just a survival, but also a rise.

Do we need a special holiday to celebrate the enlightenment andday of education- it is certainly a time and place to notice, celebrate or make sense of what our ancestors or our contemporaries did in this great work to enlighten and move with their ideas, wisdom and strength of the world forward! In Bulgaria, November 1 is celebrated as the Day of the Nation's Awakeners. The Day of the Nation's Awakeners is a national holiday, praising the work of the Bulgarian educators, writers and revolutionaries - awakeners of the reviving national spirit, striving for education and literature. This holiday is celebrated annually with torchlight processions on November 1st and is an official holiday in the Republic of Bulgaria.

3. Conclusion

The spiritual enlightenment of the Bulgarian people gave impetus to the national liberation movement in the Bulgarian lands. Bulgaria, which had just rejected Ottoman rule, became aware of the feat of the Revival educators and revolutionaries, who spiritually guided the Bulgarians to commence their struggle for national liberation. Many towns and villages want to give the deserved gratitude to the national awakeners not only by naming streets, community centers and schools after them.

Deemed with respect and recognition, considered the heavenly patron-saint of the Bulgarian people and state, st. Ivan of Rila has remained in people's memory as a model of devotion, unmercenary and love of thy neighbor and fatherland. The people's love and respect for this saint remained alive during the centuries of Ottoman rule. Many other awakeners were also revered and canonized as saints by the Bulgarians' historical memory.

In 1922 Stoyan Omarchevski - Minister of Public Education in the government of Alexander Stamboliyski, on the initiative of a group of intellectuals (Stanimir Stanimirov, Alexander Radoslavov, Dimitar Lazov, Prof. Benyo Tsonev, Ivan Vazov, Prof. Lubomir Miletich, Dr. Mihail Arnaudov, Dr. Fil. Manolov, Hristo Tsankov - Derizhan, Prof. Ivan Georgov, Stilian Chilingirov, Adriana Budevska and Elena Snezhina) submitted a proposal to the Council of Ministers for the designation of November 1st as the Day of the Bulgarian National Awakeners. (When the Gregorian calendar was established as the state calendar in 1916, the Bulgarian Orthodox Church continued to use the Julian calendar until 1968. Accordingly, October 19th , the day on which St.Ivan Of Rila the Wonderworker is celebrated, became November 1st according to the new calendar.) July 28, 1922 The Ministry of National Education issued a district decree № 17743, according to which November 1st was designated as "a holiday of the Bulgarian awakeners, a day to pay tribute to the memory of the great Bulgarians, distant and future builders of modern Bulgaria." On October 31st, 1922, a decree of the Council of Ministers was issued declaring the holiday. On December 13th of the same year, the XIX National Assembly passed a law supplementing the Law on Holidays and Sunday Rest. On February 3rd, 1923, King Boris III signed the law on the introduction of the Day of the Nation's Awakeners. Three years after the signing of the Neuilly Treaty, the Bulgarian society felt an urgent need for spiritual stimuli and found them in the legacy of ideas of the wisest Bulgarians.

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The proclamation for the Day of the Nation's Awakeners:

"Let the Day of St.Ivan of Rila become the Day of the Nation's Awakeners, a holiday of the great Bulgarians, in order to awaken in the young people a common sense of existence and interest in the figures of our past."

In 1945, the celebration of the holiday was abolished by the communist regime. The ban was part of the systematically imposed propaganda and censorship, characteristic of the entire period of totalitarian rule in Bulgaria (Hristov, 2013). With this act, the communist government tried to downplay the importance of the awakeners and their contribution to the development of the culture and history of Bulgaria. Nevertheless, the tradition remained preserved in the memory of the Bulgarian people. In many villages in the country this day has been celebrated unofficially: for example in the area of the town of Pirdop, on this day, primary school students make lanterns adorned with letters of the Bulgarian alphabet, illuminated from the inside, they parade in front of the public, dressed solemnly, often - in traditional costumes.

After a long intremission, the Law on Amendments to the Labor Code, adopted by the XXXVI National Assembly on October 28th, 1992, resumed the tradition of the holiday. November 1st has been officially declared the Day of the Nation's Awakeners and a day off for all school children in the country. The idea for its restoration came from Professor Petar Konstantinov - Chairman of the National Association Mother Bulgaria. Since 2002, a ritual of raising the national flag in front of the main entrance of the Presidential Administration, followed by a solemn change of guard, has been introduced.

Since 1991, the Union of Scientists in Bulgaria statred celebrating the Day of the Nation's Awakeners as the Day of Bulgarian Science. By decision of the Union of Bulgarian Journalists, this day also became the Day of Bulgarian Journalism (Statute for the annual awards of UBJ (Union of Bulgarian Journalists), 2010).

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The shifting of agricultural land functions in South Sulawesi

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Abstract

The agricultural sector plays an essential role in the development of the economy in a nation. However, infrastructure enhancement and economic growth often sacrifice agricultural land. This study investigates the development of the rate of conversion of agricultural land and examines the driving factors influencing the shifting of agricultural land functions in South Sulawesi during 2015-2019. Using a regression data panel with Random Effect Model, the findings indicate that the population has a positive and significant influence on shifting agricultural land functions. The escalation of industrial companies has a negative and insignificant effect on agricultural land converted in South Sulawesi Province. Additionally, GRDP and road infrastructure have a negative and significant influence on the area of agricultural land converted. Lastly, farmers' exchange rates and land productivity have a positive and insignificant effect on shifting agricultural land functions in South Sulawesi of Indonesia.

Keywords: agricultural sector, GDRP, population, infrastructure development

Jel codes: O44, R11, R12

1. Introduction

Land is a natural resource that has a crucial function in developing a nation (Anugrah, 1998). Almost all development sectors require land, for example, industry, infrastructure, agriculture, and trade. In the agriculture sector, the land is highly needed both for agricultural development and for farmers. This condition is based on the fact that Indonesia is an agricultural country dependent on land (Pondaag, 2018). Land takes a great role in production activities as it produces the food that is needed by every human being (Putri, 2015). Therefore, development in the agricultural sector must be developed to achieve more efficient production output (Mustopa, 2011).

The role of the agricultural sector is important for economic development due to the majority of Indonesian concerns in this sector (Aziz et al., 2015). When governments pay attention to community welfare, the solution is to enhance the community members who live in the agricultural sector. The role of agriculture as a support for the national economy is seen not only in normal situations but also in times during crisis (Gadang, 2011).

However, the Indonesian government policy to increase foot loss in the industry, which was originally in the agricultural sector, leads to this sector experiencing a decline again (Trisnasari, 2015). Since then, the main driver of the Indonesian economy has been shifted to the industrial sector. In fact, the industrial sector has often experienced shocks due to the crisis that peaked in 1998. From 1990 to 2007, the agricultural sector in Indonesia faced difficult times. Many problems are confronted, especially the government's attention, which is increasingly paying less attention to the industrial sector to improve the economy. This condition has resulted in a decrease in state income from the agricultural sector (Mustopa, 2011).

In the South Sulawesi Province of Indonesia, the agricultural sector is one of the main drivers of the regional economy. With the largest rice production, South Sulawesi holds the title of the national food barn of eastern Indonesia (Ministry of Agriculture, 2020; Simreg Bappenas, 2015). This is because the carrying capacity of agricultural land is quite extensive and the type of fertile soil. There are several main rice-producing centers in South Sulawesi, including Bone, Wajo, Sidrap, Pinrang, Gowa, Luwu, Bulukumba, and Sinjai (RPJMD South Sulawesi Province 2018-2023). One form of the importance of the agricultural sector in Sulawesi in South Sulawesi, which works based on the field of business.

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Table 1. Population aged 15 and over who work by main occupation in the South Sulawesi Province during 2015-2019

Year	Agriculture	Industry	Others	Total
2015	1.454.451 (42%)	251.739 (7%)	1.779.302 (51%)	3.485.492
2016	1.468.852 (40%)	296.882 (8%)	1.928.978 (52%)	3.694.712
2017	1.391.639 (39%)	279.246 (8%)	1.927.778 (54%)	3.598.663
2018	1.426.501 (38%)	341.716 (9%)	2.006.707 (53%)	3.774.924
2019	1.377.408 (36%)	341.865 (9%)	2.110.823 (55%)	3.830.096

Source: Statistics Indonesia (BPS)

Table 1 informs that the agricultural sector has shown a downward trend in labor contribution in the last five years (2015-2019). In 2015, the agricultural sector accounted for 42% of the workforce in South Sulawesi, and in 2019 it was delined to 36%. Meanwhile, the industrial sector shows an increasing trend and in 2015 accounted for 7% of the workforce in South Sulawesi, and in 2019 it increased to 9%. This indicates that despite the agricultural sector having the largest contribution to employment, its development from year to year shows a decline. This is due to the labor movement to other sectors such as the industrial, trade, and service sectors. This indicates that the industrial sector and other sectors are preferred by workers to the agricultural sector because they may think that the industrial sector can provide better income than the agricultural sector. In addition, to contribute to the workforce, the agricultural sector plays a crucial role in local revenue generation. The contribution to the GRDP of South Sulawesi Province can be informed in Table 2.

