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TABLE OF CONTENTS

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THE IMPLEMENTATION OF DIGITAL CHANNELS IN BUSINESS PROCESSES AND ACCESS TO FINANCE FOR MSMES IN AZERBAIJAN

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Abstract: *Digitalization is assessed as a factor contributing to the sustainable growth of business entities. Implementation of digital solutions has been recognized as a key tool stimulating expansion and development of micro, small and medium enterprises into the economy. Micro small and medium enterprises represent a vast majority of firms in Azerbaijan. Limited access to financial resources is one of the key challenges exhibited by this size of enterprises. The rate of usage of online services by firms accelerated after COVID-19 pandemic. Despite significant progress during recent years, the adoption level of digital technologies particularly for financial services among population and entrepreneurs still needs to be developed. This article applies time series regression analysis and finds the existence of positive relationship between digitalization of business activities exemplified by e-commerce and the amount of credit funds allocated micro, small and medium business entities. The authors suggest about the existence of other factors that contribute to financial inclusion of small and medium-sized enterprises.*

Keywords: *digitalization; access to finance; entrepreneurship; e-commerce; e-banking*

INTRODUCTION

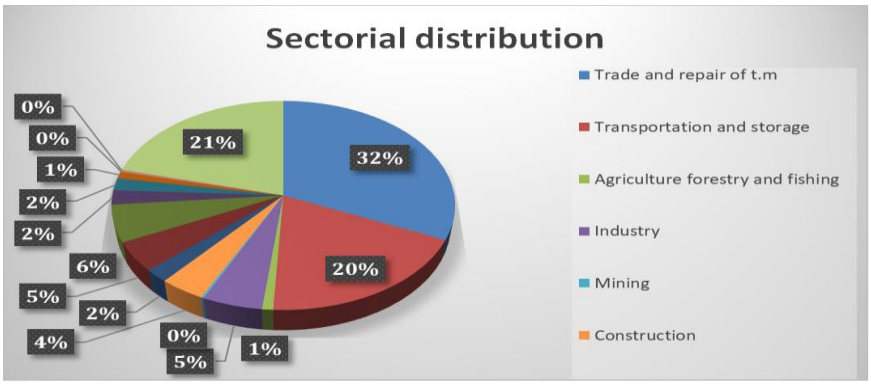
During recent years Azerbaijan experienced remarkable reforms in the improvement of the business environment. According to OECD (2022), the expansion of e-government services by using digital technologies for completing many procedures such as company registration, business licensing, public procurement, customs and visa applications online is evidence of significant progress. The development of SMEs stands out as a crucial goal because these firms are the main contributors to job creation and sustained economic growth. They can also be interpreted as a source of prompt for diversification in the economy which eventually leads to an increase in productivity (OECD, 2019).

According to State Statistical Committee of The Republic of Azerbaijan (2022) in 2021, the value added generated by MSMEs was 16.4% of the total value added in the economy. This figure was by 16.7% in the previous year. When it comes to the distribution of value added across sectors, 32.7 percent of value added generated by MSMEs was recorded in trade and repair of transport means sector, 13.6 percent in industry and 12.9 percent in construction. As it was mentioned before MSMEs play an important role in job creation. While looking at employment figures of MSMEs, we can observe that there was a 41.8 percent contribution in 2021 to total employment across all firms. Other interesting results were given about investments made by MSMEs. According to published figures in Statistical Yearbook 2021, more than 74.7 percent of investments of MSMEs in fixed assets were financed through internal sources.

In general, MSMEs represented 99.7 percent of all active enterprises in the country in 2021. Meanwhile, micro firms make up 97.3 percent of all MSMEs. In terms of distribution of MSMEs by economic activity shown in Figure 2, firms registered in trade; repair of transport means constitute 32 percent of the total number, to be precise is 119306 out of 355906 of all enterprises. The next largest share of enterprises is found in the sector with the label "other" which contributes to approximately 21 percent of the total number of firms. These two sectors compose more than half of all MSMEs in the economy. The third place is allocated to transportation and storage activity with 20 percent share.

The goal of this article is to prove empirically the existence of a link between digitalized business services and the accessibility of funding for MSMEs in Azerbaijan. MSMEs that usually suffer from lack of collateral or find it difficult to prepare relevant financial statements about their business may explore the advantages of using digital financial services for payments, savings and borrowing issues. Demand for bank digital services mainly concentrated on consumer products related to mobile banking and payments.

Figure 1. Sectorial Distribution of MSMEs in Azerbaijan



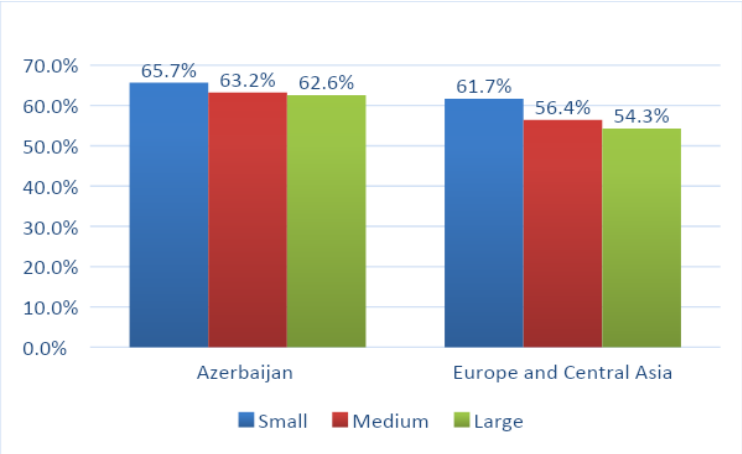
Source: The State Statistical Committee of the Republic of Azerbaijan

Azerbaijan has taken many important actions to support the development of entrepreneurship in the country. There have been implemented several state programs for the development of entrepreneurship and improvement of the business environment up to nowadays.

SWOT analysis performed for SMEs in Azerbaijan mentions strengths and weaknesses along with opportunities and threats that SMEs exhibit in the country in the Strategic Roadmap. From the strong sides, we can point to the existence of legislative framework for the entrepreneurship and constant expansion of the scope of the "electronic governance" system among many other points, whereas from the weakness part, it is worth mentioning the lack of highly qualified professionals, poor business skills, particularly at medium management level and difficulty in access to financial resources. Introduction of private credit bureaus and movable collateral registry creates an opportunity for MSMEs to get financing. Small and Medium Business (SMB) Development Agency of the Republic of Azerbaijan otherwise called “KOBİA” was established to support small and medium businesses by ensuring proper coordination and regulation. One of the steps taken towards the adoption of digital channels by SMEs is introduction of online sales platform for micro, small and medium entrepreneurs called “KobMarket”. SMEs can easily register there and sell their products according to relevant guidelines.

As admitted by the State Statistical Committee of the Republic of Azerbaijan (2022), the role of banks in financing capital investments declined in 2021 compared to the importance of internal sources of funding. Meanwhile, the enterprise survey conducted by World Bank by interviewing 225 firms from July 2019 to March 2020 demonstrates in Figure 2 that the percentage of firms of different size not feeling necessary to obtain a loan is higher in Azerbaijan compared to the average of Europe and Central Asia (ECA) region (World Bank, 2020).

Figure 2. Percentage of firms not needing a loan



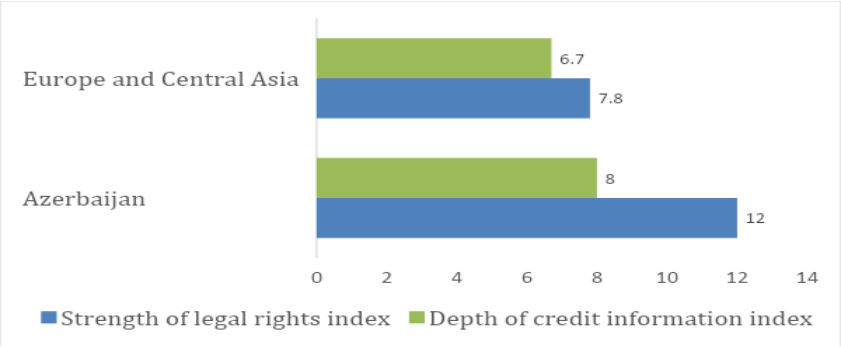
Source: World Bank Enterprise Survey

World Bank (2020) collected data to measure regulations applied to SMEs across 190 economies. One of the dimensions quantitatively measured in this report is getting credit. This indicator focuses on two sets of issues. The first one is the strength of the credit reporting system and the second one is the effectiveness of collateral and bankruptcy laws in facilitating lending. There are two main indexes captured in Figure 3 for Getting Credit Score:

- Strength of legal rights (0-12)
- Depth of credit information (0-8)

The score for strength of legal rights was at a maximum of 12, whereas depth of credit information stood at maximum of 8. These indexes reflect important issues regarding legal framework, collateral registry and distribution of credit data.

Figure 3. Getting Credit- 2020. Azerbaijan

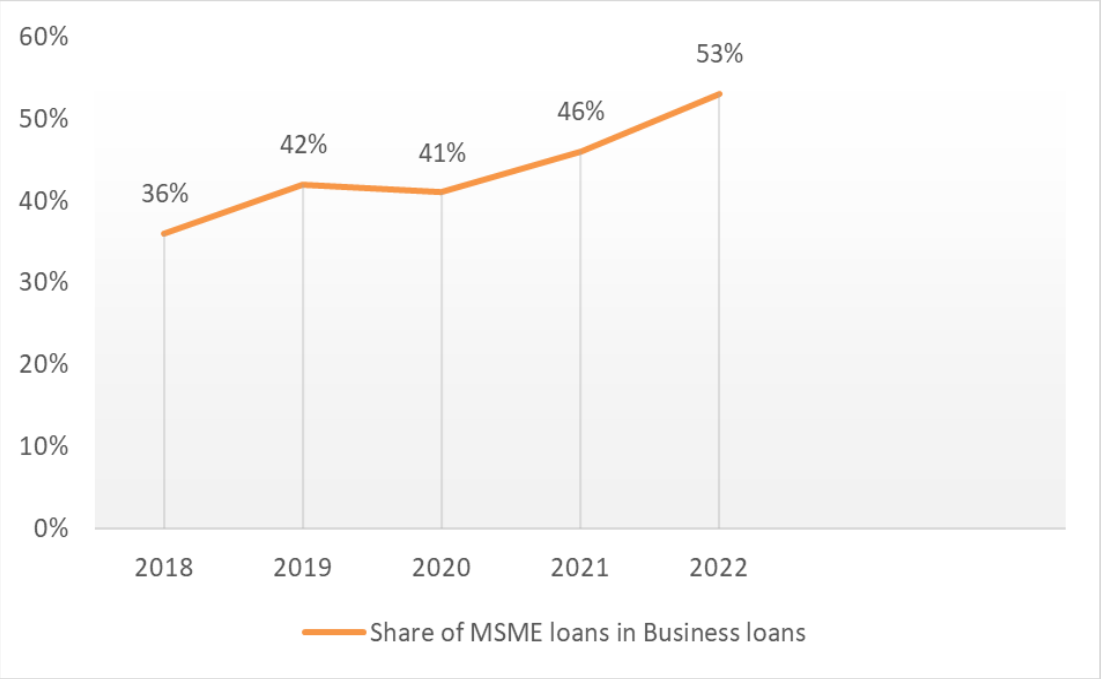


Source: World Bank Doing Business 2020

Digital Payments Strategy of Central Bank of Azerbaijan for 2021-2023 has been developed to ensure access to affordable payment services for all groups of population and businesses (CBAR, 2021). According to statistics, the volume of e-commerce transactions in the country has increased from 2016 to 2020 by 12.1 times. An upward trend was also found in the usage of e-banking services. As a piece of evidence, 61.6 percent of customer transfers from current accounts were made through e-banking in 2020 compared to 4.5 percent in 2016. However, despite the rapid growth over the last few years, the level of adoption of cashless payments among the population still lags behind those of advanced countries.

Analysis of trends about sources of loans issued for MSME reveals that funding of credits given by banks is mainly financed through internal funds of banks. According to Financial Stability Report prepared by CBAR (2022), the percentage of funds provided by banks accounts for more than 80% of total sources from 2020 to 2022. Regarding the share of MSMEs lending in total business loans, there is a strong upward trend from 2018 until 2022. This indicator obviously states a surge in access to finance for MSMEs so that recently more than half of distributed credit has been given to these types of firms. The growth of business loans continued due to implemented anti-crisis measures to minimize the negative impact during the pandemic period as it is mentioned in Financial Stability Report of 2021(CBAR, 2021).

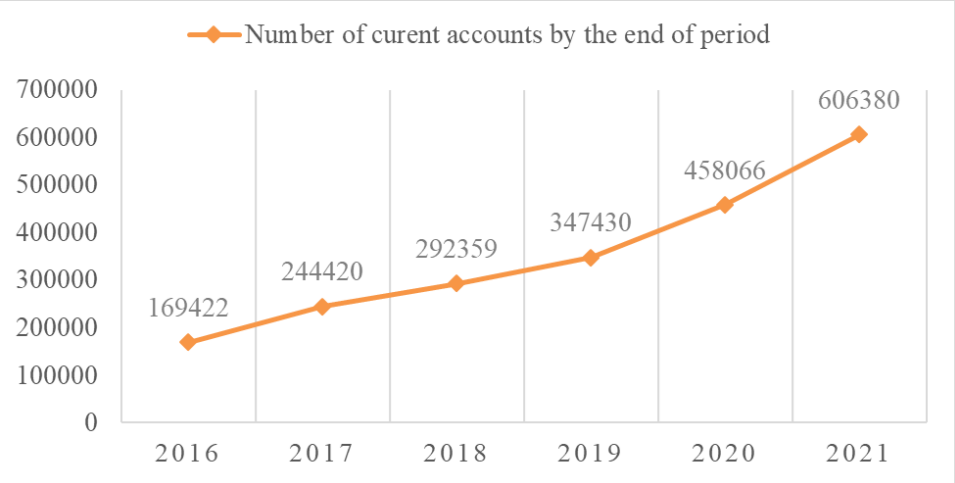
Figure 4. Percentage of business loans allocated to MSMEs in Azerbaijan



Source: Central Bank of Azerbaijan

On the other side, the number of opened current accounts in banks for individual entrepreneurs who comprise micro businesses increased dramatically since 2016. Basically, this fact suggests an increase in the usage of banking services by them.

Figure 5. Number of opened current accounts by individuals engaged in entrepreneurship



Source: Central Bank of Azerbaijan

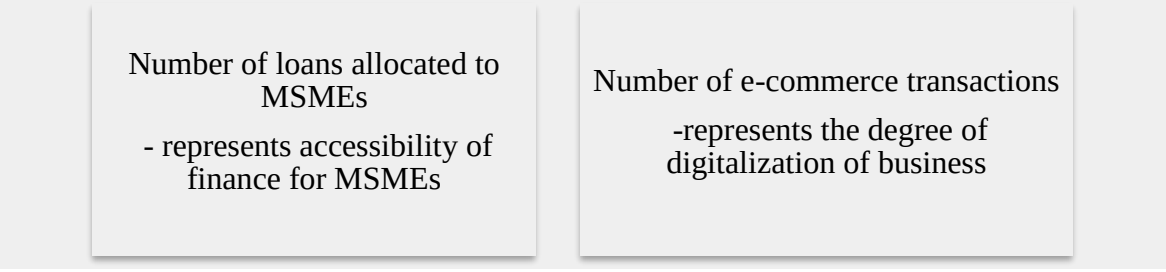
METHODOLOGY

The absence of relevant financial statements is one of the factors preventing access to finance for MSMEs (CBAR, 2021). On the other hand, the adoption of ICT-based services facilitates access to formal financial resources for MSMEs by making available records of business transactions via digital platforms. By using these records financial institutions can assess the creditworthiness of business entities. E-commerce platforms are one of the bright examples of such experience that enables banks and other financial institutions to obtain relevant information about the business performance of MSMEs. Entrepreneurs who use e-commerce to run their businesses are more likely to achieve financial inclusion (Wirdiyanti, Rosnita, et al. 2022). Digitalization also has an impact on the profitability of banks by increasing return on equity (ROE).

This article applies time series regression analysis for Azerbaijan and investigates the following hypothesis:

- Integration of digital tools into business processes improves the financial inclusion of MSMEs.

Figure 6. Proxy variables for regression analysis



To start research, we need to identify relevant variables for running a quantitative analysis. Firstly, we perform correlation analysis. There are two variables in Figure 7 that are the most relevant ones, according to the existing literature, to analyse the relationship between the digitalization of business operations and getting access to financial resources for MSMEs. Another factor which plays

an important role for MSMEs in getting access to financial resources is asset quality in the banking system, according to Armand, Ndoye and Sydorenko (2020). Asset quality can be measured by portfolio of non-performing loans (NPL) of the banking sector. The ratio of defaulting loans in Azerbaijan followed a sharp decline within consecutive years and reached 3.8 percent in 2022 (Central Bank of The Republic of Azerbaijan, 2022).

To normalize figures for the variables we use logarithmic functional forms. Two explanatory variables with intercept are included in the regression. The tendency to turn to digital channels expanded intensively after the COVID-19 pandemic when due to circumstances many operations were held online. Due to the novelty of this trend in the country and the relative scarcity of available data, the time span for analysis is short. The preliminary check of the time series indicates the existence of an upward trend from 2018 to 2022 for e-commerce transactions and loans provided to MSMEs, whereas for the portfolio of non-performing loans the opposite downward trend comes true as it is shown in Figure 7.