Table 2. Gross regional domestic product at 2010 constant prices by business field in South Sulawesi Province

 2015-2019 (billion rupiah)

Year	Agriculture	Industry	Others	Construction
2015	54,099.10	35,547.21	34,915.41	29,967.28
2016	58,351.27	38,473.77	38,257.38	32,070.16
2017	61,597.20	40,407.19	42,245.01	34,873.99
2018	64,844.03	40,788.01	47,132.15	37,854.20
2019	66,658.84	44,832.07	51,442.42	41,232.63

Source: BPS South Sulawesi (2020)

Table 2 illustrates that the agricultural sector has been the leading sector in South Sulawesi Province in the recent five years, followed by manufacturing, trade, hotel, restaurant, and construction sectors. The amount of GRDP in South Sulawesi in the agricultural sector has remarkably escalated compared to other sectors. The increase in GRDP in the agricultural sector is due to the vast area of agricultural land in South Sulawesi and has a high soil fertility level.

However, the increasing economic growth in South Sulawesi requires various physical developments to enhance the need for land. As a consequence, many agricultural lands have been converted to non-agricultural functions. Land transfer is widely used for housing construction, industrial development, and various infrastructures in South Sulawesi. This conversion of agricultural land can be seen from the shrinking area of agricultural land in South Sulawesi. Figure 1 depicts an overview of the area of agricultural land each year in South Sulawesi Province from 2015 to 2019.





Figure 1. Area of Agricultural Land in South Sulawesi 2015-2019 (Ha)

Source: Ministry of Agriculture (2020)

In general, during 2015-2016, the area of agricultural land in South Sulawesi has soared by 19,419 Ha, but from 2016 to 2019, the area of agricultural land in South Sulawesi has decreased. From 2016 to 2017, the largest diminish in the agricultural land area reached 16,541 Ha, then from 2017 to 2019, the area of agricultural land shrank from 5,848 Ha to 4,154 Ha. The decline in the area of agricultural land means that the increasing conversion of agricultural land is caused by the demand for land for various developments. While the increase in productivity is strongly influenced by the area of land used. In this case, the factor of agricultural land has a pivotal influence. That is, when its presence decreases, it will affect the amount of food production that exists and have an impact on the welfare of the farming community where the increase of farmers has alleviated.

Studies related to the conversion of agricultural land have been attracted among scholars. For instance, Hidayat and Noor (2020) conducted a study on the effect of economic growth on land transfer in Samarinda and concluded that economic growth has a positive and significant effect on land conversion in Samarinda. Additionally, Achmad Zaini et al. (2020) showed that the most dominant factor influencing farmers' decision to transfer land function (from pepper garden to coal mining area) is a factor in technical aspects, followed by socio-cultural and economic aspects. A recent study by Wunarlan and Syaf (2019) regarding the analysis of the effect of population growth and land productivity on urban land transfer (case study of Marisa city) remarked that population growth factors and land productivity have an influence on land conversion in Marisa city and Pohuwato regency.

Furthermore, a prior study by Hastuty (2018) concluded that the factors that encourage farmers to change land functions include, infrastructure factors (adequacy of irrigation), cultivation factors (pest and disease attacks), production factors (production output) and economic factors (price stability). Fajriany (2017) conducted a study on the analysis of factors influencing the transfer of agricultural land functions in Pangkep regency, showing that the drivers affecting the conversion of agricultural land in Pangkep are population, number of industries, and GRDP. Similarly, Setyoko and Santosa (2014) revealed that economic, social, land condition factors, and government regulations together have a positive and significant influence on farmers' decisions to convert agricultural land into non-agricultural land. For this reason, the purpose of this study aims to determine the development of the rate of land conversion and examine the driving factors of the agricultural land use in South Sulawesi during 2015-2019.

2. Method

This study adopted a quantitative approach and involved secondary data from Statistics Indonesia (BPS) and the Ministry of Agriculture. The data used in this study is panel data which is a combination of time series data with a time span of 2015-2019, and cross-section data covering 24 districts/cities in South Sulawesi Province, which produces 120 observations. The data collection technique engaged in this research is documentation. Furthermore, the data were analyzed using a panel data regression model with the independent variables being population, number of industrial companies, gross regional domestic income (GRDP), farmers' exchange rates, land

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productivity, and road length, with the dependent variable being agricultural land area. The model proposed in this study is provided as follows.

 $ln \ LLPit = \beta_0 + \beta_1 ln_J P_{it} + \beta_2 ln_J P I_{it} + \beta_3 P D R B_{it} + \beta_4 N T P_{it} + \beta_5 P L_{it} + \beta_6 P J_{it} + e_{it}$

Information:

LLP

	0
JP	= Population (people)
JPI	= Number of Industrial Companies (unit)
PDRB	= Gross Domestic Regional Product (Million Rupiah)
NTP	= Farmer's Exchange Rate (%)
PL	= Land Productivity (kw/ha)
PJ	= Road Length (km)
ln	= Natural Logaritm
i	= Data cross section districts/cities in South Sulawesi
t	= Data time series year 2015-2019
e	= Error term
β0	= Constant
β1, β2,	β 3, β 4, β 5, β 6 = Independent variable regression coefficient

= Agricultural Land Area (ha)

Panel Data Estimation Model

The panel data method has three approaches:

1. Common Effect Model/CEM (Pooled Least Square/PLS)

This PLS approach uses the usual OLS method, which is the simplest method. In the estimation, it is assumed that each individual unit has the same intercept and slope (there is no difference in the time slice dimension). In other words, the resulting panel data regression will apply to each individual (Juanda and Junaidi, 2012).

2. Fixed Effect Model (FEM)

This model approach uses a dummy variable known as the fixed effect model or the Least Square Dummy Variable (LDSV). In this method, the estimation can be made without weighting (no weighted) or Least Square Dummy Variable (LDSV) and with weighting (cross-section weight) or General Least Square (GLS). The purpose of weighting is to reduce heterogeneity between cross-section units (Gujarati, 2004).

3. Random Effect Model (REM)

This model will estimate panel data where the disturbance variables may be interrelated over time and between individuals. In the random effect model, the difference in intercepts is accommodated by the error terms of each cross-section. This model is also called the Error Component Model (ECM) or the Generalized Least Square (GLS) technique.

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Panel Data Regression Model Selection Test

1. Chow Test

The chow test is an examination of the difference between two regression models to determine the best model between FEM or CEM/PLS.

2. Hausman Test

The Hausman test is a statistical calculation used to determine whether the fixed effect model is better than the random effect model.

3. Lagrange Multiplier Test

The Lagrange Multiplier test is an evaluation to determine whether the model used is common effect or random effect.

The Classical Assumption

The classical assumption test includes the normality test to estimate whether the data is normally distributed or not (Sugiyono, 2010: 55). Furthermore, the multicollinearity test aims to determine whether in the regression model there is a correlation between independent variables (independent), while the heteroscedasticity test aims to examine whether in the regression model there is an inequality of variance from the residuals of one observation to another observation (Ghozali, 2005:105). Lastly, the autocorrelation test is intended to see whether there is a correlation between a period t and the previous period (t - 1).

Coefficient of determination (R^2)

The coefficient of determination is a quantity that shows the amount of variation in the dependent variable that can be explained by the independent variable. In other words, the coefficient of determination is used to measure how far the independent variables explain the dependent variable.

Hypothesis Testing

1. Simultaneous Test (F-Test)

F-test is commonly adopted to determine the effect of the independent variable simultaneously significantly on the dependent variable. When the significant value is less than 0.05 or the independent variables together have an influence on the dependent variable, it means that changes that occur in the dependent variable can be explained by changes in the independent variable. In this study, the significance level used is 0.5%.

2. Partial Test (t-test)

T-test aims to determine the partial effect of the independent variable on the dependent variable and that the other independent variables were considered constant. The significance can be estimated by looking at the significant value. When the significant value is lower than 0.05, meaning that the independent variable individually affects the dependent variable. Otherwise, when the significant value is higher than 0.05, it can be concluded that the independent variable partially does not affect the dependent variable.

3. Results

3.1. Farmland Description

The function of land as a place to live and a source of livelihood for the community. For farmers, the land is a source of food production and survival. Figure 2 illustrates an overview of the area of agricultural land in districts/cities in South Sulawesi for five years during 2015-2019. As provided in Figure 2, the area with the largest agricultural land area during that period was Bone Regency with an agricultural land area of 1,039,049 Ha, while

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the area with the smallest agricultural land area in the 2015-2019 period was Parepare with an agricultural land area of 12,381 Ha. The fundamental reason is that the area of Parepare has the smallest area compared to other areas in South Sulawesi Province.





Source: BPS South Sulawesi

3.2. Demographic Population

The population is the number of people who live and settle in an area or area that is recorded by the local government. Figure 3 is the population of districts/cities in South Sulawesi for five years from 2015 to 2019. From the figure, it can be seen that during the last five years (2015-2019), Makassar has the largest portion with a population of 7,442,867 people, and the area with the least population is Selayar Islands with a number of 664,687 inhabitants.





Source: BPS South Sulawesi

3.3. Industrial Company Description

As the number of industries increases, the area of agricultural land decreases as a result of the conversion of agricultural land to non-agricultural functions. The number of district/city industrial companies in South Sulawesi for five years from 2015 to 2019 is informed in Figure 4. As illustrated in the figure, the area with the highest number of industrial companies in that period was Makassar, with 544 industrial companies. The number of industrial companies in Makassar is due to the Makassar Industrial Estate (KIMA), the leading industrial estate management in eastern Indonesia. KIMA can be reached in approximately 20 minutes from Soekarno Hatta seaport

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via the freeway (Toll) and about 20 minutes from Hasanuddin Airport that making KIMA very strategic as a center for the development of various types of industries in Eastern Indonesia. Meanwhile, the area with the least number of industrial companies was the Enrekang Regency, with five units of industrial companies.





Source: BPS South Sulawesi

3.4. Gross Domestic Regional Product (GDRP)

Gross Regional Domestic Product (GDRP) is one of the essential indicators that determine the economic condition of a region in a certain period, either based on current prices or on the basis of constant prices. GRDP in South Sulawesi during 2015–2019 is presented in Figure 5. In general, the highest GRDP is Makassar, with a GRDP value of Rp. 523,646 billion Rupiah, and the area that has the lowest GRDP value is the Selayar Islands district with a GRDP value of Rp. 15,904 billion Rupiah.



Figure 5. Gross Regional Domestic Product at Constant Prices 2010 by Business Field in District/City of South Sulawesi Province, 2015–2019 (Million Rupiah)

Source: BPS South Sulawesi

3.5. Description of Farmer's Exchange Rate

Farmer's Exchange Rate (NTP) is a comparison between the price index received by farmers (It) and the price index paid by farmers (Ib) expressed as a percentage. NTP is also an indicator to see the level of ability/purchasing power of farmers in rural areas. In detail, the farmer's exchange rate in South Sulawesi Province for five years from 2015 to 2019 can be seen in Figure 6. Overall, the NTP index of South Sulawesi Province tends to increase and decrease. In 2015 and 2016, the NTP index was 104.73 percent. However, in 2017 NTP decreased by 3.88 or

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100.85 percent. In the following year, 2018 to 2019, the NTP index began to increase. In 2018 the NTP index rose by 1.44 or 102.29 percent, and in 2019 it rose by 0.76 or 103.05 percent.



Figure 6. Farmer's Exchange Rate of South Sulawesi Province, 2015–2019 (Percent)

Source: BPS South Sulawesi

3.6. Description of Land Productivity

Productivity in agriculture (food crops) is a value that shows the average production yield per unit area of land in the period of one reporting year. Rice and corn productivity in South Sulawesi Province for five years from 2015 to 2019 is informed in Figure 7. From the figure, it can be seen that the area that has the highest average productivity of rice and maize is the East Luwu district of 145.77 Kw/Ha. Meanwhile, the area that has the lowest average productivity of rice and corn is located in North Toraja Regency at 86.62 Kw/Ha.





Source: BPS South Sulawesi

3.7. Description of Road Infrastructure

Roads are an important infrastructure that can encourage the distribution of goods and factors of production between regions and increase population mobility. In agricultural and economic development, a road network is indispensable for the smooth flow of production and sales of produce. Figure 8 describes the length of roads according to road conditions in districts/cities of South Sulawesi province. Overall, in the 2015-2019 period, the area that had the highest increase in road length was Gowa Regency, with a road length of 14,231.17 km, and the area that had the lowest decrease in road length was Parepare with a road length of 1,579.31 km.

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Figure 8. Road Length According to Road Condition in District/City of South Sulawesi Province (km), 2015-2019

Source: BPS South Sulawesi

3.8. Panel Data Regression Estimation

As mentioned previously, the direction and magnitude of the influence of population (JP), number of industrial companies (JPI), gross regional domestic product (GRDP), farmers' exchange rate (NTP), land productivity (PL), and road length (PJ) on the agricultural land area (LLP) in South Sulawesi Province which was estimated by panel data regression analysis. The following is the estimation result of panel data regression with pooled least square approach, fixed-effect model, and random effect model.

Table 3. Results of the Regression of Factors Affecting the Transfer of Agricultural Land Functions in SouthSulawesi Province during 2015-2019

Variable	Regression Coefficient			
	CEM	FEM	REM	
С	-19.253	13.395	-7.351	
Ln_population	2.478***	-0.161	1.457***	
Ln_number of	-0.248***	-0.021	-0.038	
industrial				
companies				
Gross Regional	-0.000***	-0.000***	-0.000***	
Domestic Product				
Farmer's Exchange	-0.002	-0.002	0.002	
Rate				
Productivity of	0.000	0.000	0.000	
Land				
Length of Road	-0.000	-0.000**	-0.000***	
\mathbb{R}^2	0.678	0.283	0.620	

Note: Significant at * p<0.05; ** p<0.01; *** p<0.001

Source: Data Processed

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From the estimation of the CEM model in Table 3, it can be seen that the variables Ln_Amount of Population, Ln_ Industrial Companies, and GRDP have a significant effect on agricultural land area. Meanwhile, R-squared shows the number 0.678, meaning that by using this PLS model, the independent variable can explain 67.8 percent of the dependent variable, while other independent variables outside the model explain the remaining 32.2 percent. Then, it can be seen that the statistically significant F-value is indicated by the value of Prob > F (< 0.05). This indicates that together with the independent variables significantly affects the dependent variable.

As illustrated in Table 3, it is known that the GRDP and road length variables have a significant effect on the area of agricultural land. Meanwhile, the R-squared within shows the number 0.283, meaning that by using this FEM model, the independent variable can explain 28.3 percent of the dependent variable, while other independent variables outside the model explain the remaining 71.7 percent. The F-statistic shows a significant value, which means that the independent variables significantly affect the dependent variable.

The REM model indicates that the variables Ln_Amount of population, GRDP, and road length significantly affect the agricultural land area. Overall, R-squared shows the number 0.620, meaning that the independent variable can explain 62 percent of the dependent variable, whilst the remaining 38 percent is explained by other independent variables outside the model. In general, the model can be confirmed as good by considering the Wald chi-square with a chi-square probability of 0.0000 < 0.05, which means that simultaneously the independent variables have a significant effect on the dependent variable.

3.9. Panel Data Regression Model Selection

The selection of the panel data regression model is the stage of analysis used to determine which model is the most appropriate and best between common effects, fixed effects, and random effects. In this study, there are three tests to choose the panel data estimation model, namely the Chow test or F-test, Hausman test, and Lagrange multiplier test.

1. Chow Test/ F-test

The chow test aims to determine which model is better to use between CEM and FEM. The following are the results of the F-test.

F 33 30-3 -444-8. F(88, 7	B) = 587.77	Faak 6 F - 8.8888
---------------------------	-------------	-------------------

Figure 9. Chow Test Results

Source: Data Processed

From the results of the chow test, it can be seen that the probability value of 0.000 means that the F-test gives significant results. Because the probability is smaller than the value of (0.05), then H0: CEM is rejected, and H1: FEM is accepted. The conclusion that can be drawn is to use the fixed-effect model.

2. Hausman Test

Hausman test is adopted to find out which model is better between fixed effects and random effects (see Figure 10).

chi2(3) = (b-B) '[(V_b-V_B)^(-1)](b-B) = 4.77 Prob>chi2 = 0.1897 (V_b-V_B is not positive definite)

Figure 10. Hausman Test Results

Source: Data Processed

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From the results of the Hausman test in Figure 10, it can be known that the results have Prob > chi2 of 0.1897, which is greater than the value of (0.05), meaning that H0: REM is accepted and H1: FEM is rejected. Therefore, the conclusion that can be drawn is to involve a random effect model.

3. Lagrange Multiplier Test

The Lagrange Multiplier test is intended to find out which model is better between random effects and common effects. Figure 11 provides the results of the Lagrange Multiplier test.

```
. xttest0
Breusch and Pagan Lagrangian multiplier test for random effects
        ln_LLP[Kode,t] = Xb + u[Kode] + e[Kode,t]
        Estimated results:
                                  Var
                                          sd = sqrt(Var)
                  ln_LLP
                              1.067391
                                            1.033146
                              .0122678
                                              .1107602
                        \Theta
                              .4682419
                                              ,684282
                        u
        Test:
                Var(u) = 0
                              chibar2(01) -
                           Prob > chibar2
```

Figure 11. Lagrange Multiplier Test Results

Source: Data Processed

The Lagrange multiplier shows that the model has Prob > chibar2 of 0.0000, smaller than the value of (0.05), meaning that H0: CEM is rejected and H1: REM is accepted. Therefore, the conclusion that can be drawn is to use a random effect model.

3.10. Classic assumption test

1. Normality test

Table 4 provides information about the results of the residual normality test. From the test, it can be seen that the p-value of Combined K-S is 0.541. The assumption of normality will be fulfilled when the p-value of Combined K-S is greater than the value of (0.05). Since the p-value of Combined K-S is higher than alpha, the residual data is normally distributed.

Table 4. Residual Normality Test Results



Source: Data Processed

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2. Multicollinearity Test

To detect the presence of multicollinearity in the regression model, it can be seen based on the correlation matrix between the independent variables shown in Table 5. From the table, it can be known that there is no multicollinearity between independent variables because the correlation coefficient between independent variables is less than 0.8 or more so that the obtained regression model is free from multicollinearity.