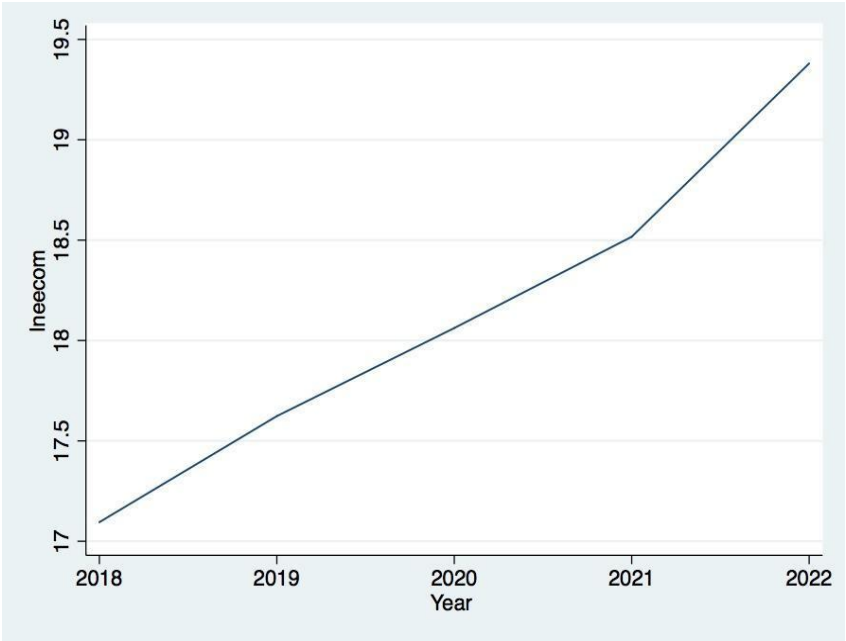
The baseline regression model 1 is the following equation:

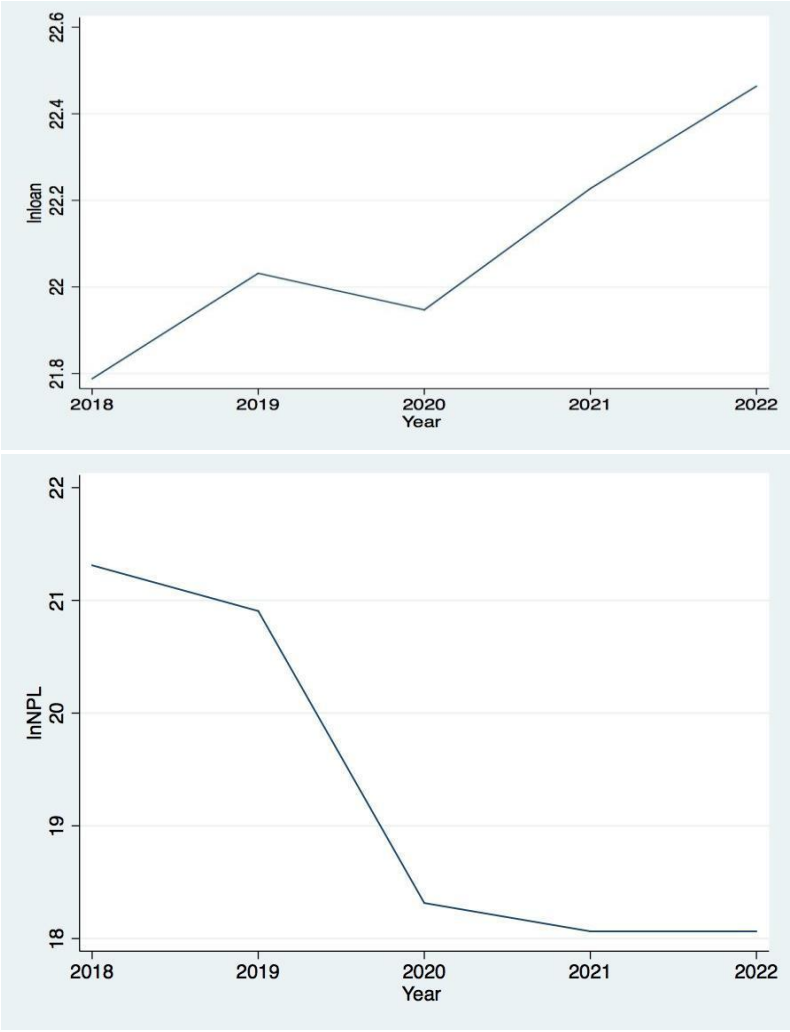
- $\boldsymbol{LnLoan_t} = \alpha + \beta_1 \boldsymbol{Lnecommerce_t} + \beta_2 \boldsymbol{LnNPL_t} + \varepsilon_t$ (1)

Notation:

- α- intercept
- β_1- slope coefficient on log function of e-commerce transactions held within country
- β_2- slope coefficient on log function of non-performing loans portfolio

Figure 7. Time series graphs of key variables: lnecommerce, lnloan, lnNPL respectively





(Source: Authors' calculations)

RESULTS

The data set is obtained from Central Bank of Azerbaijan and captures years from 2018 to 2022. The correlation coefficient measures the linear association between two variables. This coefficient is computed as the square root of R-squared obtained by regressing one variable on the other. A sign of coefficient shows whether the relationship is positive or negative.

The correlation matrix in Table 1 illustrates a strong positive correlation with a correlation coefficient 0.95 between credit funds allocated to MSMEs and e-commerce transactions conducted in the country. By contrast, the number of non-performing loans demonstrates a strong negative correlation with the amount of loans given to MSMEs. Their coefficient of correlation is -0.69.

Table 1: Correlation Analysis (Source: Authors' calculations)

Variable	Lnloan	LnEcommerce	LnNPL
Lnloan	**1.0**	**1.0**	
Lnecommerce	**0.95**		
LnNPL	**-0.69**	**-0.85**	**1.0**

Assuming that classical linear regression model assumptions hold, we regress our dependent variable log function of loans to MSMEs on two independent variables namely log function of e-commerce transactions and log function of NPL portfolio. Regression output (Table 2) demonstrates coefficients of both regressors β_1 and β_2.

Table 2: Regression Results for model 1 (Source: Authors' calculations)

Variable	**Coefficient**	**p-value**
LnNPL	0.06	0.24
Lnecommerce	0.39	0.03
Cons.	13.6	0.02

R-squared which measures goodness of fit is around 96 percent. According to obtained estimates, the implementation of e-commerce practices within the country positively affects the accessibility of credit funds for MSMEs. However, the regression output did not illustrate a significant coefficient for asset quality. Presumably, a small sample creates bias and inconsistency. Another possible explanation could be the irrelevance of NPL portfolio as an indicator for analysis as it captures asset quality within all the types of issued loans not only business loans. The only reasonable concluding remark from this time series analysis is that there is a strong positive relationship between the financial inclusion of MSMEs and digitalization of business in Azerbaijan.

It implies that these variables move in the same direction. To eliminate the assumption of heteroskedasticity, we apply Breusch-Pagan test for heteroskedasticity in Table 3. As it is obvious from p-value, we accept the null hypothesis of homoscedasticity and there is no need to use robust standard errors.

Table 3: Breusch- Pagan Test for heteroskedasticity

Chi2(1)	0.02
Prob (chi2)	**0.87**

CONCLUSIONS

This article discussed the current state of MSMEs in the framework of digitalization trends in Azerbaijan. The importance of the digital technologies is highlighted to achieve sustainable development. Access to formal financial resources has been recognized as one of the main obstacles for MSMEs. Considering that nowadays digitalization stands as a prominent factor for the development of MSMEs, the analysis includes an evaluation of the digitalization process and its implementation into business practices through conduction of e-commerce transactions. This hypothesis was tested for Azerbaijan as we have found positive dynamics in loans attributed to

MSMEs as well as in the usage of digital tools by business owners within the country during recent years. The results showed a positive correlation for both indicators and suggested a positive impact on the external financing of MSMEs generated by the appliance of digital mechanisms in business processes. However, due to the scarcity of data, we could not prove the existence of a statistically significant relationship between loans issued for MSMEs and asset quality in the banking sector as it was expected. Further investigation may involve a detailed analysis of all possible determinants of financial inclusion of small and medium-sized enterprises including firm-specific, macroeconomic and institutional factors.

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INVESTING IN CRYPTOCURRENCY AS AN ALTERNATIVE WAY OF FINANCIAL INVESTMENTS

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Abstract: *In the realm of finance, cryptocurrency has emerged as a captivating alternative to traditional investment avenues, such as stocks, bonds, and real estate. Its decentralized nature, unfettered by government or financial institution control, presents a unique proposition in the world of wealth management. The allure of cryptocurrency lies in its potential for substantial returns. Its value has experienced remarkable growth in recent years, offering investors the prospect of significant financial gains. Additionally, cryptocurrency serves as a valuable tool for portfolio diversification, as its performance is often uncorrelated with traditional asset classes. Moreover, cryptocurrency boasts portability and accessibility, making it a convenient and inclusive investment option. Its digital nature allows for seamless storage and transferability, while its global reach enables anyone with an internet connection to participate in the cryptocurrency ecosystem. However, alongside these potential benefits, cryptocurrency also harbors inherent risks. Its volatility poses a challenge, as its value can fluctuate dramatically in a short period. Regulatory uncertainty looms, as governments worldwide grapple with the implications of cryptocurrency and may impose restrictive measures. Furthermore, security concerns persist, as cryptocurrency exchanges and wallets have fallen prey to cyberattacks, jeopardizing investors' assets. In light of these considerations, investing in cryptocurrency demands a thoughtful approach. Investors must carefully assess their risk tolerance and align their investment goals with the inherent risks associated with cryptocurrency. Thorough research and a well-diversified portfolio are crucial for navigating the complexities of this emerging asset class. The purpose of the article is to analyze the profitability and safety of investments in cryptocurrency and study the different methods associated with it*

Keywords: *dividend policy, crisis, cryptocurrency, FEC.*

INTRODUCTION

This article summarizes information and conducts a comparative analysis of the advantages and disadvantages of investing in cryptocurrency instruments on the corresponding platforms in the conditions of existence of classical financial markets and increasing global risks in all areas of activity and investment activities and investments. The work applies the tools and methods of comparative analysis, as well as the methods of deduction, induction, classification and systematization. The work is useful for determining the peculiarities of realization of investments in cryptocurrency as an alternative channel of investment of companies and individuals in conditions of increasing variability of conditions of functioning and within the framework of all existing instruments of financial investments. In the conditions of rapidly changing macroeconomic and microeconomic conjuncture, accompanied by often large-scale structural and technological changes, crypto-instruments are becoming increasingly relevant and the cryptocurrency market is increasingly developing. The prerequisite for the rapid development of

the crypto-instruments market is the growing interest of Individuals and business both from the position of a settlement and payment instrument, and from the position of potential investment investments. Within the framework of this article it is the investment potential of cryptocurrency and other crypto-instruments is of scientific interest, because these quasi-financial instruments can be used both for long-term and medium-term investment strategies, and for short-term investment strategies, as well as for short-term trading speculation.

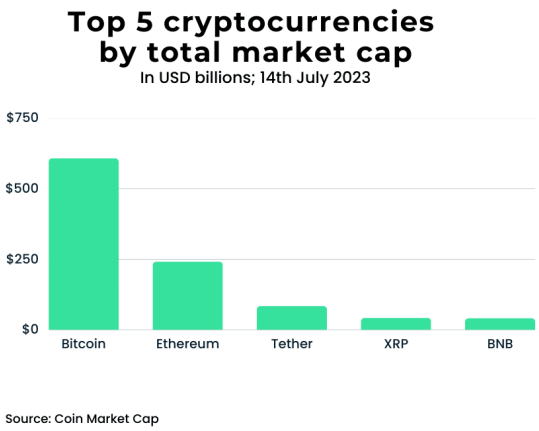
RESEARCH METHODOLOGY

Blockchain technology has become widespread in the world because of its unique features. These features are being actively utilized by various organizations and even some central banks (Heideman, M., Johnson, D., Burrus, C., 1984) Initially, it is necessary to give a definition of Cryptocurrency. Cryptocurrency, according to many modern analysts and on the actual realization of its economic functions is a special form of money, for the issuance of the which requires minimal expenditure of physical material, but requires computational power. Cryptocurrencies are issued in the form of digital tokens that can be used for commodity exchange transactions with individuals or legal entities (Härdle, W.K., Trimborn, S., 2015. Masters, B., 2023) The investment potential of cryptocurrencies is formed at the moment of its exchange for official currencies or other values. Currently, in the world practice it is customary to compare the value of other currency or commodity, immovable value, converting into reserve world currencies, which are accepted for payment and convertible in most countries of the world: it is the dollar, euro, Chinese yuan and others (Masters, B., 2023).

In this case, the essence of investment in cryptocurrency is similar to the purchase of reserve or foreign currency, different from the currency of the investor's country. Because in the modern world macroeconomic processes are accelerated, and the topics of development and growth of various countries, expressed in terms of gross domestic product, differ from each other, the value of each country's currency of each country's currency in relation to the major reserve currencies and in relation to the currencies of other countries (Nasekin, S., Chen, C., 2020).

Thus, by exchanging a national currency for a reserve currency, a person can build up investment financial capital, which, as the changes in cross rates, inflationary dynamics, economic growth dynamics and many other factors may change, because under the influence of these factors the ratio of currencies operated by the investor will also change. For example, when buying U.S. dollars for Turkish Lira in 2021 and selling back US dollars in 2023, the amount of cash denominated in Turkish Lira will be higher. Based on this we obtain the investment function of currencies at its convertibility (Petukhina, A.A., Reule, R.C.G., Härdle, W.K., 2021). Cryptocurrencies have similar properties, which have a certain volatility of exchange rates and are subject to fluctuations over time. At the same time, given that the amount of computing power in the world is limited, uncontrolled emission of this currency becomes extremely difficult, and therefore the full-fledged acquisition of investment properties of this asset acquires already and may be comparable, according to the estimation of some analysts, with monetary gold for these purposes. Anyway, at the moment there are certain difficulties in investing in cryptocurrency. These difficulties consist of significant risks, as pointed out by public authorities, which in addition fear not only the volatility of cryptocurrencies, but also the uncontrolled issuance, use and cross-border movement of cryptocurrencies movement. Currently, many cryptocurrencies are available for purchase (Fig. 1), including bitcoin, Ethereum and others.

Figure 1. Top 5 cryptocurrencies by market capitalization

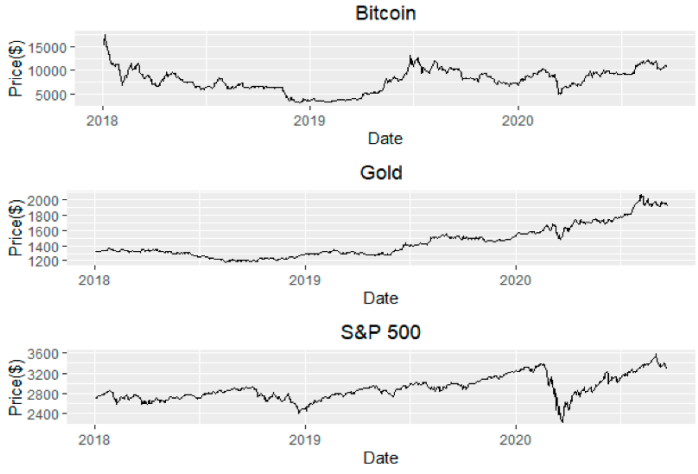


Source: https://coinmarketcap.com

Unlike standard financial instruments, to make a transaction using cryptocurrency, you need to register with special software and open a digital wallet, which today can be obtained at a specially organized crypto exchange. At the same time, each investor has a unique identifier, which is used to record transfer of ownership within the framework of blockchain technology and for the operation of the exchange's personal cabinet. Analysts and experts highlight a number of advantages and disadvantages of using cryptocurrency as an investment asset. Firstly, it is a high yield potential instrument. Perhaps, the main argument of many traders and analysts in favour of using cryptocurrencies as a financial asset. cryptocurrencies as a financial investment asset compared to investments in the classical currency market or, for example, compared to the stock market, is the possibility of a high yield high returns.

For example, over the five-year period to 2020, the S&P 500 index of shares of American companies with the largest capitalization grew at a rate of about 14% per year, while the bitcoin price over the same period, expressed in dollars, grew at a rate of about 14% per year. The same period, expressed in US dollars, grew at over 130% per year (some of the movement is demonstrated in Figure 2).

Figure 2. Comparison of the movements of the S&P 500 index, gold prices and Bitcoin (BTC)



Source: compiled by the author according to Bitmex.com and Bloomberg

The second argument in favour of cryptocurrencies for investment is the opportunity for potential diversification. As mentioned above, many traders and analysts compare cryptocurrency to gold (Trimborn, S., Härdle, W.K., 2018.) The comparison is usually made in the context of being able to hedge a portfolio against macroeconomic downturns, as in this case instruments behave in a multidirectional manner, so, for example, in the second half of 2021. There was a fall in the S&P 500 index and a simultaneous rise in the value of bitcoin. A portfolio with 10 per cent invested in bitcoin and 90 per cent in the S&P 500 would have delivered a compound annualized return of 26.8%. The third argument is the limited supply of this instrument. Returning to bitcoin, which we use to analyse as a representative sample of the underlying cryptocurrency market, according to current estimates, there is the possibility of issuing a maximum of 21 million coins, of which more than 18 have already been created (Table 1). This feature makes it possible to predict the number of bitcoins in circulation over time, given the possibility of them. The number of bitcoins in circulation in dynamics, taking into account the possibility of them.

This feature makes it possible to forecast the number of bitcoins in circulation in dynamics, taking into account the possibility of their issuance, on the basis of which, in conjunction with several other factors, it is possible to predict the future dynamics of this instrument. Logically, that as the mining limit is approached, the value of one bitcoin traded on the market will rise, contrary to the general rule of money, which reflects a fall in the value of a monetary unit when the mining limit is approached. An increase in their quantity without a commensurate increase of its collateral. In this sense, an analogy can also be made with gold, the extraction of which is also limited and becomes more difficult over time.

Table 1. Dynamics of the number of bitcoins in circulation as of 31 December of each of the years from 2016 to 2021

2016	15,016
2017	16,079
2018	16,808
2019	17,483
2020	18,163
2021	18,595

Source: compiled by the author based on Bloomberg data

In addition to the advantages of diversification and hedging inflation risks, there are several disadvantages and risks associated with cryptocurrencies. High volatility is one major concern, as the prices of cryptocurrencies can fluctuate significantly within short periods of time. (Huang, X., Zhang, W., Tang, X., Zhang, M., Surbiryala, J., Iosifidis, V., Liu, Z., Zhang, J.,2021)

For example, the annual percentage volatility of bitcoin and Ethereum can be as high as 85%, making them highly unpredictable and risky for short-term trading. Furthermore, the correlation of cryptocurrencies with other financial assets, such as stocks included in the S&P 500 index, limits their effectiveness as a means of absolute hedging of stock market risks. While correlation may not be noticeable in the long term, it can appear at certain timeframes, reducing the potential benefits of diversification. Another drawback of cryptocurrencies is their constantly growing number. While there are technological limitations on the issuance of new bitcoins or other cryptocurrencies, there are no restrictions on the launch of new cryptocurrencies. This unlimited supply potential can lead to shifts in popularity, potentially causing a decline in the value and popularity of existing cryptocurrencies like bitcoin. Limited acceptance and recognition is another

drawback of cryptocurrencies. While bitcoin has gained widespread popularity and recognition, most cryptocurrencies are not recognized as a means of payment or financial investment instruments by central banks. Only a few exceptions exist, and it is challenging to use cryptocurrencies for everyday transactions or in the traditional commodity circulation. (Cortez, K., Rodríguez-García, M.d.P., Mongrut, S., 2021.) The lack of acceptance and recognition is often due to the volatility, uncontrollability, and unregulated nature of cryptocurrencies. The lack of regulation also makes cryptocurrencies susceptible to criminal activities and fraudulent manipulation. The unregulated and unsecured nature of cryptocurrencies attracts individuals involved in illegal activities. Studies have indicated that a significant portion of bitcoin users and transactions are linked to illegal activities. Overall, while cryptocurrencies offer some advantages, such as diversification and potential protection against inflation, they also come with high volatility, limited acceptance, and increased risks of illegal activities. These drawbacks should be carefully considered before investing in cryptocurrencies.

The decision by El Salvador to recognize Bitcoin as legal tender has brought significant attention to the use of cryptocurrencies in the financial world. While other countries like the United States, Canada, and EU countries have not fully embraced cryptocurrencies as legal tender, they are open to limited use cases and exploring their potential. Cryptocurrencies are gaining relevance in developing countries where access to traditional financial services may be limited. They provide a way for individuals and businesses to overcome barriers and engage in financial transactions. The decentralized nature of cryptocurrencies also offers greater financial inclusivity and empowers individuals with control over their own finances. The increasing interest in using cryptocurrencies by legal entities and individuals can be attributed to several factors. Firstly, cryptocurrencies provide opportunities for income generation. With the volatile nature of these digital assets, there is potential to make substantial profits through trading or investing. Secondly, cryptocurrencies offer a means of risk hedging. In uncertain economic environments, some individuals and businesses seek alternatives to traditional assets like stocks, bonds, or fiat currencies. Cryptocurrencies provide an additional avenue for diversifying investment portfolios and mitigating risk. Lastly, the growing popularity of cryptocurrencies is fueled by the desire for portfolio diversification. (Saleh, Fahad 2020.) Many investors are looking for ways to diversify their holdings beyond traditional assets. Cryptocurrencies offer an alternative asset class that operates independently of traditional financial markets, allowing investors to spread their risk across various sectors. Overall, the attractiveness of using cryptocurrencies for investing funds lies in the potential for income generation, risk hedging, and portfolio diversification. While different countries have varying levels of acceptance and regulation around cryptocurrencies, the global interest in these digital assets continues to grow.

Table 2. The main advantages and disadvantages of investing in cryptocurrency

advantages	shortcomings
high profitability	high volatility, high potential losses
diversification	positive correlation with equities and gold
limited number of objects in some cryptosystems	low retention of value, poorly regulated in terms of legislation
protection against currency depreciation and inflation	low retention of value
growing acceptance and usage	susceptible to hacker attacks

Source: compiled by the author

DISCUSSION

In summary, cryptocurrencies are considered a non-traditional investment option at the moment. Access to the relevant infrastructure is difficult to restrict, making it an alternative investment channel. However, investors should carefully consider the advantages and disadvantages discussed in this article, assess the degree of risk, and define their goals before investing in cryptocurrencies. Cryptocurrencies are seen as a high-yield and high-risk investment that often falls short of expectations. It is not recommended for inexperienced investors to enter the cryptocurrency market with substantial financial resources. The decision to include cryptocurrencies in a portfolio should be based on an individual assessment of the balance between advantages and disadvantages. (Cong, Lin William, Zhiguo He, and Jiasun Li 2020.)

Key Findings and Implications

1. Potential for Diversification and High Returns: Research suggests that cryptocurrency has historically exhibited low to negative correlations with traditional asset classes, such as stocks and bonds. This potentially makes it a valuable tool for portfolio diversification. However, it's crucial to note that past performance is not indicative of future results.

2. Increased Adoption and Institutional Interest: Growing adoption by individuals, businesses, and financial institutions is adding legitimacy to the cryptocurrency market. Institutional investors are increasingly allocating funds to cryptocurrency, indicating a potential shift in mainstream acceptance.

3. Regulatory Uncertainty and Challenges: The lack of clear and consistent global regulations surrounding cryptocurrency poses challenges for investors and businesses. Regulatory developments can significantly impact cryptocurrency prices and adoption rates.

4. Technological Advancements and Security Concerns: Ongoing advancements in blockchain technology, such as scalability and privacy solutions, could enhance the use cases and appeal of cryptocurrency. However, security breaches and hacks remain a concern for investors and developers.

5. Volatility and Risk Management:

The inherent volatility of cryptocurrency prices underscores the importance of risk management strategies, such as: Diversification across multiple cryptocurrencies and asset classes, setting appropriate investment goals and risk tolerance levels, employing stop-loss orders to limit potential losses

Future Research Directions: Exploration of factors influencing cryptocurrency price volatility and its correlation with traditional asset classes. Evaluation of the impact of regulation on cryptocurrency adoption and market dynamics. Development of robust risk management frameworks for cryptocurrency investing. Assessment of the potential for cryptocurrency to disrupt traditional financial systems. Examination of the ethical and social implications of cryptocurrency adoption.

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MANAGING INTERNATIONALIZATION AT HIGHER EDUCATION INSTITUTIONS: ASSIGNED DRIVERS AND PERCEIVED IMPORTANCE

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Abstract: *The internationalization of higher education has become a central focus in contemporary higher education policies, where various demands, motives, and meanings are attributed to higher education institutions and management in the global and international environment. The complex relationship between globalization and internationalization is briefly explored in the article, as well as motives and drivers for the internationalization of higher education at both national and institutional levels, with university management considering it a strategic priority. Through semi-structured interviews with representatives of Slovene higher education stakeholders, it was found that university management emphasizes the significance of internationalization as a strategic priority and as part of the university's daily activities, highlighting its integration into research, education, various networks, projects, etc. The article underscores that internationalization serves as a means and driver for changes, raising quality, improvements, employability, and innovations in higher education, fostering a knowledge-based society, and addressing the challenges of the globalized world, which were highlighted by the respondents. In the final part of the article, suggestions for improvements and further research activities are presented.*

Keywords: *management of higher education, internationalization of higher education, globalization, motives for internationalization, perceived importance of internationalization*

INTRODUCTION

The expectations, needs, interests, and demands of higher education institutions, management, students, and higher education staff are changing due to globalization and significant technological advancements. Higher education is undergoing radical change and growth (Treleaven et al., 2009). The forces of globalization still cause ongoing increased flows of people, money, services, goods, and ideas around the world (despite the World Health Organization (2020) declaring an epidemic a few years ago). Like nothing else in the modern era, the epidemic's development had a significant negative impact on the social, political, economic, and educational domains (Rumbley, 2020) – however, nowadays, all the latter is only a memory. Students and higher education staff consider the opportunity to study and work abroad as a right and a means of furthering their personal and professional development; higher education institutions and their management see internationalization as a means for improving quality and the institutions' reputation, etc.

The global and international dimensions of higher education are receiving more attention than ever before in international, national, and institutional strategic documents, policies, and mission statements. The dynamics of the twenty-first century have increased the significance of the global context (Altbach, Reisberg & Rumbley, 2009), wherein immediate communication is now easily possible, and scientific, project and pedagogical communication is made easier by the advancement

of information and communication technology and artificial intelligence. In this context, the importance of comprehensive international cooperation of higher education (institutions) and their stakeholders must be strategically and purposefully addressed.

The aim of this article is to present and justify the demands and expectations that the contemporary global and international world places on higher education, clarifying a few concepts related to the internationalization and globalization of higher education and its managing role. Additionally, the article aims to define the motives, dimensions, and importance embedded in international and intercultural currents of higher education management. In some parts, the article represents an upgraded discussion of previously published findings in the field of the internationalization of higher education, but with a different focus and with an emphasis on the management role (e.g., Aškerc Zadravec, 2021).

Internationalization in higher education and related concepts

The international dimension of higher education is increasingly becoming a central topic on the agendas of international policies, national governments, transnational organizations, higher education institutions, and their representative bodies. Over the last two to three decades, the internationalization of higher education has moved from the periphery of institutional interest to the very core of the concept (de Wit, 2011a). In this light, the first definition of the internationalization of higher education was described as "the process of integrating an international or intercultural dimension into the teaching, research, and service functions of the institution" (Knight, 1994, p. 7). This was followed by a series of definitions of the concept of internationalization of higher education, as well as their negative and positive criticisms from different authors. In 2015, de Wit and his colleagues, in a study for the European Parliament, updated Knight's definition of internationalization of higher education, defining it as the intentional process of integrating an international, intercultural, or global dimension into the purpose, functions, and delivery of post-secondary education, with the aim to enhance the quality of education and research for all students and staff and to make a meaningful contribution to society (de Wit et al., 2015).

Many authors discuss the complex relationship between the trend of globalization and internationalization in higher education, which emerged at the end of the last century (e.g., Teichler 2004, 2010; Knight, 2008; Maringe & Foskett, 2010; Zgaga, Teichler & Brennan, 2013; Aškerc Zadravec, 2021). However, the normatively simplistic distinction between globalization and internationalization causes a blurring of the differences between the two concepts and the way in which they 'feed' each other (Marginson & van der Wende, 2007). It appears that the two terms are related, and it is impossible to draw a clear line between them (de Wit, 2011b). The concept of globalization, along with internationalization, originated in general social science studies in the second half of the 1960s (Zgaga, 2009). It was then applied to higher education policies in the second half of the 1990s and became increasingly prominent in the field of higher education, particularly after 2000 (Marginson & van der Wende, 2007). According to Marginson and van der Wende (2007), the term "globalization" is not always understood in a neutral sense. For this reason, Beck (2003) draws attention to the term's ambiguity, which makes it difficult to define clearly, leading to its frequent misuse. The term "globalization" is all too frequently substituted with an analytical term or

a process that speaks of reciprocal national and cultural interdependence, along with an ideological definition of "globalism" that limits the term's application to just one aspect – the economic one.

Globalization, according to Knight (2008), is the process of increasing cross-border movement or mobility of people, ideas, knowledge, values, cultures, technology, and economics that strengthens global interdependence. Globalization can have positive and/or negative consequences, affecting each country and nation differently, depending, among other things, on the historical and cultural context. An increasingly interconnected global economy, the creation of new information-communication technology, the influence of artificial intelligence, the rise of international knowledge networks, the growing significance of the English language, and other factors outside the purview of academic institutions are some of the factors driving globalization. Internationalization, according to Altbach, Reisberg, and Rumbley (2009), is the range of strategies and initiatives that academic institutions and governing bodies carry out in reaction to globalization. Therefore, education is among those impacted by globalization (Knight, 2008). Since the globalization of education is not the same as the internationalization of education, Zgaga (2009) emphasizes how crucial it is to distinguish between the two ideas in the context of (higher) education. Furthermore, the rise of the nation-state in the 19th century influenced internationalization, which was crucial for the creation of contemporary educational theories and the national systems based on them.

According to Brandenburg and de Wit (2011), globalization is too often characterized as "bad," while internationalization is frequently defined as "good" and as a means of fostering understanding between people or raising the standard of higher education or research. The latter ignores the fact that activities more directly associated with the idea of globalization (such as higher education as commercial goods) are increasingly being conducted under the aegis of internationalization, and the topic of real internationalization's impacts and goals is becoming less common. Additionally, Knight (1999) wrote that the internationalization of higher education is one of the possible ways in which a country and its education respond to globalization, reinforcing the fact that internationalization is a means to an end and not an end in itself. According to the theoretical foundation in the literature, internationalization is the way higher education reacts to and functions within globalization, which is a social, economic, and political process in which it plays a significant role as an actor (Adams & de Wit, 2011). Thus, internationalization is transforming higher education, and globalization is transforming the internationalization landscape (Knight, 2008).

In addition to the terms internationalization and globalization of higher education, other related terms, such as international education, international studies, transnational education, cross-border, and borderless education, etc., can be recognized. There are also more concrete sub-categories, such as academic mobility, international cooperation, study abroad, international exchange, as well as multicultural and intercultural education, global education, transnational studies, global studies, joint programs, etc. (de Wit, 2002; Hénard, Diamond & Roseveare, 2012). The majority of the concepts and definitions are united in their relationship between (higher) education management approaches in their broader meaning and the inclusion of global, international, and/or intercultural approaches in different aspects of (higher) education institutions. For the purpose of this article, the focus is mainly on Knight's and de Wit's et al. definitions of internationalization in higher education, which are considered to be broad enough to cover all aspects and activities of modern higher education institutions and their management roles.

Internationalization in higher education – drivers and motives

Depending on their goals for internationalization, universities take different routes to it. As the purposes of internationalization vary from institution to institution, the choice of internationalization strategies is contingent upon the objectives that each institution seeks to achieve (Hudzik, 2011). According to de Wit (1998), who defines four categories of motives for internationalization in higher education, the latter can be understood as a final goal or as a means to achieve other or "higher" goals. However, its deeper and broader aim is to achieve new purposes and goals (Hudzik, 2011; Hénard, Diamond & Roseveare, 2012; Middlehurst & Woodfield, 2007) – thus, internationalization is a means and a driver for changes, improvements, and innovations. It creates jobs, develops the skills needed for the twenty-first century, and shapes a knowledge-based society.

As a result of the growing significance of internationalization for higher education institutions, new conceptions of internationalization are being created as a component of a strategy to accomplish core institutional objectives (Green, 2012). There is widespread consensus that, despite notable variations across nations and educational establishments, internationalization, when incorporated into a more comprehensive approach, can lead to substantial advantages for students, staff, and the institution (Hénard, Diamond & Roseveare, 2012). These benefits include the promotion of innovative and strategic thinking that leads to innovation, the facilitation of staff and student collaboration, the encouragement of novel approaches to learning assessment, and increased awareness of global issues and the functioning of educational systems across diverse nations, cultures, and languages.

According to Green (2012), several factors drive internationalization: educating students for "global citizenship" and preparing them for the (global) workforce; raising the standard of research and teaching; strengthening institutional capacity; bringing in more profits; promoting local/regional economic development; resolving global issues, fostering global understanding and peace, etc. Additionally, Marmolejo (2010) outlines the following justifications for the institution's internationalization: enhancing student qualifications; expanding the institution's international profile; internationalizing curriculum; enhancing research and knowledge acquisition, diversifying the higher education staff and institution, etc. Knight (2008) makes a distinction between national and institutional justifications for internationalization, mentioning factors such as the development of human resources, strategic alliances, earning capacity through commercial trade, nation-building, social-cultural advancement, mutual understanding, international brand and profile, quality improvement through international standards, staff and student development, knowledge acquisition, etc. Globalization and internationalization positively contribute to students' growth and development (Kadlec & Jukić, 2023), wherein successful international cooperation is often associated with online forms of cooperation (Aškerc Zadravec, 2023). The motives vary by time, nation, or geographic distinction; they do not conflict with one another and result in various strategies and policies.

Knight and de Wit (1999; de Wit, 2002) distinguish four categories of motives for the internationalization of higher education: political, economic, socio-cultural, and academic motives, which may vary in importance across countries and regions, and their dominance may also change over time. In 2002, de Wit expanded the existing categories with subcategories (de Wit, 2002), and his classification is probably the most comprehensive, despite the fact that his methodology did not distinguish between justifications and motives at the national, institutional, or sectoral levels.

The scope of the study

According to the previously presented theoretical background with a focus on the conceptual background and motives or reasons for internationalization, in the later parts of the article, some basic results will be presented with a focus on the following objective: to investigate and understand the factors influencing internationalization at Slovene universities, with a specific focus on identifying the main drivers and assessing the significance that university management attributes to the internationalization of higher education.

METHODOLOGY

Data collection method

A semi-structured interview format with open-ended questions on predetermined topics was conducted, allowing for the change of the sequence of questions or the addition of new questions depending on the structure of each interview. Similar but not completely identical questions were used, as questions were slightly adapted to specific institutional contexts. The collected data were processed through content analysis (Cohen, Manion & Morrison, 2007). In the article, both facts obtained through interviews, as well as the opinions and views of the interviewees, are included.

The interviews took place at the beginning of 2020. Subsequently, in June and July 2020, some of the interviews were supplemented to gain insight into the specifics that occurred at higher education institutions due to the declaration of the epidemic. The interviews were conducted in person, as well as online, using Skype, due to the time constraints of the people involved and later due to restrictive measures in connection with the epidemic.

Sample

The interviewees were purposefully selected based on their involvement in internationalization activities at the universities or national institutions where they work and according to their roles at the institutions. For this article, the findings of six interviews are presented, involving representatives of the three largest Slovene universities: the University of Ljubljana, the University of Maribor, and the University of Primorska, as well as representatives of the Slovene national institution in the field of higher education. All the interviewees agreed that conversations were recorded, enabling later verbatim recording of all conducted interviews. The long-term storage of the transcripts in a secure location has been ensured.

The questions were structured to allow for the greatest possible anonymity and confidentiality of the interviewees, which is an important aspect of research ethics (Cohen, Manion & Morrison, 2007). Following this methodological approach, the anonymity of the persons involved in the research is maintained. The list of interviewees included in the research, in an anonymous form and with numbers assigned to individual interviews, is in the final part of the article.

RESULTS: UNIVERSITY MANAGEMENT PERSPECTIVES ON THE DRIVERS AND SIGNIFICANCE OF INTERNATIONALIZATION IN HIGHER EDUCATION

In this chapter, key observations are presented regarding the perceptions of the interviewees. In the initial part, the results are provided concerning the main drivers and motives for internationalization at Slovenian universities. In the second part, key findings are presented regarding

the importance that university management attributes to the internationalization of higher education in the context of other areas of the university's activity.

The results are presented by summarizing key observations and outcomes from the interviews in the form of text excerpts. The acquired findings are not analyzed in more detail through the coding of qualitative data but are presented as specific excerpts of the text. This approach provides a deeper insight into the opinions of the interviewees and offers an understanding of concrete practices at universities.

In the context of *motives or drivers for internationalization in higher education*, at the national level, Interviewee 1 highlights that "internationalization is an important building block of our higher education system". It ensures "a high-quality higher education system in Slovenia […], it is about promoting intercultural competences, […] [and] raising the quality of the international recognition of our higher education, research, and scientific field," (Interview 1).

At the university level, the interviewees highlight the motives for internationalization in the context of increasing quality in connection with the pedagogical process (including intercultural learning), the improved reputation of the institution, and the general academic level, e.g. "Actually, the biggest motive is academic excellence" (Interview 2); the motive is "certainly strengthening the quality of teaching and broader social and cultural development" (Interview 3). "These are purely academic motives – the quality of the study process" (Interview 4).

Internationalization makes a significant contribution to employability, e.g.: "Certainly, the quality aspect is of primary importance here because we are actually training quality personnel, who are then widely employable, not only in a certain local environment" (Interview 5). Additionally, "it is a kind of signal for the employer […], if nothing else, already polished English is in a way a 'brand' that [students] can write down in their CV" (Interview 2).

On the other hand, the interviewees see economic or financial advantages in internationalization only in an indirect sense, e.g. "to say that this makes financially added value directly – no. But indirectly, of course" (Interview 5), "because from a financial point of view – it would be difficult to say, yes [there is financial advantage. But] later [there is financial advantage] indirectly, because you become more successful and better" (Interview 4). Namely, "prestige is most important to individuals in the academic profession, money is not important to them […]. If something contributes to prestige, then it is very, very desirable" (Interview 2).

In the context of the assigned *significance of internationalization in higher education* at the national level, an interviewee representing a national organization points out that "[…] different managements have different affinities for internationalization" (Interview 6).

From the point of view of university management, all interviewees emphasize that internationalization is extremely important in the strategic operation of universities. "I would say that [internationalization carries important meaning at] the highest possible [level] because our university realizes that only when a university is integrated into the international environment, it literally is a university" (Interview 3). Interviewee 2 highlights that "internationalization [is] one of the university's three key priorities, purely strategic [priority]. […] in the last four-year period, it is, in fact, in close connection with other areas, but it is the highest priority." Likewise, a representative of one of the universities states: "Internationalization is very important in our strategy and also in our daily activities. […] We certainly put [internationalization] alongside research and education. […]

Like most universities, we are also very involved internationally […] at various levels. Of course, the management strives to include the university in various networks, various connections, and various exchanges […] at the system level" (Interview 5).

University representatives emphasize the importance of internationalization of higher education from the point of view of various levels of higher education management, e.g.: "Unfortunately [...] everything depends on how much experience the management has had with the international environment. If the management is involved in international experience, [...] then there is no fear at the level of [international] cooperation, and [...] they know how to judge what form of cooperation makes sense. [We have international] initiatives, which I am sure will have a long-term impact on the development of universities […]. Not even that much money was allocated, compared to the impacts [achieved]" (Interview 4).

University management primarily highlights the added value and the upgrading of existing activities with an international focus: "[Internationalization has] an added value […] and it makes sense to take advantage of [it], so that what [university] fundamentally does, becomes, or at least remains, at a much higher level. That is why we increasingly […] carefully choose international partners, […] we control in some way or follow guidelines, i.e. excellence, quality. […] we choose strategic partners from whom we can get the most and with whom we can significantly upgrade and improve our core processes" (Interview 2).

In this context, Interviewee 4 adds that it is important to plan international activities more broadly and holistically because "[…] if you have very little [international] experience, they are like some little interesting thing. If they are permanent, they become part of the process and change the operation of the university as a whole. Intensity turns the exotic into a principle. [...] It is very inappropriate if [university's international activities are not holistically] coordinated."

DISCUSSION

The internationalization of higher education has gained increasing significance over the past three decades, transitioning from a peripheral concern to the core of the concept. As emphasized by Altbach, Reisberg, and Rumbley (2009), the global and international context has become progressively vital in the twenty-first century, further fueled by the development of artificial intelligence and advanced utilization of information and communication technology. In this context, various drivers, motives, and meanings are ascribed to internationalization in higher education and its associated concepts. A comprehensive understanding of the concept of internationalization in higher education, as well as related concepts and the motives behind it, is essential for effective planning, implementation, and achievement of its objectives.

Within the theoretical introduction, this article clarifies the conceptual issues related to the internationalization of higher education and presents the underlying motives and drivers. These should be perceived as instrumental in achieving higher objectives, such as enhancing the quality of higher education systems and various services (van der Wende, 1997). These foundations set the basis for presenting key findings from interviews involving representatives of the management of three Slovenian universities and national institutions at the higher education level in Slovenia.

The interviewees underscored the significance and driving forces behind internationalization (and globalization) in higher education, primarily in terms of improving the quality of research and pedagogical processes or the overall performance of higher education organizations. Notable

advantages of internationalization in the educational process include the modernization of pedagogy, the development of intercultural and various soft competencies (e.g., communication skills, collaborative work, and strategic thinking), and increased awareness of global issues among students and staff.

Additionally, participants at the university level expressed the considerable importance of internationalization, closely intertwined with all other university activities. However, as emphasized by Interviewee 3, the meaning attributed to internationalization at the university level depends on the management's experience with internationalization and, consequently, how much importance the university management places on it.