Table 5. Correlation Matrix Between Independent Variables

	ln_LLP	ln_JP	ln_JPI	PDRB	NTP	PL	ΡJ
ln LLP	1,0000						
ln_JP	0.2015	1.0000					
ln JPI	-0.1678	0.6084	1.0000				
PDRB	-0.3747	0.7359	0.5804	1.0000			
NTP	0.0577	0.0435	-0.0362	-0.0099	1.0000		
PL	0.0058	-0.0708	-0.0607	-0.0256	-0.1657	1,0000	
PJ	0.4227	0.4747	-0.1256	0.0845	0.0744	-0.0099	1.0000

Source: Data Processed

3. Heteroscedasticity Test

The heteroscedasticity test aims to test whether in the regression model there is an inequality of variance and residuals from one observation to another. In this study, the best model is the Random Effect model. According to Gujarati (2004), the Random Effect (RE) model uses Generalized Least Squares (GLS) estimation, where the error term in the Random Effect model is homoscedastic, which means the model is free from heteroscedasticity problems (See Figure 12).

```
. xtgls ln_LLP ln_JP ln_JPI PDRB NTP PL PJ
Cross-sectional time-series FGLS regression
Coefficients: generalized least squares
Panels: homoskedastic
Correlation: no autocorrelation
```

Figure 12. Heteroscedasticity Test Results

Source: Data Processed

4. Autocorrelation Test

Autocorrelation is a condition where there is an error relationship between time in the data used. In this study, the best model is the Random Effect model. According to Gujarati (2004), the Random Effect (RE) model uses Generalized Least Squares (GLS) estimation, where the individual error component is not correlated with other individuals, and there is no autocorrelation across individuals between cross-section and time series, which means the model is free of the autocorrelation problem (see Figure 15).