It is important to note that the findings of the article cannot be generalized, given the limited number of representatives from the university management included in the interviews, conducted solely among the management of universities in one country – Slovenia. Nonetheless, the article presents some general insights into the management perceptions about the motives and importance of internationalization in higher education, serving as a foundation for further, more detailed analyses. Given the challenges and trends in modern higher education influenced by rapidly changing realities and technologies, a thorough understanding and identification of the drivers, motives, and reasons for internationalization, and the importance universities attach to it, are crucial. This understanding significantly influences the strategic planning of universities and the implementation of international activities in university practices.

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POLICIES AND STRATEGIES AIMED AT ENSURING THE SECURITY OF BANKING INSTITUTIONS AND THEIR IT SYSTEMS

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***Abstract**: With the development of the banking system, its security and, implicitly, security policies emerged as critical factors in the entire banking sector. In the context of the current technologicaldevelopment, the vulnerability of banking institutions has increased dramatically. For both bank employees and customers, cybersecurity, operational security and data privacy have become top priorities. Therefore, a central concern for banks is the prompt detection of threats and the development of measures aimed at eliminatingsuchdangers, which might both considerably increase the level of security in the banking sector.*

***Keywords:** banking security, banking strategy, fraud, cyber-terrorism, banking system, international transactions, IT security.*

1. INTRODUCTION

In time, the concept of security and its component elements have undergone essential changes, along with the attitude of the states towards the means whereby this notion can be transposed into life, in relation to the changes that occur at the global level.

The term "security", derived from the Latin words *securitas-securitatis*, represents "the state of beingprotected against danger; the feeling of security that one associates with the absence of any type ofrisk". Security also means "protection, defence".

In principle, security represents “that state of affairs that protects any community or country from any external and internal danger, following specific measures, which are adopted and can ensure the existence, independence, sovereignty, territorial integrity of the state and the respect for fundamental interests". (*Mica enciclopedie de politologie*- The Little Encyclopaedia of Politics, 1977)

Starting from the general understanding of security as the absence of physical violence, while progress is seen as material development related to the standard of living in a continuous process of improvement, Mary Kaldor observes that "both concepts encompass the idea ofexemption from fear and the absence of needs" (Marty Kaldor, 2010)

The concept of security applies to all levels in the organization of a society, from the individual to the state andto the international system. Security is based onboth economic and political stability. Thus, a viable security system can only be built if the two components are strengthened. Certainty, trust, and tranquillityare associated not only with the absence of dangers, but also with the idea of keeping them under control.

The banking sector operates in an environment characterized by instability and uncertainty, and losses can generate significant disturbances within the banking sector. The reputation and stability of banks depend on their ability to cope with the unstable economic environment, whether such instability is associated with money laundering, terrorist financing, corruption or fraud, or if it is generated by globalization or economic crises.

In the case of banks, security is an essential issue, being characterised by a state when even the smallest dangers might be anticipated. With the development of the banking system, security and, implicitly, the security policy was categorically imposed in the entire banking system.

Although a remarkable subject, bank security continues to be an impenetrable area, associated particularly with the idea of securing the banking system, but also with other issues. The economic environment is constantly evolving while also being subject to a state of perpetual uncertainty. The economic and banking events of the last period brought to the fore the fact that the accentuation of specific risks generate the problems experienced by the entire banking system. Consequently, credit institutions must comply with legislative acts, norms and regulations that include provisions regarding the security of information. The need to ensure security at the level of the system involves ensuring minimum security requirements for each participant, since the security problems of a participant can affect the functioning of the entire system.

As a result, cyber security is not only a protection factor, but also an element of trust and stability for financial institutions.

2. Policies and strategies regarding the security of banking systems

Any financial-banking operation involves a series of risk factors. Exposure to risk is inherent tothe banking system; therefore, the objective of risk management is to mitigate risk. Only the banks that succeed in accepting and managing risks have the possibility to anticipate the evolution of future events.

The bank security policy is an essential document regarding the security of banking institutions and includes considerable aspects, guidelines, as well as requirements that the management considers appreciable in order to maintain its security. At the same time, it includes a set of rules, norms and procedures that regulate the manner of managing, using, protecting and distributing resources in the banking institution. This policy applies to all activities, processes, procedures, directives, regulations, products, assets and decisions associated with the institution, since they may all influence the secure way in which a bank operates.

When it comes to operations and security, financial organizations should use a multi-level, layered approach, which nevertheless involvesseveral challenges. The pressure to improve and secure IT systems in financial institutions is enormous, since cyber-attacks on banks are on the rise.

The policy of the authorities and the obligation of the banks is to disclose and prevent the trafficking of illegally obtained funds. The threat of terrorism is a problem for all of humanity. This phenomenon is hard to detect because the sources of funding can be both illegal and legal. Those who intend to prepare various terrorist attacks seek to find new

sources, relying on the vulnerability of the financial and banking system, but also that of the legal system. In most cases, financial transactions are neutral; they come to the attention of specialized institutions only when suspicious persons are involved.

As far as money laundering is concerned, this phenomenon, which has already acquired an international character, leaves even deeper traces not only in the activities of banking institutions, but also in their image, which represents a crucial factor. Criminals, in their attempt to hide values gained from illegal acts, make use of banking institutions, by means of bank transactions. Thus, illegally obtained profits are "laundered" much more easily. However, the damages resulting from the crime of money laundering affect the economy worldwide. With the development of organized crime, the profits obtained also increased, and the banking circuit has become involved into the transfer of illegally acquired funds; for those involved in money laundering, technological progress has been a means whereby financial advantage can be obtained.

The banking system is, without a doubt, one of the economic systems dramatically affected by financial globalization. In their attempt to cope with all the changes in the economic environment, banks sought to implement new strategies and policies; their purpose was to protect themselves from criminals and the risks associated with the activities carried out, but also to survive the competition.

Crises, along with other social phenomena, become problematic only when they affect the social order, and their effects can no longer be controlled. These crises negatively affect the entire economic system. Along with it, the banking system has also suffered from desecurization and destabilization caused by these crises.

Most banking institutions, as well as other types of institutions, have recently operated in an environment characterized by uncertainty and instability, and the destruction or losses can cause serious disturbances to the activities of the institutions concerned. Considering the crime situation at global level, which has accentuated dramatically, while also taking into accountthe IT system, geographical location, and the community of employees and customers, the banking system is more exposed and vulnerable than other economic systems. The banking institution, as actor on the capital market and credit institution, is exposed to vulnerabilities. Therefore, a significant part of its activity requires special security measures.

In order to solve security- related problems, many innovative schemes have been developed (Singh & Malhotra, 2004; Rombel, 2003). Some authors have proposed the inclusion of biometric features in authentication schemes (Arumuga, 2006).

Maintaining banking stability and security is a fundamental requirement for the successful conduct of banking operations, but also a requirement that must be treated with particular care. The consequencesgenerated by either natural disasters or the human factor have shown that it is hard to anticipate the totality of the potential causesthat might generate an undesirable event. Instead, it should be pointed out here that the damage caused by these disasters can be compared in terms of value to the destructive effects of cyber-attacks.

Banking institutions that do not have a well-developed security policy, according to the standards in force, may face situations that negatively influence their existence and reputation, and the resulting effects also impact their financial situation.

The security policy must provide support, inspire credibility, but also demonstrate efficiency in the efforts that banking institutions make with the view of protecting their

resources. Maintaining the security of a banking institution is the daily task of every bank employeewho holds a position of either executor or bank manager, in conformity with the duties of their specific position and related skills. In order to ensure its security, the banking institution in question will proceed in accordance with the legal regulatory framework in force. Every standard, recommendation, and good practice, experience and information that can contribute to improving security will be evaluated and appreciated.

3. IT security in banking institutions

In the current global business environment, where information systems have effectively penetrated all organizations, the importance of information technology is widely accepted and recognized. The increasing dependence of most organizations on information systems, in conjunction with the risks, benefits and opportunities they bring, make information security control a critical component for the general administration of the organization.

Information is a vital resource of any organization and must be protected accordingly, by ensuring confidentiality, integrity, and availability. In the interconnected business environment, information is currently exposed to an increasing number and a much wider variety of threats and vulnerabilities.

Nowadays, information security is a fundamental pillar in the banking environment. Banks face various and multiple threats, caused by internal or external factors. Financial institutions must ensure the protection of data relating to corporate customers, clients' personal information and their financial resources. In the absence of security, the trust of customers and business partners can be easily compromised or lost. In addition, risk management and compliance requirements must be assessed constantly.

The deterioration of the economic situation, together with the inefficient activity of the institutions responsible for the financial security of the country, will affect the quality of assets in the banking sector and generate new challenges for financial institutions. At the same time, the volatility of the foreign exchange market and the low trust in public and financial institutions represent a risk for the stability of the banking sector.

Risks can have an obvious impact on the value ofboth financial and banking institutions, dueto its effects on staff, partners, clients, or the banking authority, or because it might take the form of direct losses. In the banking sector, risk should be understood as a conglomerate of threats, which are often interdependent and might have common causes. At the same time, the emergence of one type of risk can generate the appearance of a succession of other risks. (Gheorghe Manolescu, Adriana Sîrbea Diaconescu, 2001)

When it comes to operations and security, financial organizations should use a multi-level, layered approach that presents a number of challenges. The pressure to improve and secure IT systems in financial institutions is enormous, with cyber-attacks on banks being on the rise.”

Both financial institutions and consumers agree upon the fact that financial fraud and attacks are becoming more complex, since they are perpetrated by a different class of criminals, who use increasingly sophisticated methods, where technology is part of their

strategy. Moreover, experts predict that the current global crisis is likely to increase the frequency of internal fraud and security breaches.

Banking institutions must focus on preventing security events as the best means of ensuring security. In order to establish security, a bank must develop a clear and consistent regulatory environment, but also avoid exceptional procedures. When customers are inquired about their expectations in relation to the banking institution they work with, two aspects are generally mentioned: security of operations and cyber security, as well as confidentiality of information.

The need for the cyber-security of banking institutions has increased simultaneously with the total computerization of banking activity. The implementation of an IT security policy gives the management of a banking institution the security of a quantifiable and controllable system.

Computer system vulnerabilities are basically weaknesses that can be exploited by a possible threat at any time. Thus, we can say that information security is not only a technical problem, but also a managerial problem.

Following the emergence of situations related to criminality in the banking cyber system, as well as customer panic, banking institutions have increased their measures and efforts to protect the IT infrastructure. Maintaining IT security has never been more important than now. There are more sophisticated and lethal cybercrime trends that the banking sector should pay attention to. Internet fraud is currently the most practiced type of fraud at international level. The phenomenon is booming, correlated with the increase in the number of users and, at the same time, in electronic transactions.

These events can cause financial damage, IT infrastructure damage, but most importantly, reputation damage. In such cases, banking institutions should not wait for legislation or government decisions to find solutions to suchproblems but reactpromptly instead. (Cindy Collins-Taylor, 2013) Investments in software and hardware solutions, however, remain a necessity, as by such means institutionsare ablerespond quickly to IT threats. And the training and testing of both employees and customersmay contribute to reducing computer fraud.

Concerns for IT security increased in direct proportion to the increase in the number of users, but also in the value of transactions made by banking institutions.

Along with technological development, the security of information systems has also developed. At the same time, attackers managed to develop their skills and opportunities to penetrate deeper and faster into information systems, the effects of their actions being most often particularly serious. Thus, it can be stated that computer security is a constant and continuous process, because in order to increase security, one should always return to the starting point.

Innovative technologies and ideas constantly require an update of the IT security policy. Once connected to the Internet, banking institutions become more accessible to the public, but also vulnerable, in the face of unforeseen attacks, caused by unauthorized penetration into the IT system.

In order to achieve the protection objectives of the IT system, banking institutions must hire reliable personnel, who have the necessary skills and qualifications, while also being prepared for critical events. The continuous training of employees who use the

computer system is also of significant importance, so as they might constantly update their knowledge and reaction skills. The employees should also receive information about new methods used by cybercriminals with the view of penetrating the banks' IT system. Each user of the IT system is responsible, in one way or another, for ensuring the security of the data. A well-implemented and selected IT security strategy can help the institution avoid undesirable events, with impact upon the information resources of a banking institution.

The security requirements are constantly changing due to the developments of the banking system in recent years. Such prerequisites include the expansion of electronic communication channels with customers and partners, the electronic payment system, the reporting systems to the National Bank of Romania, the development and integration of payment systems, etc. In this context, in addition to the individual demands that relate toensuring information security, there is also the issue of the risks that a properly unsecured component induces in the system and the need to ensure the safety of the entire banking system.Each banking institution, in part, must implement its own information security system. Its management can be achieved by implementing practices, tools, procedures, policies, organizational structures, or software functions. Following the emergence of situations related to criminality in the banking cyber system, which generate panic among customers, banking institutions have intensified their measures and efforts to protect the IT infrastructure.

Maintaining IT security has never been more important than now. Sometimes, the banking system might encounter difficulties in controlling the increasingly sophisticated and lethal cybercrime trends. These events can cause financial damage, IT infrastructure damage, but most importantly, reputation damage. In such cases, banking institutions should not wait for legislation or government decisions to find solutions to these problems, but to react immediately. Investments in software and hardware solutions, however, remain a necessity, so as banks might be ready to respond to cyber threats. And the training and testing of employees, but also the instruction of customers, is a solution to reduce computer fraud.

4. CONCLUSIONS

In the current climate, banks are called upon to implement strategies and business models that make them stronger and more competitive in a market heavily involved in innovation. At the same time, they must strengthen customer trust and loyalty.

Most often, companies avoid sufficient investment in IT security because their perception is that the threats do not justify a very high level of expenses. However, the costs of a computer breach and the loss of confidential data, as a result of large-scale cyber-attacks, arevery important issues. The creation of a security culture is essential to any organization. This can be achieved by the continuous instruction and training of the staff, through permanent collaboration with partners for a common approach to security issues, and by constantly making customers aware of the risks regarding information security.

The security of the computer system can be increased by building and improving collaborations between banking institutions, governments and institutions specialized in combating computer crime. It is also important to adapt the national security strategy to these cyber issues, as well as to expand IT security in order to support both banking and national or global security.

Banking institutions must determine and develop IT tolerance, in a context where protection will never be enough and tolerance should be high. Depending on the level of risk and protection, the level of investment necessary to reach the comfortable level of protection is determined. But no one knows the cost associated with the aim to reduce the risk.

According to the commitments assumed, Romania has undertaken measures to develop the national normative framework in the field of cyber security, harmonized with the provisions of EU legislation, which will meet international requirements, facilitate bilateral cooperation and the exchange of information among the competent authorities.

To fully ensure the safety and security of critical data and systems, financial institutions should use a robust privileged access management solution in order to protect both themselves and their customers against attacks. Since it is necessary to comply with this large number of regulations, standards and requirements, information security must be considered a crucial concern for the organization, which requires the involvement of the management at the highest level and the active engagement of all the structureswithin the organization, from professionals in the domain to the final users of data.

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THE IMPACT OF AI ON MARKETING: OPPORTUNITY OR THREAT?

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Abstract: *Today we are talking about a new generation of AI, about generative AI, which came into mass use at the end of last year. Artificial intelligence is useful if we know how to use it and it has certainly been fundamentally changing the marketing universe for some time. In marketing, AI tools help in customer segmentation, in finding new customers who show propensity to buy, in product recommendations, in sales, in customer support, in the production of advertising messages, in the generation of responses on social networks, in purchasing behavior research, in algorithms for predicting buyer behavior, etc. ChatGPT and related technologies are the reality of individuals and organizations. New technologies develop very quickly and exponentially, where we do not know where and how the development will go, but we know that changes will happen. It is best to start preparing for the changes today. AI is not so much a technological change as it is a business change in organizations that requires change management, strategy and vision.*

Keywords: *AI, marketing, changes, Chat GPT, technology*

INTRODUCTION

There are many unknowns, there is also a lot of coordination, what is AI in marketing anyway. One of the very useful definitions says: AI marketing refers to the advanced approach of using artificial intelligence (AI) in marketing to automate, optimize, and improve elements of the marketing procedure and process. You can also leverage AI to make more informed and data-driven decisions through the insights AI marketing gathers through its data collection, hence improving overall marketing (Sauter, 2023:2). The aim of the article is to listed some of positive and negative impacts of AI on current practices in marketing.

Generative AI and global economy

Breakthroughs in generative artificial intelligence have the potential to bring sweeping changes to the global economy, according to Goldman Sachs Research. As tools using advances in natural language processing work their way into businesses and society, they could drive a 7% (or almost $7 trillion) increase in global GDP and lift productivity growth by 1.5 percentage points over a 10-year period (Goldman Sachs, 2023). The percentage of respondents who say that their company uses AI has jumped from 22% in 2018 to 50% in 2023. Nearly half of respondents, 46%, say that they have experimented with generative AI, and 27% say that they use it regularly (Boston Consultancy Group, 2023:3).

AI is changing the marketing universe

Today we are talking about a new generation of AI, about generative AI, which came into mass use at the end of last year. Artificial intelligence is useful if we know how to use it (Meden, 2023, p. 1), and it has certainly been fundamentally changing the marketing universe for some time. In marketing, AI tools help in customer segmentation, in finding new customers who show propensity to buy, in product recommendations, in sales, in customer support, in the production of advertising messages, in the generation of responses on social networks, in purchasing behavior research, in algorithms for predicting buyer behavior, etc.

There are many unknowns, there is also a lot of coordination, what is AI in marketing anyway. One of the very useful definitions says: AI marketing refers to the advanced approach of using artificial intelligence (AI) in marketing to automate, optimize, and improve elements of the marketing procedure and process. You can also leverage AI to make more informed and data-driven decisions through the insights AI marketing gathers through its data collection, hence improving overall marketing (Sauter, 2023:3).

A study by Gartner predicts that by 2024, AI-generated content will account for 30% of the total content produced by enterprises. By automating content creation, companies can save time and resources, allowing their marketing teams to focus on higher-level strategic initiatives. Gartner predicts that: By 2024, 40% of enterprise applications will have embedded conversational AI, up from less than 5% in 2020. By 2025, 30% of enterprises will have implemented an AI-augmented development and testing strategy, up from 5% and 2021 (Gartner, 2023:1). In a recent Gartner webinar poll of more than 2,500 executives, 38% indicated that customer experience and retention is the primary purpose of their generative AI investments. This was followed by revenue growth (26%), cost optimization (17%) and business continuity (7%) (Gartner, 2023:1). Gen AI has captured interest across the business population: individuals across regions, industries, and seniority levels are using gen AI for work and outside of work. Seventy-nine percent of all respondents say they've had at least some exposure to gen AI, either for work or outside of work, and 22 percent say they are regularly using it in their own work (McKinsey, 2023:1).

When we talk about marketing, we assume that it is a holistic approach to marketing that emphasizes the holistic understanding of our customers and the satisfaction of their needs, which focuses on creating consistent and connected marketing activities through all communication channels (Kotler, et al., 2016:347). The authors start from the assumption that significant changes are taking place in consumer behavior, for which the Internet enables greater expectations and the expected consistency in communication with brands. Holistic marketing allows companies to integrate different communication channels in a coherent marketing plan, which enables more effective communication with customers. Customers expect a multifaceted experience that includes all aspects of integration with the company, from advertising, social media, mobile applications, sales support to customers, etc., which increases customer satisfaction. It is easier and more efficient to measure the success of marketing campaigns, since holistic marketing allows all channels and activities to be connected in a single data analysis system. This makes it easier for brands to understand which channels are more effective than others. Brands must also express the values of their customers, who are increasingly sustainable and expect social responsibility from brands. Holistic marketing therefore enables companies to develop elements of their own competitive advantage, as they

are more comprehensively and efficiently equipped to meet the needs of their customers and respond more quickly to changes in the market environment.

Positive effects of changes in marketing with the use of AI

In addition to processing existing data with algorithms that accurately predict customer purchasing behavior, predict trends and enable the creation of personalized marketing campaigns, improved user experience increases marketing efficiency, and thus also the value and ROI of companies.

According to Eurostat (2023), the number of Slovenian companies that use AI in marketing and research is higher than the average in Europe (22.8% in Slovenia compared to the EU, where the average is 12.6). In Slovenian advertising, AI tools are mostly used in sales, the development of AI tools in advertising agencies and the research sector is relatively balanced between the development of employees and the use of already developed tools. The biggest obstacle to using AI seems to be that they do not consider AI technologies useful. Ethical considerations and concern about invasion of data protection and privacy do not seem to be an issue (Eurostat, 2023).

A more personalized consumer shopping experience

AI improves the buying process of customers because it gives a more personalized experience and more accurate results (Meden, 2023:2). Customers have an easy shopping process that is accurate and personalized. We address the customer in a personalized way when, e.g. in the online store we present a certain product, we offer the possibility to compare it with similar products, sometimes also to test it, and above all with the help of AI conversation bots can answer typical questions of customers, which responds in real time. Buyers get an answer to their question immediately, which is why the purchase decision is faster and more efficient (Meden, 2023:2). The use of personalized addresses is especially suitable for the creation of customized landing pages, the use of email marketing and the selection of products (Sauter, 2023:2).

Better customer segmentation

AI will address customers in a personalized manner, based on activities on the website, mobile application, activities in the physical store, based on demonstrated interest in communication (on social networks), and above all, the company will take into account the customer's interest in addition to classic segmentation. More targeted communication has improved conversion rates and targeting specific keywords (Sauter, 2023:3). By using predicative algorithms, we can predict trends, more easily follow the changed purchasing habits of customers and optimize marketing campaigns.

Cost aspects and savings

As early experience shows, the need for repetitive tasks will be reduced. Most of the answers or questions that customers address to the content of the website are repeated. With well-structured data, AI will be able to answer them on its own. We will need fewer people in contact centers to answer questions. It is expected that the productivity of those individuals who will use AI tools will improve compared to those who will not learn it. The use of AI can

improve the effectiveness of marketing efforts, leading to higher ROI. This can include optimizing ad placement, adjusting bid prices, and targeting specific audiences (Sauter, 2023:3)

Changed the way of communication with customers

We expect that at the expense of conversational interfaces, communication with customers will be faster, the customer will also be able to quickly get more accurate answers that will be generated by AI, for example to his email address (Meden, 2023, p.3). The content of the message is already and will be adapted differently for different individuals. AI, especially by understanding the unified communication of an individual on various digital platforms, is changing digital marketing, where it connects social networks, online stores, customer responses... In addition to better customer support and the preparation of appropriate personalized marketing materials, especially sales documents, it is easier to analyze data (especially in large quantities), market research, etc.

Benefits of AI in digital marketing (Sauter, 2023:3):

- Analyze customer behavior
- Increase customer engagement
- Detect churn tendencies
- Anticipate purchase preferences
- Predict future trends
- Personalize marketing campaigns
- Increase conversion
- Target past customers
- Enhance ad targeting

Understanding customer needs and preferences

When it comes to unstructured data, AI tools already know how to process it well in real time, form a recommendation for a possible purchase to a customer who is still on the website, comments, a customer satisfaction survey are possible, AI detects potential problems and can adjust them. AI is also excellent at detecting trends in the market. This can include insights into customer behavior, interests, and preferences, as well as sentiment analysis of customer feedback (Sauter, 2023:3). AI tools also make it possible to read the emotions of customers in the purchasing process (McKinsey, 2023:2). Research shows that customer expectations are changing, 43% of customers are starting to replace traditional ways of finding products or service recommendations with tools like ChatGPT, 70% want wider implementation of generative AI in their interactions with organizations, 30% of customers are willing to pay more to use certain virtual services based on the use of AI (Capgemini, 2023:1).

AI as a sales tool

Virtual and augmented reality are already important marketing tools in the field of sales, enabling a more authentic and personalized shopping experience. Brands will have the opportunity to connect sound with AI and gain the opportunity in the meta universe to create sound environments that will attract visitors, potential buyers (Salzman, 2023:3). Optimizing content for voice search is becoming increasingly important as more people use voice assistants

such as Siri, Alexa, and Google Assistant to search for information, while augmented reality (AR technology) connects the real and virtual worlds and improves the shopping experience. (McKinsey, 2023:3). By analyzing customer data and transaction patterns, AI can detect suspicious behavior and prevent fraudulent transactions. This can include strategies such as monitoring for unusual transaction patterns and identifying suspicious IP addresses (McKinsey, 2023:3).

Negative effects of changes with the use of AI

AI response control

With modern generative systems, control is not the easiest, since there is no desire to limit them on the one hand, and on the other hand, it is necessary to prevent intentional offensive, obscene or inappropriate provocations on the part of users that can force the AI to give answers that are not appropriate. How to control that both AI and users do not cross the line of decent and acceptable communication in their behavior?

Unrelated data in the company

In companies, especially larger systems and those that operate in several markets, not only local, we come across a lot of data in an unconnected, aggregated state. If we want to develop our own conversational bot, we need to make sense of the data according to some key and connect it in a way that will be understandable by modern AI that works on large language models. If the data is not relevant enough, we get bad answers. All the time, the answers must be controlled so that the content is not offensive, biased or fabricated. A significant challenge in the use of AI in marketing is ensuring the credibility and integrity of data (Sauter, 2023:4), since AI works on the basis of predicative algorithms based on data. Incomplete databases are the reason AI results are unreliable. At the same time, it is also worth emphasizing the issue of privacy and data protection, as well as the fact that different AI tools have different rules for protecting the privacy of users, as well as their own conditions of use.

Lack of empathy

Humans are generally distrustful of messages generated by AI, especially when a problem arises that AI cannot solve without human help because it lacks empathy. Companies also have the opportunity to develop their own sources of competitive advantage, i.e. combinations of human intervention and generated responses. AI can automate tasks that are routine, analyze large amounts of data, optimize marketing strategies, but it is not precise. In addition, she lacks creativity, intuition, ability to see the big picture and understanding of complex emotions and motivation (Sauter, 2023:3). The issue of intellectual property and copyright is also unclear.

Distrust of employees

If we know how to formulate questions correctly, i.e. i. prompt, we will get more or less useful answers. As it seems, routine jobs in marketing (writing electronic responses, data analysis, press releases, writing other marketing texts, etc.) will give way to more strategic ones, which require more consideration and knowledge that AI does not yet possess. AI will not replace humans, but it will change their work. AI is unlikely to replace marketing employees,

as it lacks creativity. However, according to the BCG survey, 86% of employees believe that the use of AI at work will require additional training, almost 30% believe that the employer will take care of the responsible use of AI, and as many as 36% believe that AI will replace their job (Boston Consultancy Group, 2023:3).

The impact of AI on people's mental health (fake news, deep fakes, trolls, etc.)

Deliberately inaccurate information that has flooded the world web, the media, destroys our ability to rely on scientists, facts, institutions (Salzman, 2023:4). Fake news, disinformation, influencing elections and democracy, mistrust of institutions, politics, media, affect people, their fears, which is related to mental health (depersonalization disorder (Salzman, 2023:4), when people feel alienated and have a reduced sense of reality. The ethical use of AI, which takes into account users' privacy and is based on their consent to data processing, is a prerequisite for the transparent use of AI (Sauter, 2023:4). The use of AI also has positive effects on employees (Microsoft, 2023:4): increasing productivity, increasing job satisfaction, enabling greater creativity and opening new jobs. The same survey found that the time employees spend on Microsoft Teams has tripled since February 2020, 70% employees would delegate tasks to AI if it would reduce the amount of their work, 49% fear that they will be replaced by AI, twice as often management believe that AI will increase productivity rather than reduce the number of jobs, and 89% of managers believe that their employees will need new skills to support AI exploitation. However, wage pressures, the need for restructuring and less competitiveness due to skill equalization will be expected (Microsoft, 2023:4).

CONCLUSIONS

ChatGPT and related technologies are the reality of individuals and organizations. New technologies develop very quickly and exponentially, where we do not know where and how the development will go, but we know that changes will happen. It is best to start preparing for the changes today.

Generative AI can bring new business models, new business opportunities and create new jobs, but the biggest challenge is the speed of change, as well as the lack of knowledge about AI and the resulting lack of AI strategies. With increased productivity, costs are expected to decrease, the range of new products and services will increase, processes and business models will be transformed, and there will be less need for certain services, as changes in customer behavior will also change their expectations.

It is also worth mentioning the elements of responsible use of AI, from data protection, copyright issues, ethics and influence on decision-making, and risk management.

AI models will get smarter, they will support all forms of data, text, images, audio, video, they will have up-to-date data, often in real time. They will often be industry oriented (e.g. for marketing). Marketing is one of the fields that, even after a year of commercial use of generative AI, is exposed to major changes, both in terms of the speed of individual tasks performed by advertising agencies, as well as the quality of the agency's work performed (graphics, pitch preparation, production of texts, media posts, especially on social networks), as well as certain new services (media buying in real time). Technology goes hand in hand on the one hand with fears and on the other with high expectations for cost, content and time

efficiency of employees. Lack of current knowledge on how to use existing and developing AI tools is a big problem.

AI is not so much a technological change as it is a business change in organizations that requires change management, strategy and vision, skilled, empowered employees and large amounts of data. ChatGPT is just the beginning.

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THE DIGITAL ECONOMY PART OF THE INTERNATIONALIZATION OF THE LABOR MARKET. THE CASE OF ALBANIA

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Abstract: *This study aims to analyze the impact of the digital economy on strengthening the labor market and its growth in Albania. In this analysis, we focus on the growth of the Information and Communication Technology (ICT) sector as a result of technological advancements and innovation in the country. Using official data from Albanian state sources, we identify the changes and challenges of the labor market in this context of digital transformation. Also, we research the policies and strategies undertaken by state institutions to improve the adaptation of the workforce to the demands of the digital economy sector. Through our analysis, we assess the role of training and skills development as well as their impact on increasing employment and innovation in Albania. Based on the results of the study, we conclude with concrete recommendations to improve existing strategies and policies in accordance with the needs of the digital economy sector and the workforce in Albania. In conclusion, we examine the future opportunities for the growth of the digital economy and the labor market in the country. The intercommunalization of digitalization is a trend for global economic development, a necessary part of the high-quality development of any business. The internationalization of digitization suggests that the principles of sustainability and digitization can and should be combined with each other to ensure business longevity.*
Artificial intelligence, quantum computing, brain-computer interface, digital transformation of enterprises, digital technology and digitization are gaining ground in global economic development.
Keywords: *Digital Economy, Workforce Adaptation, Labor Market Transformation, Modernization, Digitalization, Internationalization, Career Development, etc.*

1. Introduction

The digital economy is a concept that includes the use of digital and information technology to transform economic processes efficiently and innovatively. This includes using the Internet, information and communication technology to increase productivity, expand impact and create new value for the economy at large. The importance of the digital economy is highlighted, becoming an important engine for innovation, economic growth and the creation of new job opportunities.

The article aims to analyze the impact of the digital economy in Albania, evaluating the use of technology and innovation as an important source for the growth of the labor market. The focus will be on identifying special challenges and opportunities for the Albanian economy in

accordance with current developments in the field of technology and digitization. Our approach will include the analysis of economic policies, the necessary investments in digital infrastructure, as well as raising awareness of the importance of this transition in key sectors of the Albanian economy. The aim is to present a clear vision for the future path of Albania's economy, emphasizing the role of the digital economy in increasing competitiveness, creating new jobs and promoting innovation, where through the process of internationalization it will bring more modernized standards. , more sophisticated.

2. Labor market, internationalization and some indicators.

The data published by INSTAT speak of a constant increase in the working-age population over the last few years. Projections show that this growth has already reached its peak and it is expected that the following years will mark a gradual decline in the working-age population. It is the first time that our country encounters such a demographic development, hitherto unknown by our economy. Its ramifications will soon begin to be felt in all areas of human activity in the country, ranging from the various levels of education to the most important economic implications related to domestic production, productivity, consumption, social security schemes, the standard of living, etc. The figures speak of employment difficulties encountered mainly among young people, so a significant part have left the country for employment. In the age group of 15-29 years, more frequent fluctuations are observed between unemployment and employment, which indicates difficulties in keeping a job. This age group is more prone to emigration.

2.1 Human resource Management.

Human resources are the most important asset of a business that should be invested in its development. When it comes to internationalizing a business, human resources can be that business's biggest challenge. A business that considers market growth in regional European or world countries must carefully analyze the opportunities and capacities for business expansion. Usually the training, management and staff travel required for the international market is a very large and sometimes unaffordable cost for a business. It is important to carefully evaluate the country in which you are thinking of extending that business by analyzing the average age of that country, the unemployment rate, the professional education of that country that if the company were to recruit employees from that country it would be a higher cost small (Bach and Edwards, 2013).

3. Digital economy. Analysis of the impact of the Information and Communication Technology (ICT) sector in Albania.

The first concepts, as well as the concept of the modern digital economy, appeared at the end of the last century. In 1995, the American computer scientist Nicholas Negroponte presented it in the form of a transition from the motion of atoms to the motion of orbits. N. Negroponte said that material substances, considered in the form of raw materials and products, have their

drawbacks, such as: the physical size of the product, the need for resources for its production, the use of space for its storage, logistics costs, as well as problems related to the transportation of goods. According to computer scientists, the advantages of the digital economy as a type of "new" economy can be: the lack of physical weight of products replaced by the volume of information, lower cost of resources for the production of electronic goods, the area occupied several times smaller. By products (usually electronic media), as well as the immediate global movement of goods via the Internet.

In 1995, the American computer scientist Nicholas Negroponte (University of Massachusetts) coined the term "digital economy". Now this term is used worldwide, it has come into use by politicians, entrepreneurs and journalists. Last year, one of the main reports of the World Bank contained a report on the state of the digital economy in the world (the report was published under the title "Digital Dividends").

However, so far the content of this concept remains unclear and there is no clear definition in the WB report. This article from RIA Nauka contains the most general ideas of what the digital economy is.

To begin with, it is worth recalling the definition of the usual "analog" economy – this is the economic activity of society, as well as the totality of relations that develop in the system of production, distribution, exchange and consumption. The use of the computer, the Internet, mobile phones can now be considered "consumption". The digital economy can be represented as that part of economic relations, which is mediated by the Internet, mobile communication, ICT. The Information and Communication Technology (ICT) sector has shown significant growth and contributed significantly to the labor market in recent years. According to the official data of the Ministry of Economic Development, Trade and Entrepreneurship, the ICT sector has recorded an average annual growth of 8-10% in recent years, making it one of the fastest growing sectors in the Albanian economy.

In recent years, there have been a number of major investments in digital infrastructure in Albania, including projects to connect to high-speed Internet, improve telecommunications infrastructure, and drive innovation in the ICT sector. This has influenced the growth of firms and companies specialized in information technology in the country, as well as the creation of new jobs for ICT specialists.

Moreover, the growth of the ICT sector has influenced the increase in demand for qualified specialists in the fields of software engineering, web application development, data analysis and others. These occupations have seen a significant increase in wages and have created a strong job market for young people and specialists with technological skills.

However, challenges still exist, including the need to provide a stronger foundation of ICT education and training, as well as to adapt education to the demands of the labor market. To continue to benefit from the growth of the ICT sector, it is important that the government and the private sector continue to invest in the development of digital infrastructure and in improving the technological skills of ICT specialists.

Evaluation of policies and strategies undertaken by state institutions.

Albanian state institutions have undertaken several important policies and strategies to develop the digital economy, including efforts for training and development of technological skills. Some of these policies include:

a. Investments in digital infrastructure: The government has invested in improving digital infrastructures, ensuring high Internet access throughout the country. This has encouraged the increased adoption of information and communication technology in all sectors of the economy.
b. Development of training programs: The government has taken measures to improve the education system and professional training in the field of information technology. This has included the creation of updated curricula and specialized training programs in the areas of software engineering, information security, and web application development.
c. Encouraging innovation and start-ups: The government has taken steps to encourage innovation and the creation of start-ups in the ICT sector. This has included the provision of fiscal and financial incentives for new innovative firms, as well as the creation of innovative workspaces for start-ups in various innovation centers in the country..

These policies have had a significant impact on the improvement of the labor market and the growth of the ICT sector in Albania. The increase in investments in digital infrastructure has facilitated the access of businesses and individuals to modern technology, creating new opportunities for business development and the creation of new jobs. Meanwhile, investments in the training of ICT specialists have increased the number of qualified professionals in the ICT sector, making Albania an attractive destination for foreign investors in this sector. In addition, the encouragement of innovation and the creation of start-ups has fostered the growth of innovation and the development of new products and services based on information technology.

4. Identification of challenges and steps towards improving the situation.

In Albania, the growth of the digital economy has brought with it some challenges for the labor market, requiring adaptation of the workforce to the demands of the ICT sector and related fields. Some of the main challenges are:

4.1 Lack of specialized knowledge: Strengthening the technological skills of ICT specialists and professionals in related fields is a major challenge. In many cases, the education system is not able to provide the necessary knowledge to adapt to the rapid technological changes in the ICT industry.

4.2 International competition: The job market in the ICT sector is open to international competition, making it challenging for local ICT specialists. The need to improve foreign languages and keep up with international developments in the field of technology is a challenge that must be addressed.

4.3 Matching skills to market demands: To ensure that ICT specialists are suitable to the demands of the labor market, there should be a regular adaptation of educational curricula and training programs to the current demands and trends of the ICT industry. -ut.

To address these challenges, some possible steps and recommendations could be:

a. Improving educational curricula: The educational system should be improved by including more specialized programs in the field of ICT, adapting it better to the demands of the labor market and encouraging innovation and creativity among students.
b. Investments in training and skilling of employees: Government and the private sector should invest in training and skilling programs to increase the knowledge and skills of ICT sector workers. This will ensure that they are able to meet the demands of the sector and be competitive in the labor market.
c. Promotion of innovation and industry-education cooperation: Close cooperation between the ICT industry and educational institutions would enable a better adaptation of curricula and training programs to the demands of the labor market, encouraging innovation and development of products and services new technologies.

5. Digitization and internationalization.

Digitization, investments in digital transformations of institutions and businesses and embracing the latest trends such as Artificial Intelligence seem to be in the focus of European institutions. Recently, the European Commission announced a financing program from which Albania can also benefit, in the total financing cake of 122 million euros. The European Commission opened the first set of calls for proposals under the 2023-2024 Major Work Program of the Digital Europe Program to strengthen digital technologies and competences across the EU. In addition, €31 million will support projects in the field of data, with investments in the 'Genome for Europe' project to create a reference European genome database that will drive major advances in research, innovation, prevention of diseases and the provision of health care.

Projects in the field of cloud infrastructure will receive €25 million in grants to support the Exploitation Office of Important Projects of Common European Interest (IPCEI), which will support the development of a secure collaboration platform for the aeronautics industry and safety.

There will also be 18 million euros for projects in the field of Artificial Intelligence and 16 million euros for the promotion of advanced digital skills, with funding for increasing the digital skills of young students, with a focus on young girls.

6. Conclusions and recommendations.

The article aimed to examine the impact of the growth of the digital economy in Albania, with a focus on the growth of the labor market and the contribution of the Information and Communication Technology (ICT) sector as part of internationalization. Two elements that are seen as the key to economic recovery are digital transformation and international cooperation.

With increased investments in digital infrastructure, development of training programs and encouragement of innovation and start-ups, Albania has experienced excellent growth in the ICT sector, creating new opportunities for young people and improving the labor market in the

country. The higher the rate of computer use in an economy, the more digitized and closer to overall economic progress that country is.

However, there are some challenges that need to be addressed to improve the adaptation of the workforce to the demands of the ICT sector. To achieve this, it is necessary to improve the education system, invest in training and skills of employees, as well as promote close cooperation between industry and educational institutions.

In order to improve the current strategies and policies related to the development of the digital economy and the labor market, it is important that the government fulfills the above recommendations. Continuous investments in digital infrastructure and innovation, improving the education system and creating specialized training programs are essential to ensure a sustainable development of the digital economy and improve Albania's competitiveness in the international arena. The close cooperation of different actors in these fields would strengthen the country's capacities and would make it possible to benefit maximally from the advantages offered by the digital economy.