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```
. xtgls ln_LLP ln_JP ln_JPI PDRB NTP PL PJ
Cross-sectional time-series FGLS regression
Coefficients: generalized least squares
Panels: homoskedastic
Correlation: no autocorrelation
```

Figure 13. Autocorrelation Test

Source: Data Processed

3.11. Coefficient of Determination (R^2)

The coefficient of determination (\mathbb{R}^2) test measures how much the model's ability to explain the variation of the dependent variable is. From the results of testing using a random effect model of the influence of variables on population, a number of industries, GRDP, farmer's exchange rate, land productivity, and road length on the agricultural land area in South Sulawesi Province for five years (2015-2019) obtained \mathbb{R}^2 of 0.620. This means that the independent variables in the model can explain the area of agricultural land by 62 percent, while other variables outside the model explain the remaining 38 percent.

3.12. Hypothesis Testing

The F-test shows whether all the independent variables included in the model have a joint or simultaneous effect on the dependent variable. Based on the test results using the random effect model, it can be seen in prob > chi2 0.0000 < = 0.05, which means that together the variables of population, number of industries, GRDP, farmer's exchange rate, land productivity, and road length have a significant effect on the variable area of agricultural land in South Sulawesi Province for five years during 2015-2019.

The t-test was conducted to see how far the influence of one independent variable individually explains the variation of the dependent variable. The independent variable is said to have a significant effect on the dependent variable if the p-value or probability is $\{p>|z|\} <$ from the alpha value (α), which is 0.05. The results of testing the hypothesis of the independent variable partially on the dependent variable can be analyzed as follows:

- 1. The population variable (ln_JP) has a p-value or probability $\{p>|z|\} = 0.000 < 0.05$. This means that the variable number of inhabitants has a significant influence on the variable area of agricultural land. The coefficient value for the population variable is 1,456 and has a positive relationship which implicates that the population has a positive influence on the area of agricultural land in South Sulawesi from 2015 to 2019.
- 2. The population variable (ln_JP) has a p-value or probability $\{p>|z|\} = 0.000 < 0.05$. This means that the variable number of inhabitants has a significant influence on the variable area of agricultural land. The coefficient value for the population variable is 1,456 and has a positive relationship which indicates that the population has a positive influence on the area of agricultural land in South Sulawesi during 2015-2019.
- 3. The Gross Regional Domestic Product (GDP) variable has a p-value or probability $\{p>|z|\} = 0.000 < 0.05$. This indicates that the GRDP variable has a significant effect on the variable area of agricultural land. The coefficient value for the GRDP variable is -0.0000335 and has a negative relationship which means that GRDP has a negative influence on the area of agricultural land in South Sulawesi from 2015 to 2019.
- 4. Farmer's exchange rate variable (NTP) has a p-value or probability $\{p>|z|\} = 0.803 > 0.05$, implying that the farmer's exchange rate variable has no significant effect on the variable area of agricultural land. The coefficient value for the farmer's exchange rate variable is 0.0019527 and has a positive relationship

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which means that the farmer's exchange rate has a positive influence on the area of agricultural land in South Sulawesi from 2015 to 2019.

- 5. Variable land productivity (PL) has a p-value or probability $\{p>|z|\} = 0.474 > 0.05$. It can be informed that the variable of land productivity has no significant effect on the variable area of agricultural land. The coefficient value for the land productivity variable is 0.0000869 and has a positive relationship which means that land productivity has a positive influence on the area of agricultural land in South Sulawesi from 2015 to 2019.
- 6. The road infrastructure variable (PJ) has a p-value or probability $\{p>|z|\} = 0.001 < 0.05$, indicating that the GRDP variable has a significant effect on the variable area of agricultural land. The coefficient value for the road infrastructure variable is -0.0001808 and has a negative relationship which means that Road Infrastructure has a negative influence on the area of agricultural land in South Sulawesi during 2015-2019.

4. Discussion

4.1. Development of Agricultural Land Transfer Rate in South Sulawesi

Analysis of the growth rate of the agricultural land area can be provided partially. The partial analysis aims to determine the growth rate of agricultural land area from year to year to know the rate of conversion of agricultural land from year to year in South Sulawesi Province. Table 5 informs maps that describe the area of agricultural land and the level of development of the area of agricultural land partially from year to year.

Year	Land Area (ha)	Conversion of	Growth Rate of
		Agricultural Land (ha)	Agricultural Land (%)
2015	1,344,587	4,267	0.31
2016	1,364,006	19,419	1.44
2017	1,347,465	-16,541	-1.21
2018	1,341,617	-5,848	-0.43
2019	1,337,463	-4,154	-0.30
Total		-7,124	-0.19
Average		-1,425	-0.04

Table 5. Change and Growth of Agricultural Land Area from 2015 to 2019

Source: Ministry of Agriculture (2020)

South Sulawesi Province has an agricultural land area of 1,337,463 ha consisting of 654,819 ha of paddy fields, 496,641 Gardens, 89,895 fields, 96,108 lands that are temporarily not cultivated. The area of agricultural land in South Sulawesi Province in 2015 was 1,344,587 ha. In 2019, the area of agricultural land in this area was only 1,337,463 ha or decreased by 7,124 ha. Table 5 informs the area of agricultural land in South Sulawesi for five years (2015–2019) and shows a decrease in land from year to year. This indicates that there is a condition where the conversion of agricultural land occurs during that period. Table 5 also illustrates that the average growth rate of agricultural land in South Sulawesi for the last five years (2015–2019) is –0.04 percent per year, meaning that the average amount of land is reduced by 0.04 percent every year. The highest rate of conversion of agricultural land was in 2017 with a value of 1.21 percent of the rate of land conversion and the lowest rate of conversion of agricultural land in 2014 with a value of 0.30 percent. The development of agricultural land that is converted from year to year shows an up and downtrend. This is due to the development in several districts/cities in South Sulawesi Province, both settlements and other supporting developments for economic activities.

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4.2. Factors Affecting Agricultural Land Conversion in South Sulawesi

Based on the results of the panel data processing research with the Random Effect model, analysis and discussion can be made regarding the effect of the independent variables, namely population (ln_JP), the number of industrial companies (ln_JPI), gross regional domestic income (GRDP), land productivity (PL), the farmer exchange rate (NTP), road infrastructure/road length (PJ) to agricultural land conversion (LLP) with the following interpretation.

4.3. The Influence of Population on the Transfer of Agricultural Land Functions in South Sulawesi

From the hypothesis estimation, it indicates that there was a positive and significant influence between the population on the area of agricultural land in South Sulawesi Province from 2015 to 2019, which the probability value of 0.000 < 0.05 and the coefficient value of 1.456. This implies that for every one person increase in population, the area of agricultural land converted will increase by 1,456 ha.

The increase in population causes the need for land to increase. The land area is fixed while the need for land is increasing, causing the conversion of land functions, especially agricultural land. The escalate in the rate of population growth shows an increase in the number of residents every year in South Sulawesi. This is related to the increasing need for land for the provision of housing, facilities, and infrastructure. The expanding demand for land will lead to the demand for agricultural land, causing a reduction in the area of agricultural land.

This is in line with a prior study by Tulenan (2014), which mentioned that the decline in agricultural land area is due to an increase in population. Due to the increase in population, most of the people, according to tradition, bequeath their agricultural land continuously. As a consequence, a rapid growth in population will affect the reduction in agricultural land area. Likewise, the research of Kurowska et al. (2020) which concludes that an increase in population leads to the inevitable urbanization of rural areas of Poland, which contributes to the loss of agricultural land converted to other uses. The finding corroborates preliminary research by Azadi et al. (2010), which revealed that urbanization is significantly considered the main cause of the conversion of agricultural land, especially in developing countries that have fast urbanization growth rates.

4.4. The Influence of Number of Industrial Companies on the Transfer of Agricultural Land Functions in South Sulawesi

The statistical calculation shows a negative and insignificant effect between the number of industrial companies on the area of agricultural land in South Sulawesi Province from 2015 to 2019, which is provided by the probability value 0.156>0.05 and the coefficient value of - 0.0380. This indicates that for every one-unit increase in the number of industrial companies, the area of converted agricultural land will diminish by 0.0380 ha.

In South Sulawesi Province, the increase occurred not in large industries but solely in home industries, small and medium industries that did not require large land areas. The results also indicate that a small number of industries in South Sulawesi Province whose construction sites are built on agricultural land areas such as rice fields. Then, most of the large industrial developments in South Sulawesi Province use non-agricultural or non-rice fields. Where non-agricultural land or non-rice fields have the advantage of adequate access and better support the smoothness of industrial processes.

This is in agreement with a preliminary study by Kumaat (2013); Pondaag et al. (2018), which mentioned that the number of industries does not affect the decrease in the area of agricultural land. The fundamental rationale is that the covered industries include cottage industries that may not require large areas of land for cultivation. Likewise, Suriyanto (2014) remarked that there is an insignificant value between the influence of the number of industries on the conversion of agricultural land. This is because most of the industrial developments are located in non-rice fields.

However, the results contrast with research by Fazal (2000), which showed that in industrial areas, seen from small industrial units, it affects the conversion of agricultural land. This result is similar to Ghataka et al. (2013) research, which indicated that industry affects the conversion of agricultural land to non-agricultural land. Where rapidly developing industrial countries such as China and India are experiencing conversion of agricultural land into land designated for industrial projects.

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4.5. The Influence of Gross Regional Domestic Income (GRDP) on the Transfer of Agricultural Land Functions in South Sulawesi

The next estimation indicates a negative and significant influence between GRDP on the area of agricultural land in South Sulawesi Province during 2015 -2019 with the probability value of 0.000 <0.05 and the coefficient value of -0.0000335. This means that for every one million rupiah enhanced in GRDP, the converted agricultural land area will decline by 0.0000335 ha.

This condition reflects that the conversion of agricultural land to non-agriculture impacts an increase in Gross Regional Domestic Income (GRDP). The escalate in Gross Regional Domestic Product (GDRP) has a positive impact on the welfare of the community, but it has a negative influence due to it triggers the conversion of agricultural land, especially on rice fields to non-rice fields.

Community welfare can affect people's consumption patterns, where public consumption presents many choices in consuming goods or services. However, the reality on the ground is that people are faced with the problem of limited availability of supply on demand for goods and services. To meet the community's needs with limited supplies, public facilities were built, the land expansion for shopping centers, settlements, places of business such as restaurants, and other infrastructure. The expansion of the land tends to use agricultural land.

The results of this study are in line with research conducted by Haryanto (2017), which showed a negative and significant relationship between GRDP and agricultural land area. According to the research, an increase in the GDP of an area will promote the quality of the area for the better. Judging from the infrastructure development in the area, which is also growing. This will later require agricultural land to modernize the area to be of higher quality from an economic and regional perspective.

Indeed, this research supports Pujianti (2020), which remarked that the GRDP of the agricultural Sector had a negative and significant effect on the area of rice fields. Although the contribution of the agricultural sector is still dominant to GRDP, currently, the focus of economic development is on the non-agricultural sector, such as investment in the industrial sector, infrastructure, hotels, restaurants, and other buildings, resulting in an increase in the need for land for development in various sectors.