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THE GEOPOLITICAL IMPLICATION OF THE ZANGAZUR CORRIDOR: A DRIVER FOR REGIONAL ADVANCEMENT AND LINKAGE

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Abstract: *This research delves into the geopolitical role of the Zangazur Corridor in the recently liberated territories of Azerbaijan, examining its potential as a catalyst for regional development and enhanced connectivity. Employing the gravity model, the study investigates the corridor's influence on economic growth, trade facilitation, and geopolitical dynamics among Azerbaijan, Armenia, Georgia, Iran, and Türkiye. The comprehensive methodology incorporates a detailed literature review, geopolitical analyses, and economic assessments. Through this approach, the study amalgamates historical, economic, and geopolitical insights, comprehensively understanding the corridor's implications on regional integration. The main results underscore the Zangazur Corridor as a transformative conduit, pivotal in fostering economic opportunities and enhancing regional connections. It depicts the corridor's capacity to fortify trade routes, reshape infrastructure, and bolster regional cooperation. The study also explores the geopolitical implications, presenting the challenges and opportunities arising from this infrastructure project. This article offers a nuanced understanding of the corridor's potential transformative impact on economic synergies within the South Caucasus nations. It culminates in a comprehensive evaluation of the Zangazur Corridor's role in the region's economic and geopolitical landscape.*

Keywords: *Zangazur Corridor, Regional development, Geopolitical dynamics, Economic synergy, South Caucasus.*

INTRODUCTION

The Russia–Ukraine conflict, commencing in late February 2022, triggered discussions on the accountability of various transport routes, notably in the South Caucasus. This region serves as a significant geostrategic area and a burgeoning transport passage between Europe and Asia. Despite the South Caucasus states pursuing diverse policies since the Soviet Union's dissolution, their futures are interlinked. Any analysis of emerging security threats must consider the current regional dynamics. Transport corridors in the broader South Caucasus–Caspian region yield substantial economic gains for multiple nations. The route originating from China through Central Asia, the Caspian Sea, South Caucasus, and Turkey to Europe stands out as one of the shortest, secure, and reliable links connecting East and West. The proposal of a new corridor through Armenia, known as the Zangezur corridor, presents an opportunity to further shorten and fortify this route. This initiative, if realized, could fortify economic and trade relationships among the countries in the region, fueling comprehensive regional development. Azerbaijan's active engagement in shaping the East–West corridor has received recognition from partner nations.

The country's efforts in bolstering the functionality of this transport route are commendable. While numerous studies advocate for the importance of this route in enhancing global trade, there remains an inadequacy in comprehensive academic research specifically on the establishment of the Zangezur corridor. Experts emphasize the urgency for Armenia to advance the construction of the Zangezur corridor in the wake of the Ukraine conflict. The outcome of the Second Karabakh war has been regarded as an opportunity for fresh trade relations and economic cooperation in the region, a potential unseen for a generation, according to analysts specializing in Eastern Europe and the Caucasus region. The discussions surrounding the viability of transport routes in the wake of the Russia–Ukraine conflict have heightened the strategic importance of the South Caucasus region. It has underscored the critical role of transport corridors in linking East and West, particularly the potential of the proposed Zangezur corridor in Armenia. (Iskandarov et al., 2019)

The geopolitical landscape, marked by regional interdependencies and emerging security concerns, necessitates a comprehensive understanding of the South Caucasus region's evolving dynamics. The growing significance of transport routes spanning this area, connecting Europe and Asia, demands a concerted effort to strengthen economic relationships and regional development. Acknowledging the potential of the Zangezur corridor in further bolstering trade connections and economic cooperation, it becomes imperative to delve deeper into this proposed route. Consequently, the subsequent chapter will delve into the materials and methods utilized in analyzing the significance and potential of the Zangezur corridor, highlighting the Gravity Model as a crucial tool to estimate its impact on trade dynamics among the involved nations. (Sadiyev & Iskandarov, 2018)

Methodology

This study employs the Gravity Model, a prevalent tool in international trade economics, to estimate the potential trade between countries. The model posits that trade between nations is positively correlated with their economic sizes and inversely correlated with the distance between them. The analysis encompasses the Gross Domestic Product (GDP) figures of Azerbaijan and Armenia, considering Azerbaijan's GDP as $79.98 billion and Armenia's GDP as $24.540 billion, obtained from reliable economic data sources for the year 2023. The Gravity

Model equation $Tij = \beta 0 \times \frac{Yi \times Yj}{Dist\ ij}$ has been applied in this study. Tij represents the potential trade between Azerbaijan (i) and Armenia (j), Yi and Yj denote the economic sizes of Azerbaijan and Armenia, and Dist*ij* signifies the adjusted distance between the two countries set at 216 kilometers. The constant *β0* has been considered as 1 for this theoretical analysis. The gravity Model equation has been utilized to analyze the potential trade volume between Azerbaijan and Armenia through the Zangazur Corridor. The calculated estimate, considering the respective GDP figures and adjusted distance, aims to predict the potential trade volume between the two countries facilitated by the corridor.

The Zangazur Corridor has emerged as a pivotal regional development initiative, poised to bring significant transformative changes to the economic and geopolitical landscape of the involved nations—Iran, Azerbaijan, Armenia, Turkey, and Georgia. It carries significant regional implications for the involved nations, namely Iran, Azerbaijan, Armenia, Turkey, and

Georgia. It serves as a pivotal conduit for economic, trade, and energy connectivity. For Iran, this initiative presents new prospects for enhanced economic ties and trade opportunities. The corridor facilitates avenues for electricity, gas, and trade, reinforcing Iran's regional connectivity. Azerbaijan, positioned at a strategic crossroads, stands to gain substantially from the Zangazur Corridor (Iskandarov et al., 2020) The initiative opens up new trade possibilities, particularly in the energy sector, consolidating Azerbaijan's role as a regional trade hub.

Armenia views the corridor as a gateway to renewed economic prospects, fostering trade and energy connectivity with neighboring countries. (Blank, 2022) This venture brings forth previously untapped economic opportunities. Turkey, a key regional player, anticipates substantial benefits from increased trade and energy partnerships through the Zangazur Corridor. (Karabakh and Eastern Zangazur Economic Regions of Azerbaijan, n.d.) This development could further reinforce Turkey's standing in the regional economic landscape and ensure energy security. For Georgia, the corridor signifies an opportunity to bolster regional trade and energy connectivity, potentially augmenting economic ties and solidifying its role as a regional transit hub. (De Waal, 2021)

Table 1 provided below presents the anticipated impacts of the Zangazur Corridor across various categories for the respective countries, including fiscal, trade, services, energy (electricity and gas), water, financial markets, and investments. This analysis aims to highlight the projected effects of the corridor on these critical sectors for each involved nation.

Table 1. The anticipated impact of the Zangazur Corridor across various categories for Iran, Azerbaijan, Armenia, Turkey, and Georgia.

Categories	Iran	Azerbaijan	Armenia	Turkey	Georgia
Fiscal	Large (+++)	Large (+++)	Moderate (++)	Large (+++)	Large (+++)
Goods Trade	Moderate (++)	Small (+)	Small (+)	Moderate (++)	Small (+)
Services Trade	Small (+)	Insignificant (0)	Insignificant (0)	Small (+)	Insignificant (0)
Energy and Water					
Electricity	Large (+++)	Moderate (++)	Small (+)	Moderate (++)	Moderate (++)
Gas	Moderate (++)	Small (+)	Small (+)	Small (+)	Small (+)
Water	Insignificant (0)	Large (+++)	Insignificant (0)	Large (+++)	Insignificant (0)
Financial Markets and Investments	Large (+++)	Large (+++)	Moderate (++)	Large (+++)	Large (+++)

The given table analysis outlines the potential impacts of the Zangazur Corridor on diverse sectors for several countries, encompassing fiscal benefits, trade in goods and services, energy, and financial markets.

DISCUSSION

Iran, AzeAzerbaijan, Turkey and Georgia are projected to experience large fiscal benefits from the Zangazur Corridor. Armenia is anticipated to have a moderate fiscal impact. For trade in goods, Iran and Turkey are expected to observe moderate impacts, while Azerbaijan, Armenia, and Georgia might see smaller gains in this category. Iran and Turkey are expected to experience some positive impact in services trade, while Azerbaijan and Armenia are anticipated to observe insignificant impacts. Georgia is also predicted to have an insignificant effect in this domain. (Azernews, 2022) In the realm of energy and water, the corridor is forecasted to have substantial benefits in electricity for Iran and Turkey. Azerbaijan is expected to have a moderate impact, while Armenia and Georgia might experience smaller gains in electricity. Gas trade is projected to have moderate impacts on Iran and electricity, and smaller impacts on water trade for Azerbaijan, Turkey, and Georgia. Armenia is anticipated to have smaller impacts on gas trade while showing an insignificant effect on water trade. All the countries in the table, including Iran, Azerbaijan, Armenia, Turkey, and Georgia, are anticipated to benefit significantly in financial markets and investments due to the Zangazur Corridor. Overall, the table highlights potential positive impacts across various sectors, particularly in fiscal gains, trade, energy, and financial markets, offering opportunities for economic growth and development for the involved nations. (Huseynov, 2021)

Considering applying the Gravity Model to assess the potential impact of the Zangazur Corridor on trade volumes between the involved countries. A common approach in international economics, the Gravity Model estimates trade flows between countries. This model could be employed to project potential changes in trade volumes, considering the impact of distance, economic size, and other relevant variables affected by the Zangazur Corridor's establishment. The Gravity Model in international trade economics postulates that trade between two countries is directly proportional to their economic sizes and inversely proportional to the distance between them. Considering this, let's construct a simplified Gravity Model equation to estimate the potential impact on trade between, for instance, Azerbaijan and Armenia through the Zangazur Corridor. In this regard, we create a simplified Gravity Model to estimate the potential trade between Azerbaijan and Armenia facilitated by the Zangazur Corridor.

The formula for the Gravity Model can be expressed as:

Here, we create a simplified Gravity Model to estimate the potential trade between Azerbaijan and Armenia facilitated by the Zangazur Corridor.

The formula for the Gravity Model can be expressed as:

$$Tij = \beta 0 \ \times \frac{Yi \ \times Yj}{Dist\ ij}$$

Where:

(T_{ij}) represents the potential trade between countries i (Azerbaijan) and j (Armenia).

β_0 is a constant.

(Yi) and (Yj) are the economic sizes of countries i and j, respectively.

($Dist_{ij}$) denotes the distance between countries i and j.

Let's consider hypothetical figures for GDP and distance for illustrative purposes:

- Azerbaijan's GDP (*Yi*): $79.98 billion
- Armenia's GDP *(Yj):* $24.540 billion

- Distance between Azerbaijan and Armenia *($Dist_{ij}$):* 216 kilometers

Using this simplified Gravity Model equation, we can estimate the potential trade volume between Azerbaijan and Armenia through the Zangazur Corridor based on their GDP and the distance factor. Using the Gravity Model formula:

$$Tij = \beta 0 \times \frac{Yi \times Yj}{Dist\ ij}$$

Assuming a hypothetical constant value of *1 for* $\beta_{0:}$

$$Tij = \beta 0 \times \frac{79{,}98 \times 24{,}540}{216}$$

Calculating this:

$Tij \approx$ 9.1025 billion

Therefore, the estimated potential trade volume between Azerbaijan and Armenia, based on the adjusted GDP figures and distance, is approximately $9.1025 billion.

RESULTS

The applications of the Gravity Model offers a theoretical framework to estimate $Tij = \beta 0 \times \frac{Yi \times Yj}{Dist\ ij}$ the potential trade impacts of the Zangazur Corridor on the participating countries—Iran, Azerbaijan, Armenia, Turkey, and Georgia.

This model, leveraging the economic size and distance between nations, provides insights into the anticipated changes in trade dynamics and economic interactions. The calculated estimates based on the Gravity Model suggest promising scenarios for enhanced trade interactions among the involved countries. It projects substantial potential trade volumes, particularly in the energy sector, thereby emphasizing the corridor's role in fostering increased economic ties and trade connectivity.

The Zangazur Corridor emerged as a significant catalyst for economic growth and regional integration. The calculated estimations illustrate the potential for amplified trade activity and energy exchanges among the nations, indicating an optimistic outlook for enhanced economic cooperation facilitated by this infrastructural initiative. The relevance of the Zangazur Corridor becomes apparent through these estimations, showcasing the potentially transformative effects on trade dynamics among the involved nations (Lmhamad, 2022).

The corridor stands as a promising avenue for bolstering economic cooperation and connectivity, particularly in the energy sector, which aligns with the regional aspirations for enhanced trade relationships and economic development. The Gravity Model analysis underscores the crucial role of the Zangazur Corridor in reshaping trade dynamics, providing an optimistic outlook for increased trade activity, energy exchange, and strengthened economic ties among the participating countries. (Gawliczek, 2023) This analysis offers valuable insights into the anticipated trade effects of the Zangazur Corridor, reinforcing its significance as a catalyst for regional economic development and fostering increased economic cooperation among the involved nations.

CONCLUSIONS

In the wake of the Russia–Ukraine conflict and the subsequent reevaluation of transportation routes, the Zangazur Corridor emerged as a pivotal element in the regional landscape. This passage, strategically positioned in the liberated territories of Azerbaijan, stands as a beacon for fostering regional progress and heightened connectivity in the South Caucasus region. The discussions surrounding this corridor underscore its potential significance in enhancing economic ties, fortifying trade relations, and reshaping geopolitical dynamics among the neighboring nations. The proposed Zangazur Corridor provides an unprecedented opportunity to revolutionize trade networks, bridge regional divides, and drive comprehensive economic development. Moreover, the strategic positioning of this corridor serves not only as a physical connector but also as a symbol of potential collaboration and mutual prosperity among the nations involved. As these territories transform, the Zangazur Corridor stands as a testament to the region's resilience, offering prospects for increased economic cooperation and regional integration. The impending realization of this corridor bears the promise of an era of economic rejuvenation, peace, and stability in the South Caucasus. Its potential impact on trade, infrastructure development, and regional cooperation envisions a path towards a more prosperous and connected future for the involved nations.

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GREY FLOWLESS, OR PREDICTING CAPITAL OUTFLOWS IN CRYPTOCURRENCY

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Abstract: *Globalization and irrational capital distribution have fuelled global financial crises. Illicit transactions on a global scale worsen financial challenges, limiting government spending on public services. Amid these challenges, blockchain technology and cryptocurrencies have emerged as potential solutions. Due to anonymity public identification through "keys", some scholars argue that cryptocurrencies create an opportunity for misuse as an easy tool for money laundering, tax evasion and illegal activities. This study investigates the relationship between illicit finance flows and cryptocurrency markets, utilizing grey systems theory and grey relational analysis. Drawing samples from 41 states with the highest cryptocurrency trade volumes, the research reveals nuanced dynamics within the cryptocurrency market, shedding light on the connections between cryptocurrencies, shadow activities, and capital outflows. The findings contribute valuable insights to the ongoing discourse on the impact of cryptocurrencies on global financial stability. The intricate exploration of these interconnections underscores the need for a comprehensive understanding of the role cryptocurrencies play in shaping the contemporary financial landscape.*

Keywords: *Globalization, Illicit finance flows, Cryptocurrency markets, Grey systems theory, Financial stability*

INTRODUCTION

Even though relevant national policies and international regulation are in place, lack of transparency and corruption, especially in developing countries, reduce effectiveness of these practices in stimulating financial stability, resulting in tax evasion and growth of criminal activities (Fanusie & Robinson, 2018). This means, that centralized financial systems and state power have proven insufficiency in combating illicit activities. Therefore, the need in searching for new systems and tools which could better deal with existing challenges greatly increases. One of such innovative systems was brought to economic world through invention of blockchain systems and its application in trade transactions through cryptocurrencies, offering higher efficiency and transparency for financial transactions. According to European Commission, cryptocurrencies contribute to the establishment of 'trust between two mutually unknown and unrelated parties to such extent that sensitive and secure transactions can be performed with full confidence over an open environment, such as the Internet'. This solution has introduced a new economy, namely 'crypto economy'.

In the early 1990s physicists Stuart Haber and W Scott Stornetta published the first paper to outline the use of a chain of cryptographically secured blocks to preserve the integrity of past information to protect it. This paper was followed by the subsequent seminal whitepaper "Bitcoin: A Peer-To-Peer Electronic Cash System" in 2008 by Satoshi Nakamoto (a group of people), where the scholars described the financial transactions that can be made through the use of blockchain systems, adding practical value to previous research in this area.

Cryptocurrency is the largest primary application of blockchain technology and is recently experiencing an unprecedented rise with market capitalization surpassing in 2018 $335b (Bright, Koskinen, & Malm, 2019).

In academic literature, opinions on the long-term existence of cryptocurrencies are separated, however several key applications have been identified by several sources. For instance, report of the UK Government (Lerner, 2003) states that blockchains have the capacity to 'reform our financial markets, supply chains, consumer and business-to-business services, and publicly-held registers'.

One of the key scientific opinions in this area is the analysis of Babbitt and Dietz (Babbitt and Dietz, 2014), which define cryptoeconomy regardless of 'geographic location, political structure or legal system, but using cryptographic techniques to constrain behavior in place of using trusted third parties'. Foundational principles of the blockchain technology are cryptography, smart contracts, distributed consensus and system architectures.

As a novel financial concept cryptocurrency is anticipated to remove inefficiencies identified in the financial industry, such as overcentralisation, too many intermediaries, unwillingness to delete or change historic records, tracking issues and others, adding more practical value of the current research due to the need to get a more informed perspective of how well cryptocurrency is performing with regard to transparency of financial transactions.

Cryptocurrency has demonstrated tremendous growth over last years, and the volume of trade transactions in cryptocurrencies multiplies every quarter (Broséus et al., 2016). The key advantages of cryptocurrency comparing to its precedents is its decentralized, or distributed nature. Unlike other forms of money, crypto money is not a promissory note issued by states or their central banks, rather it is a speculative code issued by individual miners (Brown, 2016; Glaser et al., 2014). Use of cryptographic signatures and smart contracts and peer-to-peer networks, which form the heart of cryptocurrency distributed consensus systems allows from the one hand, confidentiality for the financial transactions, while on the other hand, transparency and credibility in financial interactions and operations.

Cryptocurrency is a revolutionary form of money, and by its functions and nature significantly differ from all other forms of money ever existed. Cryptocurrency deliver key monetary functions deriving from its nature as described by the main relevant theories of commodity, debt (credit) and fiat theories of money.

Cryptocurrencies proved successfully delivering store of value function of money, ensuring transparency of transactions made in this currency and parties of these transactions accountable for their content. However, on the other hand, even though trade transaction both on national and international level continue to expand by means of cryptocurrencies which can be used for provisioning trade supply, the integrated distributed ledger still fails with carrying mean of exchange function, compared to its alternatives, namely national fiat currencies.

Although, crypto market continues to grow and saturate both from technical and economic viewpoints with progressively increasing number of currencies mined over the world (Mukhopadhyay et al., 2016; Corbet et al., 2020), number of arguments and misinterpretations around the concept of cryptocurrencies also boosts in the academic literature (Lee et al., 2019; Farrugia et al., 2020; Alvarez, 2018). Majority of debates around the impact of cryptocurrency are posessed on the state of shadow and illegal activities and capital outflows from one country to another. Further development and expansion of trade transactions using cryptocurrency creates the concerns around the nature and governance issues associated with this currency.

Existing debates among economists on governance and regulation of cryptocurrency can be resolved by describing the technical nature of this phenomenon (Irwin & Turner, 2018; (Yermack, 2013; Brière, Oosterlinck, & Szafarz, 2013; Brito, Shadab, & Castillo, 2014; Buchholz et al., 2012). Unlike the centralized or decentralized systems, shared and distributed data structures or ledgers, or blockchains, can securely store digital transactions without using a central point of authority, blockchain platforms instead of a single trusted center management, allow each individual network member within a distributed network of digital users to hold a copy of the records' chain and partner on the valid state of the ledger with consensus, safeguarding integrity of the ledger. New transactions are linked to previous transactions by cryptography which makes blockchain networks resilient and secure.

Despite overarching interest of international agencies towards revealing and measuring trade using cryptocurrencies, assessment of cryptomarket maturity by states remains challenging task for global cryptocurrency researchers and scholars (Lee et al., 2019, Farrugia et al., 2020; Alvarez, 2018; Hileman & Rauchs, 2017). Very few methodologies consider cryptocurrency markets maturity in a complex context, paying attention to mainly volume and number of transactions made in these endogenous currencies. However, while internet users continue safely to transact on the internet, international organizations should ensure crime finance, including three-dimensional rendering (source of funds, ways of transferring the funds and use of funds) is not flowing through this channel (Jacquez, 2016).

According to existing views on cryptocurrencies (Brezo and Bringas, 2012), due to anonymity public identification through "keys", cryptocurrencies create an opportunity for misuse as an easy tool for money laundering, tax evasion and illegal activities. In the broadest form, illicit financial flow cover illicit activities, in particular the provision of services or the production, sale, possession or use of goods forbidden by law, including the illicit production and trafficking of drugs, the illicit manufacturing of and trafficking in firearms, trafficking in persons, and money laundering, as defined in the relevant international treaties. (C.Williams, 2018). Many researchers (Farrugia et al., 2020; Brown, 2016; Bichler, Malm, & Cooper, 2017) define international financial flows in four main categories in accordance with the activities, generating these transactions, and point out inefficiencies of current financial systems and need of decentralized systems. According to analysis of Decker et al, financial institutions establish trust through audit process (Möser & Narayanan, 2019), proposing a software-based audit of bitcoin exchanges. This way financial institutions eliminate state and private intermediary actors, such as auditors, replacing latter with software relying on trusted computing.

There are studies that have been already carried out about illicit financial flows within crypto market (Liu & Tsyvinski, 2018; Liu, Tsyvinski, & Wu, 2019; Brezo & Bringas, 2012), however, majority of them are based on application of mathematical and statistic techniques to estimate cryptocurrency market maturity. Furthermore, the empirical results of research carried up to date lacks consideration of many supplementary factors, impacting market maturity and development. Therefore, the purpose of the research is to provide scientifically based and empirically proven evidence to hypothesis on existence of relation between the two concepts, one of which reflects an economic power (Liu & Tsyvinski, 2018), while another one impedes international equality and sustainability.

The current research is grounded on two fundamental theories. First, quantity theory of money defines the key factors, impacting scale and maturity of cryptocurrency as a broad term, introduced as money and successfully delivering key money functions, such as store of value,

and ideally medium of exchange. Quantity theory of money describes the value of money using its key parts, namely money supply, its velocity and demand for money. According to the quantity theory of money, cryptocurrency market maturity was identified based on the cryptocurrency market cap (money supply), cryptocurrency velocity (transaction volume divided by cryptocurrency market cap) and demand for cryptocurrency.

To analyse cryptocurrency components in the most inclusive way, we used a grey system theory approach, which is broadly applied to decentralized systems' research (Broséus et al., 2016; Bichler & Malm, 2013; Farell, 2015), such as cryptocurrency. Being interdisciplinary, grey system approach can explain the complex relationships between the elements of cryptocurrency as a multifaceted system of different elements, since decentralized systems need "a whole systems perspective, including levels, spheres, sectors and functions and seeing the community level as the entry point at which holistic definitions of development goals are from the people themselves and where it is most practical to support them. It involves seeing multi-level frameworks and continuous, synergistic processes of interaction and iteration of cycles as critical for achieving wholeness in a decentralized system and for sustaining its development" (UNDP, 2021).

As major part of grey system theory, grey relational analysis was applied during the research since the cryptocurrency system is comprised from the elements with novel features and limited information available. Application of grey relational analysis is driven by several reasons. First, the current research deals with huge amount of uncertain information, especially the one, related to illicit capital flows (Kuo, Yang, & Huang, 2008). Second, being very complex and uncertain, illicit finance flows require examination of its elements before making assessment and predictions of the system as a whole. Through application of grey relational analysis, a complex umbrella series with observable and latent variables in face of cryptocurrency was produced and analysed and further examined to have a link with the level of illicit financial flows (Holz et al., 2020), constructed by GFI (GFI, 2018). After grey relational research is completed and grades are obtained, we are comparing the grey coefficients against globally applied illicit finance flow estimations in order to reveal the possible correlation between these two concepts.

Finally, we conducted relational analysis of different social, political and economic exposure and development criteria of sustainable development of nations in order to answer the fundamental question of the research and examine the relationship between cryptomarket maturity of the countries and the state of their illicit finance flows.

RESEARCH METHODOLOGY

The current study, based on grey systems theory application, aims to scientifically reveal the grey relational coefficients of different criteria, which describe the maturity of the cryptocurrency, and examine impact of cryptocurrencies on the state of illicit trade with the existing information gaps. Selection of criteria of cryptocurrency system is grounded on the key components of currency system in accordance with the quantitative theory of money.

The theory of grey relational analysis is nowadays broadly used in many different areas, including finance markets performance analysis, money markets and economic analysis. It was first introduced (Deng, 1982; Deng, 1989) as a response to gaps and incompleteness of research data related to the studies of actual problems, including illicit and illegal economic activities. The scholar introduced grey elements and relations to express the level of trust to the source of

research information in any area and explained the behavior of mechanisms using grey clustering. Linking social and natural science through framing mathematical models for quantitative analysis with uncertain and incomplete information, grey relational analysis aims to help with decision making using multiple variables and factors. Unlike the other methodologies, applied to measure and estimate cryptomarket maturity, our methodology involves grey system theory and grey system analysis, which is not a statistical method. The reason for using grey system is a significant complexity of statistical methods and quite a large number of causes of illicit financial flows, which obscures the calculations and at high risk of creating chaotic datasets with huge discrepancies.

To successfully implement the proposed research, we used the following methodological approach:

1. Based on quantity theory of money we defined the key components of cryptocurrency and developed a list of key criteria, that contribute to market maturity and saturation: cryptocurrency market cap (money supply), cryptocurrency velocity (transaction volume divided by cryptocurrency market cap) and demand for cryptocurrency. Our data was constructed upon eight key features, which broadly reflect key currency market indicators, applied to crypto type of money. Based on the criteria, the cryptocurrency dataset was created for 41 countries with the largest number of cryptocurrency traders in the world.
2. Using grey system theory approach, which is broadly applied to decentralized systems' research (Broséus et al., 2016; Bichler, Malm, & Cooper, 2017; Farell, 2015), such as cryptocurrency, we adopted grey relational analysis, since the cryptocurrency system embraces elements with novel features and limited information available, e.g. this is a system with grey parts. Interdisciplinary grey system methodology successfully explains complex relationships between the elements of multidimensional decentralized cryptomoney system. We adopted the grey relational analysis to our cryptocurrency dataset with multiple variables describing cryptocurrency market environment in order to identify the maturity of cryptocurrency markets. Within this framework we construct the decision matrix, grey relational coefficients and identify the ranking of the countries by cryptomoney market maturity.
3. We have completed multiple regression analysis in order to answer the fundamental question of the research and examine the relationship between cryptomarket maturity of the countries and the state of their illicit finance flows in a more sophisticated way using latent variables, such as level of political and economic exposure. Therefore, after grey relational research is completed and grades are obtained, relational analysis was conducted by comparing the grey coefficients against globally applied illicit finance flow estimations in order to reveal the possible correlation between these two concepts. We then matched the result of grey relational coefficients to the list of countries with the level of illicit finance flows to reveal the correlation possible. To study the relationship between crypto market capitalization and illicit financial flows data collection approach is based on data points obtained from Global Finance Institution, World Bank, UN Comtrade, CoinMarketCap and DataWorld databases. We selected countries and ranked them by following criteria:

i. Crypto market maturity identified for the country X
ii. Illicit Financial Flow of the country X identified as per the UN data using trade misinvoicing tools and techniques
iii. Social, political and economic exposure and development criteria of sustainable development of nations.

The following steps were conducted during the grey relational analysis:

I. The evaluation matrix was produced based on the information collected on the key criteria, describing the maturity of cryptomarkets.

II. We then develop our standard series with the target values of selection criteria in our decision making model. This series will identify our reference points in the decision making problem.

III. After creating our matrix with 41 countries and 8 attributes of crypto markets we perform grey normalization in order to be able to compare the country series for each attribute. The values in the normalized series will be in the interval from 0 to 1. We apply three traditional methods of normalization to our data. For attributes, where higher is better for a selection criterion, or attribute, we apply the following calculation:

$$x_{i^*}(\mathrm{k}) = \frac{x_i(\mathrm{k}) - min_{k^{x_{i^*}(\mathrm{k})}}}{max_{k^{x_{i^*}(\mathrm{k})}} - min_{k^{x_{i^*}(\mathrm{k})}}}$$

where, $min_{k^{x_{i^*}(\mathrm{k})}}$ is a minimum value as per selection criteria *I* in the decision matrix,

$max_{k^{x_{i^*}(\mathrm{k})}}$ is a maximum value as per selection criteria *I* in the decision matrix

For attributes, where lower value is more desired for selection criteria, we used the following procedure:

$$x_{i^*}(\mathrm{k}) = \frac{max_{k^{x_{i^*}(\mathrm{k})}} - x_i(\mathrm{k})}{max_{k^{x_{i^*}(\mathrm{k})}} - min_{k^{x_{i^*}(\mathrm{k})}}}$$

For selection criteria with a given desired value within the evaluation matrix, we perform the following method:

$$x_{i^*}(\mathrm{k}) = 1 - \frac{|x_i(\mathrm{k}) - x_0(\mathrm{k})|}{max\,\{max_k x_i(\mathrm{k}) - x_0(\mathrm{k});\ x_0(\mathrm{k}) - min_k x_i(\mathrm{k})\}}$$

where $x_0(\mathrm{k})$ is a desired value of alternative (country) k

IV. Once the normalized sequence is ready, we calculate the deviation sequence as an absolute difference between reference sequence and comparable sequences. This action is performed for further obtainment of Grey Relational coefficient.

So, we subtract normalized decision matrix values and standard series values and get an absolute value of this subtraction equation, as indicated below:

$$\Delta_{0i}(\mathrm{k}) = |x_{i^*}(\mathrm{k}) - x_{0*}(\mathrm{k})|$$

$$\begin{bmatrix} \Delta_{01}(1) & \Delta_{01}(2) & \Delta_{01}(5) \\ \Delta_{02}(1) & \Delta_{02}(2) \cdots & \Delta_{02}(5) \\ \vdots & \vdots & \vdots \\ \Delta_{12}(1) & \cdots & \Delta_{12}(5) \end{bmatrix}$$

V. Once the concluding matrix is ready, we identify grey relational coefficients of attribute k for alternative I (country)

$$y(x_0(\mathrm{k}), x_i(\mathrm{k})) = \frac{\Delta_{min} + \zeta * \Delta_{max}}{\Delta_{0j} - \zeta * \Delta_{max}}$$

Where Δ_{max} refers to the highest value in the deviation sequence, Δ_{min} represents the lowest value in the difference sequence

y is the grey relational coefficient, and ζ is an adjustment coefficient between Δ_{0j} and $* \Delta_{max}$, which belongs to an interval from 0 to 1.

For the purposes of the current research we used ζ equal to 0.5.

VI. Based on grey relational coefficients we construct the grey factor matrix:

$$\begin{bmatrix} y_{01}(1) & y_{01}(2) & y_{01}(5) \\ y_{02}(1) & y_{02}(2) \cdots & y_{02}(5) \\ \vdots & \vdots & \vdots \\ y_{12}(1) & \cdots & y_{12}(5) \end{bmatrix}$$

VII. and finally, we identify our grey relational grades. Grey relational grade displays the similarity between the normalized decision matrix and the standard series. Similarity increases as the grey relational grade increases, and therefore the highest similarity gives the best alternative in the decision making challenge. If the importance levels of the selection criteria in the decision making problem are equal, the grey relational grade is calculated as

$$\tau(X_0, X_i) = \frac{1}{m} + \sum_{k=1}^{12} y(X_0(\mathrm{k}), X_i(\mathrm{k})1)$$

However, with different importance levels of attributes in the decision making problem, a different equation is used:

$$\tau(X_0, X_i) = \sum_{k=1}^{12} y(X_0(\mathrm{k}), X_i(\mathrm{k})) * W_i(\mathrm{k})$$

where $W_i(\mathrm{k})$ is a weighted value of the selection criteria i.

For the purposes of the current research, we have proportionally distributed the value among all the criteria.

RESULTS

As mentioned above, traditional grey relational analysis procedure was adopted to assess the level of cryptocurrency market maturity. Within this framework we construct the decision matrix.

First, using grey relational analysis we evaluate maturity and performance of cryptocurrencies in the countries and then compare this to the state of IFF. Selection criteria of our evaluation matrix is built upon a set of attributes for selected countries with the largest share of cryptotraders in the total amount across the globe. As a result, 41 economies were selected, namely China, United_States, Japan, United_Kingdom, India, Canada, Hong_Kong, Australia, Brazil, Switzerland, Russia, Mexico, Saudi_Arabia, Singapore, Sweden, Poland, Malaysia, United_Arab_Emirates, Vietnam, Turkey, Chile, Norway, Philippines, South_Africa, Denmark, Czech_Republic, New_Zealand, Pakistan, Morocco, Colombia, Romania, Hungary, Nigeria, Argentina, Peru, Ukraine, Kazakhstan, Kenya, Dominican_Republic, Croatia, Tanzania.

The following criteria was selected for alternatives (scenarios):

- Cryptocurrency trading volume in 2020, mln USD
- Share of trading volume in M2 broad money supply
- Average trading value per user

- Number of cryptoowners
- Share of cryptoowners in total population
- Legal Status of Cryptocurrencies
- Regulatory Framework for Cryptocurrencies: (Application of Tax Laws, Anti-Money Laundering/Anti-Terrorism Financing Laws, or Both)
- Countries that have or are in the process of issuing their own national or regional cryptocurrency

We then develop our standard series with the target values of selection criteria in our decision making model. This series will identify our reference points in the decision making problem. We have applied normalization to our data due to measurement differences of the criteria selected.

Since there is no standard of what should be the value of our preferred reference $x_0(\mathrm{k})$, when creating a normalized comparable sequences, the reference sequence was chosen from given original values of comparable sequences. Since all criteria have "the higher – the better" characteristic, target values for each of our criteria/sub criteria is selected as max values among all countries observed.

Since as mentioned the values in the evaluation matrix had "the higher – the better" characteristic, the normalized values were calculated using the following formula from Part 2. Research Data and Methodology:

$$x_{i^*}(\mathrm{k}) = \frac{x_i(\mathrm{k}) - min_{k^{x_{i^*}(\mathrm{k})}}}{max_{k^{x_{i^*}(\mathrm{k})}} - min_{k^{x_{i^*}(\mathrm{k})}}}$$

For example, the attribute "Cryptousers_Share_Of_Population" for United_States was obtained as follows:

0.489429 = (6,46-MIN(RANGE" Cryptousers_Share_Of_Population"))/(MAX RANGE" Cryptousers_Share_Of_Population"-MIN RANGE" Cryptousers_Share_Of_Population")

The other values have also been calculated in the similar way.

After normalized table is ready, deviation sequence can be calculated as a difference between reference (target) value and comparable sequence.

To calculate the absolute value of the difference between the target, or reference, value and comparable sequence, we applied the following formula

$$\Delta_{0i}(\mathrm{k}) = |x_{i^*}(\mathrm{k}) - x_{0*}(\mathrm{k})|$$

For example, "legal status of cryptocurrencies" for Japan was calculated as follows:

$$\Delta_{03}(3) = |x_{3^*}(3) - x_{0*}(3)| = |1 - 0.06104752| = 0.93895248$$

We applied the similar calculation for all countries and for each criterion to produce the table shown above. This formula shows how far the values of comparable sequences are from the values of target sequences. If the difference values are close to 0, it means that the comparable sequence values are close to the reference sequences, or target values. And vice versa, if the difference values near to 1, it means that the comparable values are far from the desired target value.

After difference sequences are ready, we used these values to calculate grey relational coefficients. Our adjustment coefficient ζ between Δ_{0j} and Δ_{max} was chosen as 0.5.

$$y(x_0(\mathrm{k}), x_i(\mathrm{k})) = \frac{\Delta_{min} + \zeta * \Delta_{max}}{\Delta_{0j} - \zeta * \Delta_{max}}$$

For instance, to calculate the grey relational coefficient average transaction value per user for Vietnam, we applied the following formula:

$$y(x_0(5), x_{12}(5)) = \frac{\Delta_{min} + 0.5 * \Delta_{max}}{\Delta_{0\,12} - 0.5 * \Delta_{max}}$$

To obtain the respective grey relational coefficient, we need to obtain first the highest and the lowest deviation values in the range of country values for criteria average transaction value per user:

$$\Delta_{min} = 0$$
$$\Delta_{max} = 1$$

Once the minimum and maximum deviation values are known, grey relational coefficient average transaction value per user for Vietnam is calculated as follows:

$$y(x_0(5), x_{12}(5)) = (0+0.5*1)/(0.989898+0.5*1) = 0.335593$$

Similarly, we obtain the other grey relational coefficients.

After grey relational coefficients are calculated, we can obtain grey relational grades by using the following equation:

$$\tau(X_0, X_i) = \sum_{k=1}^{12} y(X_0(\mathrm{k}), X_i(\mathrm{k})) * W_i(\mathrm{k})$$

For the purposes of the current research, the importance of each criteria was selected equal. Grey relational grades represent the correlation between target sequence and comparable sequence and are equal to weighted sum of the values in Table 4. Therefore, the best performance of cryptomarket is selected for the alternative (country) with the highest correlation.

For instance, grey relational grade for the United Kingdom is calculated as follows:

$$\tau(X_0, X_4) = \sum_{k=1}^{5} y(X_0(5), X_4(5)) * 0.2$$

As explained above, the weighted share was selected equal for each alternative, therefore it is equal to 0.2.

We have further ranked the grey relational grades of the countries from the greatest to the lowest cryptomarket performance comparison.

The next part of the data analysis includes comparison of grey relational grades against illicit finance flows, obtained from GFI database (GFI, 2018).

Country	Grey Relational Grade	Grey Grade Ranking	IFF	IFF Ranking
China	0.448831432	19	19.63	9
United_States	0.686291986	1	11.4	28
Japan	0.505328468	9	9.8	29
United_Kingdom	0.477219137	15	8.5	30
India	0.397895939	35	19.5	10
Brazil	0.443099532	23	16.5	23
Russia	0.541745724	3	19.3	11
Mexico	0.426950805	29	14.46	25
Saudi_Arabia	0.35338034	39	22.44	5

Poland	0.44396952	22	17.21	21
Malaysia	0.42871459	28	23.63	3
United_Arab_Emirates	0.351959316	40	25.16	1
Vietnam	0.440385873	25	16.68	22
Turkey	0.425403132	30	20.85	6
Chile	0.438397895	26	12.12	27
Philippines	0.433298612	27	24.24	2
Pakistan	0.354855142	38	17.65	17
Morocco	0.341208134	41	19.26	12
Colombia	0.392753582	36	16.4	24
Romania	0.444768525	21	19.94	8
Hungary	0.418705121	34	18.13	15
Nigeria	0.503408115	10	17.88	16
Argentina	0.459646585	17	13.61	26
Peru	0.44188191	24	18.87	14
Ukraine	0.489868532	13	19.96	7
Kazakhstan	0.423399111	31	17.35	19
Kenya	0.494064616	12	22.62	4
Dominican_Republic	0.4448156	20	17.37	18
Croatia	0.419351586	33	17.3	20
Tanzania	0.373909933	37	19.11	13

We have applied color coding to the rankings of the respective alternative both in grey relation grades and IFF ranking to visualize the results of the correlation analysis.

The first part of the research is completed successfully by obtaining the grey relational coefficients, however, when comparing to the IFF level in the selected states, direct neither positive nor negative relationship between maturity of cryptocurrency market and illicit financial trade can be concluded.