This finding is also similar to Deng et al. (2010), which suggested that there is a robust relationship between economic growth and land-use change. Urban land becomes developed or expanded when economic growth increases, as seen from the value of GDP. The development of urban land uses agricultural land. However, the results are opposite of Zhang and Wang (2014), which noted that GRDP does not significantly affect agricultural land conversion in China. When economic growth in China reaches a certain level, the level of public attention to the protection of land resources will be higher, so that the conversion rate of agricultural land will decrease.

4.6. The Effect of Land Productivity on the Transfer of Agricultural Land Functions in South Sulawesi

The data analysis found that there was a positive and insignificant effect between land productivity on the agricultural land area in South Sulawesi Province, which was shown by the probability value of 0.474>0.05 and the coefficient value 0.0019527. Productivity is one measure of the success of farming, especially when the productivity is close to the actual yield potential. Farming productivity is also one of the considerations for farmers to convert their agricultural land and increase productivity through technological innovations to control the conversion of agricultural land.

The results indicate that the variable of land productivity had an insignificant effect on the area of land conversion in South Sulawesi Province. Thus, it can be concluded that no matter how high the productivity of land obtained by farmers in South Sulawesi Province during the period, it has no significant individual effect on the conversion of agricultural land. The rationale behind this finding is that the land use in South Sulawesi is dominated by agriculture, both for seasonal crops and annual crops. Optimizing the use of land resources is also an alternative in increasing land productivity (Syafruddin et al., 2004). The use of technology in the production process, from land preparation, plant maintenance to harvest and post-harvest, plays a major role in increasing land productivity, capital, or labor (Hu et al., 2019; Valle et al., 2017).
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The results are in contract with Wunarlan (2019), which explained that land productivity influences the conversion of agricultural land in the Marisa City area. This is due to the low productivity of agricultural land resulting in changes in the conversion of agricultural land to non-agricultural land to be very fast. Indeed, the finding is also different from Putra and Ismail (2017), which showed that the factors that influence the decision of farmers to change land functions are influenced by the age and productivity of the land. Farmers change the function of their agricultural land because of the age linkage of elderly farmers. More than 53 percent of respondent farmers are more than 51 years old. Thus, although the land is still productive, the desire to convert the land continues to increase. Moreover, there are very few children of the farmers who want to continue working as farmers.

Likewise, Azadi et al. (2010) remarked that land productivity and land conversion have a direct correlation which implies that an increase in land productivity is associated with an increase in agricultural land conversion. This condition occurs because land with high productivity is generally fertile and is often close to water sources. The existence of such accessibility plays an important role in determining the location of housing and settlement development. However, the result is opposite of Lanz et al. (2017), which concluded that declining land productivity affects the conversion of agricultural land. Land conversion is most likely to occur in developing countries due to technological uncertainty or lack of innovation in farming tools in developing countries.

4.7. The Effect of Farmer's Exchange Rate on the Transfer of Agricultural Land Functions in South Sulawesi

From the statistical calculation, it was found that there was a positive and insignificant effect between FTT on the area of agricultural land in South Sulawesi Province with the probability value of 0.803>0.05 and the coefficient value of 0.0019527. The results confirmed that the farmer's exchange rate variable had no significant effect on the area of land conversion in South Sulawesi Province in 2015-2019. Therefore, it can be concluded that no matter how much the farmer exchange rate obtained by farmers in South Sulawesi Province. This is because the higher the farmer's exchange rate obtained in South Sulawesi Province, the farmers' living standards become relatively more prosperous and will have a good impact on economic growth. The increase in the exchange rate of farmers will provide opportunities for the agricultural sector to become a leading sector in regional development. Thus, the conversion of land in South Sulawesi Province is reduced.

The results of this study are different from a recent study by Ayub et al. (2021). Farmer's exchange rate (NTP) and Food Crops Subsector FTT (NTPP) significantly affect the conversion of paddy fields. The low NTPP is that product prices are increasingly high, and the selling price of rice/grain is affordable, resulting in the conversion of agricultural land. The findings of the current study do not support the previous research by Suharyanto et al. (2016), who concluded that the Farmer's Exchange Rate (NTP) had a significant effect on the rate of conversion of paddy fields. This condition explains that the low NTP causes no incentive for farmers to continue to live from their agricultural businesses so that they tend to convert their rice fields either for sale or for rent.

Likewise, Quasem (2011) remarked that farmers' income does not affect the conversion of agricultural land. This is due to advances in the use of new technologies and hybrid seeds, which increase the production of crop intensities. Then there is the level of farmer acceptance which is greater than farmers' expenditure from agricultural activities.

4.8. The Effect of Road Infrastructure on Agricultural Land Conversion in South Sulawesi

From the results of the data analysis, it was found that there was a negative and significant influence between the length of the road on the area of agricultural land in South Sulawesi Province from 2015 to 2019. This is shown by the probability value of 0.001 < 0.05, meaning that the additional length of Roads in South Sulawesi Province affects the conversion of agricultural land. The value of the variable coefficient of road length is -0.0001808. This means that for every one km increase in road length, the area of converted agricultural land will decrease by 1,456 ha.

According to Effendi and Asmara (2014), roads are essential infrastructure for land transportation. The function of the road is to connect one area to another. In agricultural and economic development, a road network is needed

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to smooth production factors and the marketing of production products. Roads are an important infrastructure to facilitate the distribution of goods and production factors between regions and increase population mobility.

The length of the road according to the good road conditions is in Parepare and Bantaeng Regency, the damaged road is in Luwu Regency, and the heavily damaged road is in Gowa Regency. From year to year, the condition of road length in South Sulawesi Province is getting better. This means that the better the accessibility of an area, the higher the tendency to convert agricultural land to function. The increase in good roads in South Sulawesi Province is because the government is more focused on repairing roads.

This research is in accordance with Tauficki and Masbar (2019) research that the length of the road has a negative and significant effect on the conversion from rice fields to non-rice fields. On the one hand, population density must be balanced with existing roads in an area, otherwise, there will be a disturbance or lack of sense of security in the community, especially in driving. Likewise, the results of research by Kanchanamala & Sekar (2015) show that the accessibility variable of the road transportation network influences changes in land use, especially on agricultural land. A prior research by Bacior and Prus (2018) concluded that road infrastructure affects decreasing agricultural land area where there is a change in land use due to road construction.

However, the results of this study are also not in line with the results of research conducted by Sebayang and Kurniawan (2018), which proves that there is an insignificant effect of infrastructure access (irrigation and roads) on land conversion. The insignificance of infrastructure access to land conversion is due to the lack of good infrastructure with what the community has expected. If there is good infrastructure availability, it will directly affect the community on resources to increase efficiency and productivity in carrying out activities both social and economical.

5. Conclusion

Based on the results of the analysis that has been discussed previously, the conclusion can be provided as follows.

- 1. The development of conversion of agricultural land in South Sulawesi for five years (2015–2019) was 7,124 ha or 0.04 percent, meaning that there was a condition in which the conversion of agricultural land occurred during that period.
- 2. The highest rate of conversion of agricultural land was in 2017 at 1.21 percent, and the lowest rate of conversion of agricultural land in 2019 was 0.30 percent.
- 3. The factors that influence the conversion of agricultural land in South Sulawesi Province during 2015-2019 are population, GRDP, and road infrastructure.

Suggestions

From the findings, several suggestions are presented as below.

- 1. Guaranteed prices for staple food commodities that are profitable for farmers
- 2. Population growth in South Sulawesi Province must continue to be suppressed due to population growth being a factor that has a robust influence on land use, both land use for settlements and other supporting needs for community activities. Emphasis on population growth can be maximized by socializing structured, systematic, and massive family planning programs.
- 3. The role of the government is necessary to provide socialization to farmers about the importance of food security so as to raise awareness in order to maintain and preserve their agricultural land. In addition, there is a need for efforts from the government to improve the welfare of farmers by facilitating the needs of farmers to support the sustainability of the agricultural sector.

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Digital economy across EU: Convergence or club convergence?

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Abstract

The monitoring and development of the process of digitalization of the economy within the EU are related to qualitative and quantitative evaluation of the implementation of information and communication technologies in various areas of public life and social sphere. In this regard, the objective of our study was to evaluate the convergence across the EU-28 countries in the field of digital economy based on the Digital Economy and Society Index (DESI) and its dimensions through the log t club convergence approach. As a result of the analysis, we found that during the period 2015–2020 there was no overall convergence across EU countries in terms of digitalization. This was a reason to study the hypothesis of group convergence and the formation of convergence clubs. In half of the cases, the formation of three clubs was enough – for the overall index and its "Connectivity" and "Use of internet" dimensions. Only two clubs were found for the "Digital public services" dimension. The presence of a large number of clubs – five for the "Human capital" dimension and six for the "Integration of digital technology" dimension, demonstrated the substantial inequalities among the Member States. We identified only two cases of divergent countries – for the overall index and the "Integration of digital technology" dimension.

Keywords: digital economy, The Digital Economy and Society Index (DESI), convergence, divergence, Log t club convergence test

Jel codes: C10, C50, O30

1. Introduction

The digital transformation is part of the integrated approach of EU policies for maintaining sustainable economic growth as the European model for the future. The interventions undertaken both at European and national level are natural extensions of the development in the various dimensions of the digital revolution. The expansion of digitalisation and the integration of information and communication technologies (ICT) in all areas of society and economic activities are key factors for enhancing the competitiveness of the Union. The convergence among the Member States is an essential factor in accelerating those processes. Convergence has its place in the European integration, and was under study in connection to the economic inequalities between the countries.

The reasonable question is: How do the rapid development of digital technologies and the ongoing processes of digitalization of the economy affect the process of convergence? The answer to this question requires appropriate methodology for identification of the convergence process and defining a measure to assess the accomplished degree of convergence. The objective of this study was to evaluate the convergence in the Digital Economy across the EU countries using the club convergence approach. To identify convergence clubs, we applied the methodology developed by Phillips & Sul (2007), (2009), known as log t club convergence test in panel data analysis. Computations were performed with R studio, package "Club Convergence" (Sichera & Pizzuto, 2019).

In the scientific literature, the convergence is understood as a process of "approaching" or "catching up" in different areas of functioning of the territorial units. For instance, there is convergence when low-income countries or regions "catch up" with high-income countries or regions. Otherwise, a process known as divergence is observed. Different approaches are used to study convergence – beta convergence, sigma convergence, Q convergence, etc. The concept of club convergence is relatively new one.

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It applies to territorial units that have similar socioeconomic conditions and tend to converge, i.e. form convergence clubs.

Digitalization metrics are provided by experts from various international organizations. A composite indicator about digitalization is the Digital Economy and Society Index (*DESI*), that:

(i) presents summary of factors on which digitalization depends;

- (ii) results in the formation of a comprehensive assessment of each country's progress in the digital transition;
- (iii) helps to detect areas where progress can be improved.

The structure of the paper is as follows. Section 2 Literature Review covers issues related to the definition of the digital economy, research on convergence in general, and convergence in relation to the digital economy in particular. Section 3 Data & Methodology presents DESI and the methodological concept of club convergence. Section 4 Discussion & Results examines the convergence between EU countries in terms of DESI and its dimensions using the club convergence approach. The paper ends with a Conclusion, where the main results of the study are summarized.

2. Literature Review

The wide-spread adoption of digital technologies in recent decades radically changed economic interactions and warranted the introduction of the concept of "digital economy" in the scientific literature. Several definitions of the term were developed by researchers as well as by various international institutions and non-governmental organizations.

The concept was introduced into the literature in the work of Tapscott (1996). At the conceptual level, the main difficulties in establishing viable definition of the digital economy can be divided into two main groups. On the one hand, they are caused mainly by the nature of the technologies that form the foundation of the digital economy, and are characterized by an accelerated development. On the other hand, the range of economic activities inherent in the digital economy is constantly expanding and it is difficult to distinguish it from the "traditional" economy. It was natural to propose a definition that captures the implications of the dynamic changes related to the technologies in the economy – from the use of internet to the implementation and application of advanced technologies such as mobile and sensor networks, cloud computing, big data, the internet of things and more.

Attempts to define the digital economy began with the establishment of the internet as general-purpose technology. Carlsson (2004) argued that the proliferation of internet technologies and innovative ways of digital connectivity between spatially distant economic agents enabled new opportunities for economic activity. Mesenbourg (2001) proposed a definition of the digital economy in which the focus was on how to measure new forms of economic activity such as e-business and e-commerce. Bukht and Heeks (2018) outlined three layers in the digital economy. The first is the ICT sector, which produces digital goods and services. The second consists of the ICT sector plus emerging digital and platform services. The third is the use of ICT in all areas of economic activity.

Convergence as an economic category has many meanings in the scientific literature. As an object of research interest, convergence emerged in the 1950s. The theoretical basis of economic convergence can be derived from the principles of the neoclassical concept of economic growth (Solow, 1956). The concepts of endogenous growth, known as new theories of growth, contributed to the development of a different view of the process of income convergence (Lucas Jr, 1988; Romer P., 1986, 1990).

First empirical studies on the issue were conducted around the 1980s (Abramovitz, 1986; Baumol, 1986; De Long, 1988). They focused on convergence in terms of GDP. In the following years, the researchers considered convergence from different perspectives: convergence within the economy and convergence between economies (Solow, 1970); convergence in terms of income growth rate and convergence in income levels (Quah, 1993);

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global and local convergence (Galor, 1996); convergence in terms of income and overall factor productivity (Wolff, 1991); deterministic and stochastic convergence (Bernard and Durlauf, 1996).

In chronological order, the study of convergence started with the concept of "absolute convergence" and then moved on to the concept of "conditional convergence" (Barro and Sala-i-Martin, 1992). Both concepts were initially explored through the "beta convergence" approach, and at a later stage the "sigma convergence" approach emerged. In parallel, the concepts of "club convergence" (Phillips and Sul, 2007), Q-convergence (Kang and Lee, 2005) and "time series convergence" (De la Fuente, 1996) were developed.

Methodological diversity made it possible to test the convergence hypothesis with respect to various socioeconomic processes and phenomena. For example, Puss et al. (2003) applied the beta convergence approach to study of social protection costs. The club convergence approach was used by Panopoulou and Pantelidis (2009) to assess convergence in Carbon Dioxide Emissions. Studies of convergence in the digital economy based on statistical and econometric approaches are few. Agabekova (2020) found evidence for sigma and beta convergence, but did not identify clubs when assessing global convergence in ICT development. Škare et al. (2021) and Park et al. (2015) applied the log t club convergence test to evaluate convergence in the digital economy.

3. Data & Methodology

3.1. Data

The monitoring and development of the process of digitalization of the economy in the EU are related to the need for both qualitative and quantitative assessment of the existing technical and technological conditions for the application and implementation of ICT in various areas of public life and social sphere. The large number of indicators complicates the analysis because it is a mechanical set of tools for evaluating the various aspects of digitalization.

This requires the construction of a composite indicator that meets several basic requirements. On conceptual level, it must be designed in such a way as to summarize maximum number of factors on which the digitalization depends, and at the same time – to lead to the comprehensive assessment of each country's progress in the digital transition. The third important and desirable feature of the indicator is to identify key areas where the digitalization progress can be improved. From computational point, it is important to ensure comparability between countries in terms of the level of digitalisation in economic and social life and to ensure accessibility and transparency for calculations and evaluations.

All these requirements are met by the composite indicator *DESI*. It was presented for the first time on 25 February 2015 in Brussels at the Digital4EU Forum, and was calculated for two periods: DESI 2015 (with data mainly from 2014) and DESI 2014 (with data from 2013).

The structure of *DESI* (Digital Economy and Society Index (DESI) 2020) is presented in figure 1. It consists of three levels. The first of them is formed by the indicators that characterize the dimensions of digitalization in 5 main areas: *Connectivity, Human capital, Use of internet, Integration of digital technology, Digital public services.* Each of these 5 areas is characterized by corresponding sub-dimensions, 12 in total, that form the second level. They are related to the necessary conditions for the full functioning of the European Information Space. The third level includes 37 primary (basic) variables that can be considered as the core for *DESI*. This determines the importance of the primary indicators in calculating reliable *DESI* values, and thus – for accurate and consistent assessment of the state of digitalisation in the EU.

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Source: (Digital Economy and Society Index (DESI) 2020).

The *Connectivity* dimension represents the infrastructure of the information society and is a necessary condition for its development. It is described through four sub-dimensions with eight indicators for the distribution, speed and price of broadband connections (mobile and fixed). The indicators that make up the *Human capital* dimension measure the digital skills of the population and the workforce through two sub-dimensions. The first one characterizes people's basic skills for online interaction and the usage of digital services with three primary indicators. The second one measures advanced skills for applying technologies leading to increased productivity and economic growth with three primary indicators. The *Use of internet* dimension is aimed at households and individuals. It is performed through three sub-dimensions, uniting eleven primary indicators – for frequency of use, for types of activities and for transactions. The *Integration of digital technology* dimension examines the digitalization of enterprises as a prerequisite for their prosperity by two sub-dimensions with four and three primary indicators respectively. These indicators measure key digital technologies such as electronic invoices, cloud services, e-commerce, etc. Undoubtedly, the introduction, dissemination and improvement of digital public services is a prerequisite for increasing the efficiency of public administration. The measurement through the *Digital Public Services* dimension focuses on e-government through a sub-dimension consisting of 5 primary indicators.

Although the structure of *DESI* has been preserved during the period of its existence, changes in the primary indicators have been made in its composition. They are imposed by the need to be constantly updated to reflect the progress of ICT. In order to ensure comparability and follow-up of the occurred changes, the values of the composite indicator for the previous years are recalculated, using the most up-to-date methodology.

The values of *DESI* vary between 0 and 100. The closer to 100 its value is, the better the results, the higher the is level of digitization in the evaluated country. The primary indicators are expressed in different units of measurement. In order to be able to aggregate them into a common measure, such as sub-indicators, they need to be normalized between 0 and 100. For the construction of *DESI*, weighing of the dimensions is used, according to their importance for the development of the digital economy. Within each of them, the sub-dimensions also participate with their own weights. The way of forming the composite indicator is shown in the figure 1.

The data in our study are structured as a panel. It consists of all the values of DESI and its dimensions, for all the EU countries for the period 2015 - 2020.

3.2. Methodology

Club convergence refers to territorial units that have relatively close socioeconomic conditions and tend to converge, i.e. form convergence clubs. In the present study, the methodology developed by Phillips and Sul (2007; 2009) in panel data analysis, known as the log t test, was applied to identify convergence clubs. This methodology has a number of advantages over other convergence research techniques, as it is based on a general nonlinear model that takes into account the probability of transitional heterogeneity or even transitional divergence

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(Panopoulou and Pantelidis, 2009). In addition, the methodology can be interpreted as an asymptotic test for cointegration. It consists of two main stages – first, testing the hypothesis of a convergence process in the EU-28 through the log t test; and second, clustering of countries into homogeneous groups.

In our study, the data were presented as the variable X_{it} , i = 1, ..., N and t = 1, ..., T, where N and T are the number of countries and the length of the time series, respectively. The variable X_{it} is decomposed into two components – general (μ_t) and specific (δ_{it}), which are not fixed in time. The specific components are measures of the distance between X_{it} and μ_t . To check the convergence between the specific components, the common component is eliminated as follows:

(1)
$$h_{it} = \frac{X_{it}}{\frac{1}{N}\sum_{i=1}^{N} X_{it}} = \frac{\delta_{it}}{\frac{1}{N}\sum_{i=1}^{N} \delta_{it}}$$

where h_{it} is the relative transition parameter that measures the degree of difference between the individual value of country *i* and the mean for the panel in period *t*.

The mean of h_{it} , calculated by the previous equation, is 1. In case that $\delta_{it} \rightarrow \delta$ and $t \rightarrow \infty$, then the variance of all units in the panel follows a tendency to zero in the long run.

The Phillips and Sul procedure for testing the hypothesis for overall convergence is based on the following regression model:

(2)
$$\log\left(\frac{\sigma_1^2}{\sigma_0^2}\right) - 2logL(t) = a + b \log(t) + \varepsilon_t,$$

where: $\frac{\sigma_1^2}{\sigma_0^2}$ is the ratio of the variances in the panel; $L(t) = \log (t + 1);$ t = [rT], [rT] + 1, ..., T, for all r > 0.

Equation (2) allows to test the null hypothesis for convergence $(H_0: \delta_i = \delta \ \bowtie \ \alpha \ge 0)$ against the alternative $(H_1: \delta_i \ne \delta \ \text{for separate countries and } \alpha < 0)$. The null hypothesis implies convergence between all countries, and the alternative – lack of convergence between individual countries. The null convergence hypothesis in the whole population is rejected with 5% confidence level, when the value of the *t*-statistic (t_b) is smaller than (-1.65). Rejecting the null hypothesis can mean both general divergence and convergence only between separate groups of countries.

The convergence rate is measured by the parameter *b* in the regression equation (2), where b = 2a. In the cases, when $0 \le b < 2$ the convergence is between the growth rates of the observed indicator while the levels remain different (conditional convergence), and for $b \ge 2$ convergence is between the levels of the variable (absolute convergence). In case the regression parameter *b* has negative and significant values, it can be concluded that there is a process of transitional divergence and turn-around phase between the countries of the specific convergence club (Caporale et al., 2019).

As already mentioned, the rejection of the null hypothesis does not necessarily imply lack of convergence within the countries in the panel – it is possible that convergence can be established among groups of countries. In order to identify these countries, Phillips and Sul developed an algorithm for the formation of the so-called convergence

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clubs, which consists of four main steps (Phillips and Sul, 2007, pp. 1800-1802). As in some cases it is possible to separate a larger number of convergence groups than the existing ones, an examination is also made of the possibility of merging neighbouring groups. According to Von Lyncker and Thoennessen (2017), it is possible that initially identified divergent units may be included in the newly formed convergence clubs. In view of this, they recommend testing the hypothesis of convergence between divergent countries and the new clubs.

4. Results & Discussion

As a result of the application of the club convergence approach (table 1), we did not find evidence for overall convergence among the EU-28 countries on the base of *DESI* and its five dimensions, namely: *Connectivity*, *Human capital, Use of internet, Integration of digital technology* and *Digital public services*. This was inferred from the negative values of the coefficient *b* in the regression equations, as well as the values of the *t*-statistic, which were significantly lower than the critical value of (-1.65). The lack of overall convergence across EU countries suggested to continue the analysis with the application of the Phillips & Sul methodology for their clustering in convergence clubs.

Table 1.	Verification	of overall	convergence with	respect to	DESI and	1 its dimensions
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Dimensions	b (S.E.)	$t_b (p - value)$
Digital Economy and Society Index	-1.153 (0.042)	-27.416 (0.000)
Connectivity	-1.086 (0.031)	-35.509 (0.000)
Human capital	-1.477 (0.067)	-21.963 (0.000)
Use of internet	-0.886 (0.067)	-13.336 (0.000)
Integration of digital technology	-1.575 (0.056)	-28.321 (0.000)
Digital public services	-0.278 (0.068)	-4.096 (0.000)

Source: authors' calculations

The application of the methodology for forming convergence clubs with respect to the overall index revealed the following results (table 2). Within the EU-28, four convergence clubs were initially identified, and France, Italy, Finland, Greece, Romania and Bulgaria were identified as divergent countries. To validate the obtained results, the methodology for merging clubs was applied. As a result, it was found that the countries of club II (Belgium, Luxembourg, Spain and Germany) and club III (Austria and Lithuania) could be grouped together. The hypothesis of the inclusion of divergent countries in convergence clubs through the procedure of Von Lyncker and Thoennessen (2017) was also tested. The results showed that France, initially identified as a divergent country, joined the countries of the newly formed convergence club II, and Italy joined club III. Thus, three convergence clubs were finally formed for *DESI*, and four of the countries were classified as divergent.

Clubs	Countries	b (S.E.)	$t_b (p - value)$
Club I	SE, DK, NL, MT, IE, EE, UK	-0.555 (0.341)	-1.625 (0.052)
Club II	BE, LU, ES, DE, AT, LT, FR	-0.846 (0.554)	-1.526 (0.064)
Club III	SI, CZ, LV, PT, HR, HU, SK, PL, CY, IT	-0.400 (0.303)	-1.319 (0.094)
Divergent	FI, RO, EL, BG		

Table 2. DESI convergence clubs

Source: authors' calculations

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Convergence club I countries were characterized by the highest average score of the aggregate index, whose value was 56.5, i.e. 1.07 times higher than the average for the studied population. The countries that formed club II had an average score of 48.0, and those of club III – with a score of 40.6. The averages of the divergent countries differed significantly from the community average. Their values were 63.1, 33.3, 31.5 and 31.4, respectively for Finland, Romania, Bulgaria and Greece. There was a process of transitional divergence and inversion phase across the countries in the individual convergence clubs (Caporale et al., 2019), an indication of which were the negative and statistically significant values of the coefficient b in the constructed regression equations.

Different numbers of convergence clubs were formed in the different areas of digitalization – two for the *Digital public services* dimension, three for both the *Connectivity* dimension and *Use of internet* dimension, five for the *Human capital* dimension and six for the *Integration of digital technology* dimension. Divergent countries – Bulgaria and Hungary, were initially identified only in terms of the *Integration of digital technology* dimension. For all *DESI* dimensions we found that clubs merging was not possible, except from the divergent country Hungary which was included in club VI. The countries in the individual convergence clubs, as well as the values of the coefficient *b* of the regression equations and the t-statistics, are listed in Tables 3-7.

The average scores for the countries of clubs I and II in the *Connectivity* dimension were respectively 1.14 and 1.01 times above the average for the whole population. Club III countries had a significantly lower score of 7.8. The values of the coefficient *b* were in the range between 0 and 2, which implied convergence between the growth rates of the indicator for the countries of clubs I and II. Simultaneously, there was a transitional divergence within club III (CZ, HR, BG, CY, EL).

Clubs	Countries	b (S . E .)	$t_b (p - value)$
Club I	SE, LU, LV, ES, DK, NL, HU, DE, FI, MT, RO, PT, PL, IT, FR	0.148 (0.355)	0.418 (0.662)
Club II	BE, EE, SI, LT, UK, SK, AT, IE	0.811 (0.787)	1.031 (0.849)
Club III	CZ, HR, BG, CY, EL	-0.215 (0.365)	-0.589 (0.278)

Table 3. The Connectivity dimension convergence clubs

Source: authors' calculations

Five convergence clubs were formed in the field of the *Human Capital* dimension. More than 1/3 of them fell into the club V, whose average score was the lowest – 25% lower than the EU-28 average for this dimension. The countries with the most substantial progress in the *Human Capital* dimension were in club I with an average score 40% higher than the EU-28 average. A process of conditional convergence was found among the countries from two of the clubs (clubs II and IV), whereas a transitional divergence and a turn-around phase – across countries from the other three clubs.

Table 4. The Human capito	l dimension convergence clubs
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Clubs	Countries	b (S . E .)	$t_b (p - value)$
Club I	FI, SE, EE, NL	-0.318 (0.266)	-1.195 (0.116)
Club II	UK, MT, DK, LU, AT, IE	0.641 (0.352)	1.819 (0.966)
Club III	DE, BE	-1.062 (0.709)	-1.495 (0.067)
Club IV	HR, CZ, SI, ES, FR, LT	0.405 (0.314)	1.289 (0.901)
Club V	HU, SK, PT, PL, CY, LV, EL, BG, RO, IT	-0.567 (0.653)	-0.868 (0.193)

Source: authors' calculations

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In the three convergence clubs formed by the *Use of internet* dimension, the countries were again unevenly distributed. In club II, which consisted of 60% of the EU-28 countries, use of the internet was at the closest to the EU-28 average level. Conditional convergence among the countries in club I (FI, SE, NL, DK, UK, MT, IE) and transitional divergence across the other countries from clubs II and III was found. The latter process was much more pronounced in club II (EL, IT, BG, RO).

Clubs	Countries	b (S . E .)	$t_b (p - value)$
Club I	FI, SE, NL, DK, UK, MT, IE	0.236 (0.396)	0.595 (0.724)
Club II	EE, DE, BE, ES, LU, LT, HU, HR, CY, CZ, AT, LV, SK, FR, SI, PL, PT	-0.024 (0.168)	-0.142 (0.444)
Club III	EL, IT, BG, RO	-0.848 (0.694)	-1.223 (0.111)

Table 5. The Use of internet dimension convergence clubs

Source: authors' calculations

The most heterogeneous was the studied population in the *Integration of digital technology* dimension. The reason for this statement was the largest number of convergence clubs – six in total. In addition, Bulgaria was a separate group as a divergent country. It was noteworthy that the last two clubs were more numerous than the rest, and the level of the indicator was the lowest. They included 60% of the EU-28 countries. There was transitional divergence in clubs I, III and VI and conditional convergence in clubs II and V. A feature of this dimension was the observed process of absolute convergence among the countries of club IV (CZ, LT), which was indicated by the value 4.748 of the coefficient b in the regression equation.

Clubs	Countries	b (S . E .)	$t_b (p - value)$
Club I	IE, FI	-0.171 (0.428)	-0.399 (0.345)
Club II	BE, NL, DK	0.277 (0.993)	0.279 (0.619)
Club III	SE, MT, UK	-0.302 (0.489)	-0.618 (0.268)
Club IV	CZ, LT	4.748 (6.122)	0.776 (0.781)
Club V	FR, HR, ES, EE, SI, PT, AT, DE, LU	1.270 (0.897)	1.415 (0.922)
Club VI	CY, SK, IT, LV, EL, PL, RO, HU	-0.115 (0.466)	-0.247 (0.402)
Divergent	BG		

Table 6. The Integration of digital technology dimension convergence clubs

Source: authors' calculations

With regard to the *Digital Public Services* dimension, only two convergence clubs were formed with almost the same number of countries, and there were no divergent countries. Given these features, it could be noted that the differences were the lowest among the EU-28 countries in the use of e-government capabilities and services. The values of the regression parameter b showed that for club I there was a process of conditional convergence, and for club II – a turn-around phase.

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Clubs	Countries	b (S . E .)	$t_b (p - value)$
Club I	EE, ES, DK, FI, LV, LT, NL, AT, IE, FR, LU, SI, HU	0.308 (0.135)	2.284 (0.989)
Club II	SE, MT, PT, BE, UK, CY, IT, PL, DE, CZ, BG, HR, SK, EL, RO	-0.846 (0.554)	-1.526 (0.064)

Table 7. The Digital public services dimension convergence clubs

Source: authors' calculations

Visual idea of the location of the clubs can be obtained from the maps in figure 2. The clubs with higher levels of the indicators consisted of the countries that are old EU members. Whereas the clubs with lower levels of digitalization were mainly comprised of the new EU members from Eastern Europe. Italy was an exception – although it is one of the founders of the EU, it was more often in clubs with the Balkan countries.

The only countries that always fell into the same group were France and Spain, i.e. their results from the digitization processes were quite close to each other. Based on most of the indicators, they were among the most advanced countries, falling into the club I or II, while in terms of the *Human capital* and the *Integration of digital technology* dimensions they were in the penultimate clubs.



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Figure 1. DESI and its dimensions club convergence across EU-28

Source: authors' calculations

There were similarities among the Balkan countries, despite a few exceptions. In comparison to other countries, they predominantly fell into the clubs with the lowest digitalization scores. Moreover, these countries were found to be divergent units for the overall index. The differences in the levels of the digitalization between them and other countries were so substantial that prevented their merging in an individual club.

5. Conclusions

The results of the log t convergence test can be summarised in the following way:

First, we found that during the period 2015–2020 there was no overall convergence across EU countries in terms of digitalization, measured by *DESI* and its dimensions.

Second, we found evidence for club convergence for *DESI* and its dimensions. In half of the cases three clubs were enough – for the overall index and its *Connectivity* and *Use of internet* dimensions. Only two clubs were found for the *Digital public services* dimension. The presence of large number of clubs – five for the *Human capital* dimension and six for the *Integration of digital technology* dimension, demonstrated the substantial inequalities among the Member States. We identified only two cases of divergent countries – for *DESI* and the *Integration of digital technology* dimension.

Third, the clubs with higher levels of the indicators consisted of the countries that are old EU members. Whereas the clubs with lower levels of digitalization were mainly comprised of the new EU members from Eastern Europe.

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Fourth, the Balkan countries predominantly fell into the clubs with the lowest digitalization scores. Moreover, these countries were found to be divergent units for the overall index. The differences in the levels of the digitalization between them and other countries were so substantial that prevented their merging in an individual club.

The digital future of Europe requires the joint efforts of all Member States. Fair and competitive digital economy can be achieved not only by each country's progress but by reducing the inequalities in digitalization and establishing a sustainable convergence process. This can be achieved by appropriate interventions which promote the good practices of the leading countries and support the lagging behind ones in their efforts towards digital improvement.

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