For this reason, we have included analysis of latent variables, such as political and economic exposure and culture index into our research. We have selected political freedom scores issued on annual basis by the Freedom House agency (Freedom House, 2021), which is an updated and most comprehensive dataset from all researched broken down by countries. Another advantage of freedom scores dataset of Freedom House Inc. is that this index includes not only political but also social integration of the states, based on its methodology (Freedom House, 2021). At the same time, appreciating cultural differences of the selected states, we have chosen a culture index dimensions, namely, power distance, individualism, masculinity and uncertainty avoidance indexes into our research. Cultural dimensions are based on 6D Model of national culture (Hofstede, 1984; (Hofstede Insights, 2020) introduced in Hofstede's Cultural Dimensions Theory by Hofstede G. et al in 1980. Subsequently, Gross Domestic Product (GDP) per capita was chosen to demonstrate economic development of the states. The data was obtained from World Bank on the latest year available in the World Bank Databank (The World Bank, 2019).

We further applied the multiple linear regression analysis to our dataset to identify the relationship between illicit financial flows and set of independent variables, including crypto grey relational grades and selected above freedom scores, national cultural dimensions and GDP per capita. Our independent variables include observed variable of grey relational grades as well as latent variables of GDP per capita, political and social integration level and selected cultural dimensions, namely power distance index, masculinity index, uncertainty avoidance index and individualism index. Mentioned cultural dimensions are considered to be the most powerful when choosing the mechanisms of financial management by economic agents.

The summary output of our research returned the following statistical results.

Regression Statistics	
Multiple R	0.802753
R Square	0.644412
Adjusted R Square	0.531271
Standard Error	2.740324
Observations	30

The result of the research shows statistical significance as per the 30 values for 7 variables observed:

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	19.87653	5.785131	3.435797	0.002361	7.878906	31.87416	7.878906	31.87416
Grey Coefficient, CryptoMaturity	-13.5859	9.022759	-1.50573	0.146359	-32.2979	5.126177	-32.2979	5.126177
Freedom Score	-0.04505	0.023592	-1.90965	0.069304	-0.09398	0.003874	-0.09398	0.003874
GDP per capita	4.77E-06	3.97E-05	0.120137	0.905465	-7.8E-05	8.72E-05	-7.8E-05	8.72E-05
IDV (INDIVIDUALISM)	0.009488	0.048773	0.194534	0.847543	-0.09166	0.110637	-0.09166	0.110637
PDI (POWER DISTANCE INDEX)	0.119966	0.040255	2.980165	0.006905	0.036483	0.203449	0.036483	0.203449
MAS (Masculinity)	-0.02005	0.038262	-0.52407	0.605469	-0.0994	0.059298	-0.0994	0.059298
UAI (Uncertainty Avoidance Index)	-0.02014	0.026632	-0.75631	0.457484	-0.07537	0.035089	-0.07537	0.035089

Our data fits the model by 81%. The regression model result of our ANOVA test is given below:

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	7	299.3942	42.7706	5.695625	0.000749
Residual	22	165.2063	7.509378		
Total	29	464.6005			

As shown above, our regression model returns strong F significance score, proving the relevance of our hypothesis on the correlation between illicit finance flows and cryptomarket maturity. As stated in the beginning of our research, we also used our proxy indicators, which strengthened our research.

DISCUSSIONS

The current study was conducted to determine if development of novel endogenous cryptocurrencies can influence countries' likelihood to impact capital outflows. According to existing views on cryptocurrencies (Brezo and Bringas, 2012), due to anonymity public identification through "keys", cryptocurrencies create an opportunity for misuse as an easy tool for money laundering, tax evasion and illegal activities.

It was hypothesized that anonymity of public identification keys creates a space for violence, increasing scale of money laundering, tax evasion and illegal activities, predicting high level of capital outflows.

To test the hypothesis, research methodology including grey relational and multiple regression analysis was used. We first applied grey relational analysis to evaluate maturity of cryptotrade at 41 states with the highest number of cryptotraders and returned their grey relational coefficients in cryptocurrency maturity. Based on the grey relational coefficients obtained for cryptocurrency maturity, we developed a new dataset comprising cryptocurrency, socio-economic and illicit trade factors across the 30 states, with available data on research

criteria. Multiple regression analysis was adopted to determine the relationship between these factors. Our data fit the multiple regression model by 81%, which is quite strong evidence of the relationship between mentioned factors. Result shows that 53.12% of the variance in illicit finance flows can be accounted by the set of cryptocurrency maturity and socio-economic predictors, collectively, $F(7,22) = 5.6956$ $p<0.001$.

Looking at the unique individual contributions of predictors, the result shows that economic indicator, such as GDP per capita, and cultural indexes, namely Individualism and Power Distance Index, positively predict illicit financial flow level.

Furthermore, result also reveals that those countries which have high rate of transactions in cryptocurrency, freedom scope, masculinity and uncertainty avoidance are more likely to report low level of illicit finance flows.

This suggests that use of blockchain systems in monetary transactions can be considered a more transparent system, adding value to the state of global trade relationships not only by less bureaucracy and intermediaries involved, but also higher transparency and simplicity.

Having central idea of decentralization, these distributed systems however provide total security and confidentiality, being transparent. Without a central authority within this network, blockchains establish trust through consensus and cryptography. Cryptography is used to shift the burden of trust from intermediaries (such as banks, financial and govern institutions) to cryptographic algorithms, and constructing and analyzing protocols that prevent third parties or the public from reading private messages. Cryptography provides techniques for keeping information secret, for determining that information has not been tampered with, and for defining who authored process of information. It is based on techniques related to aspects of information security such as confidentiality, data integrity, entity authentication, and data origin authentication. Cryptography is not the only means of providing information security, but rather one set of techniques. From the other hand, cryptocurrency development can positively impact the quality of international financial transactions, reducing not only transaction costs, but also reducing the illicit financial flows, as revealed by the research results. However, use of AML/KYC and other regulations relevant to transactions with cryptocurrency has an important role to bridge the gaps within trade operations with cryptocurrency that might potentially cause illicit financial outflows.

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THE DEVELOPMENT OF AGROTOURISM IN AZERBAIJAN: BASED ON THE ITALIAN EXPERIENCE

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***Abstract**: Agrotourism, an innovative type of rural tourism, is growing quickly across the world. Agrotourism is seen as a vital factor in increasing farmer prosperity, boosting economic growth, and improving the general quality of life in remote areas by visitors' incoming. Promoting this type of tourism in Western European nations has been a main goal as attaining long-term growth and started developing during the 1960s. Azerbaijan's principal priority is the sustainable development of diverse economic sectors, and increasing agrotourism stands out as a vital goal within this context. This article investigates Italian viewpoints regarding agrotourism and strategies to implement and promote its growth, as well as, submit proposals for the expansion of agrotourism and policy implementation in Azerbaijan. The study encompassed in-depth information on the Azerbaijani tourism industry, including programs implemented through cooperation between governmental and non-governmental organizations to promote advancement of agrotourism. The exploration bases its findings on recent investigations, information from statistics, and research papers.*

***Keywords:** Agrotourism, rural areas, farmers, agriculture, activities of agrotourism*

INTRODUCTION

The notion of "agrotourism" firstly published in the international literature in the previous century. The name "agrotourism" arose with the complex in two terms: "agro" and "tourism". So, the phrase of "agro" was taken from the Greek context: "agros" meaning "soil" and "agronomos" who possesses land as manager, on the other hand, "tourism" consists of a wide range of leisure activities motivated by intellectual, recreational, business-related, and other goals (Michał Sznajder et al., 2009). While there is no clear definition of agrotourism, it is often defined as activities in which local inhabitants participate in rural regions to cater to tourists. It may also be referred to as a rural business concept that combines well with the agricultural sector and the tourism industry (Dr. Nicole L. Vaugeois et al.,2017). Farmers, tour operators, and local communities all benefit with the help of agrotourism. It can be thought of as a supplement to the budget of farms, involving the manufacturing of various products and services, as well as the exchange of local culture and customs between visitors and inhabitants.

This industry first emerged in Western Europe in the 1960s, contributing to the transformation of mountains, as well as, rural locations in numerous countries into tourist attractions. This type of tourism has developed extensively in European countries, positively influencing people's lifestyles, financial growth, and more. European Union also is interested in this industry because of sustainable progress goals. The European

Union is also heavily invested in it since it coincides with its sustainable development goal (Ramona Ciolac et al., 2019). Agrotourism is growing in countries such as Italy, Austria, Germany, France, Denmark, and others.

Several agreements were signed, and multiple meetings were held to enhance Azerbaijan-Italy collaboration. The declaring of 2020 as the Year of Azerbaijan in Italy, the establishment of an Italian-Azerbaijani university in Azerbaijan, and ongoing collaboration in sectors such as tourism, defense, economy, and others highlight Italy's role as Azerbaijan's most reliable and prominent partner among members of European Union. That is why the researcher discussed below agrotourism in Italy and generated suggestions to stimulate agrotourism growth in Azerbaijan.

The scientific novelty of the presented research is the using of experience in agrotourism of Italy in Azerbaijan. It should be acknowledged that one of the most significant objectives for governments throughout the world, including Azerbaijan, is to guarantee that the progress of any industrial sector is based on sustainable development goals. It is extremely important to take into account that, despite the potential for agrotourism expansion in Azerbaijan, the lack of adequate scientific research is a barrier to the sector's advancement.

The goal of this study is to investigate the agrotourism in Italy and to implement this experience in Azerbaijan. The second goal is to promote agrotourism industry in Azerbaijan in the scientific area.

The following research objectives will aid in the achievement of the goal:

- *To investigate the main characteristics of agrotourism in Italy*
- *To investigate programmes which implemented in Azerbaijan to enhance agrotourism*

METHODOLOGY

The secondary data plays the important role in the research article and was utilized. The sources included scientific articles and journals, books, statistics. Statistics data were gathered from Italian National Institute with qualitative methodology.

Literature review

The tourism industry in the Republic of Azerbaijan

Tourism in Azerbaijan is booming, due to the country's rich cultural legacy, the great hospitality of its people, the country's diversified landscapes, and a variety of other elements. Azerbaijan implemented a number of laws to support the advancement of the tourism sector.

The approval of the "State Program for Tourism Development in the Republic of Azerbaijan from 2002 to 2005," as per Presidential Decree No. 1029 issued on August 27, 2002, created a favorable environment for the tourism sector's growth and laid the groundwork for Azerbaijan's entry into the international tourism market. Under Presidential Decree No. 838, dated April 6, 2010, the "State Program for the Growth of Tourism in the Republic of Azerbaijan from 2010 to 2014" was sanctioned in accordance with this ongoing plan. Its purpose was to develop a progressive tourism industry that meets demanding economic, social, and environmental standards, by an ultimate goal of making tourism a cornerstone of the country's economy (Strategic Roadmap for the Development of Specialized Tourism Industry in the Republic of Azerbaijan, 2016).

The Strategic Road Map for the Advancement of the Specialized Tourism Sector in the Republic of Azerbaijan was approved by Presidential Decree on December 6, 2016. The Strategic Road Map strives to accomplish numerous major results as part of its broader objectives. These include promoting tourism development, providing top-tier and competitive tourism services on both domestic and international levels, creating experience in tourism rooted in culture of community and values, catalyzing new investment ventures driven by contemporary concepts and innovation, and fostering coordination among relevant tourism authorities. The Strategic Roadmap includes goals such assisting the growth of tourism sector within specified timeframes, guarantying the delivery of high-quality, competitive tourism services in both global and local markets, shaping experience in tourism industry that reflect national values, stimulating new investment initiatives rooted in contemporary concepts and innovations, and fostering collaboration among relevant authorities for tourism advancement (Madina Hashimli, 2019).

The 1999 tourist Law was changed in 2021 to improve the basic components of public administration in the tourist sector, the regulatory framework for the tourism industry, recommendations for the effective usage of tourism resources, and tourism financing sources (About Tourism Law of the Republic of Azerbaijan, 2021).

The foundation of the Azerbaijan State tourist Agency in 2018 resulted in the construction of a specific body entrusted with tourism management and the creation of tourism rules, among other functions. Tourism zones or regions were formally formed in the Republic of Azerbaijan on February 8, 2023, in compliance with a presidential proclamation, including Baku-Absheron Regional Tourism Administration; Ganja Regional Tourism Administration; Sheki Regional Tourism Office; Lankaran Regional Tourism Administration; Mingachevir Regional Tourism Administration; Guba Regional Tourism Administration; Karabakh Regional Tourism Administration; Ismayilli Regional Tourism Office (Azerbaijan State Tourism Agency, 2023)

Table 1. Types of tourism and opportunities in Azerbaijan

Types of tourism	**Opportunities**
Cultural tourism	Customs and traditions, multiculturalism
Historical tourism	Rich history and historical monuments
Culinary tourism	Delicious cuisine
Rural tourism	Landscape, hospitable people
Health tourism	Naftalan, mineral springs
Business tourism	Hosting international events, conferences (also convention centers and conference rooms of hotel)
Agrotourism	Landscape, agriculture
Ecotourism	National parks, landscape

Source: Azerbaijan Tourism Board

Table 1 represents the main types of tourism in Azerbaijan as well as the resources contributing to the development of the tourism sector. It is understood, in Azerbaijan more types of tourism are advanced or can be improved because of culture, franchise hotel, history, holding international events, landscape and so on. According to the table, Azerbaijan is growing or has the potential to develop many types of tourism as a result of elements such as culture, franchise hotels, historical monuments, hosting international events, picturesque landscapes, and etc.

Because of elements such as friendly local people, rich culture, delicious food, agriculture, and other contributing aspects, agrotourism, as an emerging kind of rural tourism in Azerbaijan, has progress for expansion. Azerbaijan's principal objective is to promote growing kinds of tourism and welcome the number of visitors. State initiates programs and collaborates with international unions and other states in this context. The foundation of the Agrotourism Association in Azerbaijan in 2023 signified the start of efforts to advance and broaden agrotourism in the country (Ministry of Agriculture of the Republic of Azerbaijan, 2023).

MATERIALS AND METHODS

"Guidebook on the organization of agrotourism activities" was published by State Tourism, as well as, the United States Agency for International Development in order to contribute the utilizing of agrotourism actions that were made between tourism and agriculture. The major goal of book was to deliver assistance and to train professionals who are engaged in agrotourism or want to be expertise in this industry; including information and advice on providing and organizing agrotourism services. In the process of preparation of book specialists met with 15 farmers from various villages, including Lankaran, Gadabey, Dashkasan, Tovuz, and Goygol, and drew on the expertise of global and regional agrotourism experts. The book gave precise details about definition of this type of tourism, evaluation in tourism assets within rural communities and farms for the motivation of launching such initiatives, marketing activities and so on(State Tourism Agency, 2021)

For three years in the past, rural guesthouses were established in Azerbaijan as part of the "Development of entrepreneurship and self-employment in villages" project, capitalizing on the country's immense opportunities for rural tourism. The project has been underway since 2021, with aid from the Ministry of Economy's Small and Medium Business Development Agency (KOBA), the Ministry of Labor and Social Protection of the Population's State Employment Agency, and the State Tourism Agency. Within the scope of the initiative, 15 rural accommodations were first created in the region of Ismayilli, and they were suitably furnished and equipped. Over 220 people from various places were registered in the project's second phase, which intended to stimulate entrepreneurship in diverse locations, generate self-employment possibilities, improve rural tourism, and improve inhabitants' well-being. Individuals satisfying the required standards were picked from this group and provided with the appropriate resources. Participants in the project received training in business and tourism-related topics such as developing business plans, efficient leadership, maintaining satisfied clients, selling methods, the hospitality field methods, maintaining cleanliness and hygiene, following to health and safety guidelines, nutrition, and online communication management.

Individuals also received business management and tourist consulting help and mentorship, as well as company growth assistance. Similar guesthouses will be established in the western areas. A two-phase selection method is used to choose project members. In the beginning, partners evaluate the proposals based on their location on the tourist route, the existence of required infrastructure, and the present status of the home. Individuals' citizenship status in the labor and employment system is checked in accordance with legislative laws in the next step. Citizens who pass all parts of the selection process are eligible to participate in the project. Sessions of instruction are set up for these persons to develop relevant background in tourism and service-related industries, and rehabilitation and restoration work is carried out in the specified area planned for use as a tourism facility. In the next step, relevant assets are given to establish agrotourism business facilities. It is vital to mention that a rural guesthouse was created as part of this project to accommodate a total of 65 people from various places. In terms of the criterion for selecting designated locations, the Agency stated that the initial selection is made on the basis of increased tourism prospective. The project has already been executed in the mountainous Shirvan, Sheki-Zagatala, Lankaran-Astara, and Guba-Khachmaz areas, and it is scheduled to be implemented in the western regions at a later time. Overall, it can be concluded:

- The project's goal is to advance entrepreneurship in rural areas, facilitate self-employment, boost agrotourism, also improve the well-being of local societies;
- Initially, partner institutions examine the applications, taking into account variables such as the house's location on the tourist route, the existence of required infrastructure, and the present state of repair;
- Each residence is expected to get equipment and merchandise worth around 8,000 manats;
- The suitable rural guesthouse must have been functioning in this direction for the previous three years in order to participate in the project (The Small and Medium Business Development Agency of the Republic of Azerbaijan, 2023)

The "AgroVision" project, which will last 24 months, is being carried out in the Lankaran economic zone by the Eurasia Partnership Foundation and the Constitution Research Foundation, with funding from the European Union. The project's goal is to formulate and verify a supportable and replicable agrotourism and ecotourism development model. The basic goal of this approach is to raise the income of rural families in Azerbaijan's southern region and to strengthen ties between urban and rural areas within the nation. One of the actions planned for the project's early stages is to identify and assess the capacities of families and farmland in the region with prospects of tourism. The report will assess each Tourism Destination's (TD) progress, assess the capacity of consortium members, and identify significant financial, infrastructure, promotional activities, and other impediments that hamper the TD's advancement. The evaluations' findings will provide the foundation for consortium members' future development of TD strategies. To attain these goals, foreign specialists in this sector are being encouraged to work with native specialists as a member of a collaborative team. The following duties will be carried out by specialists:

- Examine relevant territorial and national rural development programmes to aid in the preparation of the evaluations;
- Provide direction for evaluating the selected tourism locations;
- Assist the development strategy design process and offer input on the produced documents (Eurasia Partnershop Foundation, 2020).

DISCUSSIONS

Agrotourism, like a great example, owns achieved vast success on a international scale in Italy. It is recognized for its scenic landscapes and the production of diverse exquisite foods such as olives, grapes in vineyards, cheese-making enterprises, pasta manufacture, and farms that create the famed mozzarella (Umidjon Matyakubov, 2016).

Agrotourism emerged in Italy as a natural form of hospitality and a supplement to the major occupations of farming, forestry, as well as animal husbandry (Margherita Ciervo, 2013). Agrotourism, which merges the tourism and agrarian industries, is governed by particular rules in Italy. Italy is the only Western European country having such legislation in force (Claudio Lupi et al.,2017). Italy experienced a significant rise in popularity during the last two decades as a result of the incredible growth and development of its agrotourism business (Harshavardhan Reddy Kummitha et al., 2018)

A pioneering group of persons, mostly from a renowned farmers' union centered in Tuscany, founded "Agriturist" in 1965 with the goal of developing this type of tourism both nationally and locally. The family farmers' union Coldiretti executed a project called "Terranostra " in 1973. "Agriturist" executed an initial educational course in partnership with the national Ministry which is engaged in agriculture to educate native stakeholders, along with duture operators in this field in 1978. In 1980, a second group called "Turismo Verde" was founded by small-scale farmers. The national organization "Anagritur" was established with joining of these three groups in order to manage their efforts and operations (Fabio Maria Santucci, 2011). Italy has had a statewide regulation, known as regulation 730/1985, in place since 1985 to control agrotourism operations throughout the country (Matyakubov U., 2018). Beginning in the 1990s, Italy saw a shift in agricultural techniques on its farms. This transition has had obvious environmental implications as well as beneficial benefits (N. Galluzzo., 2015)

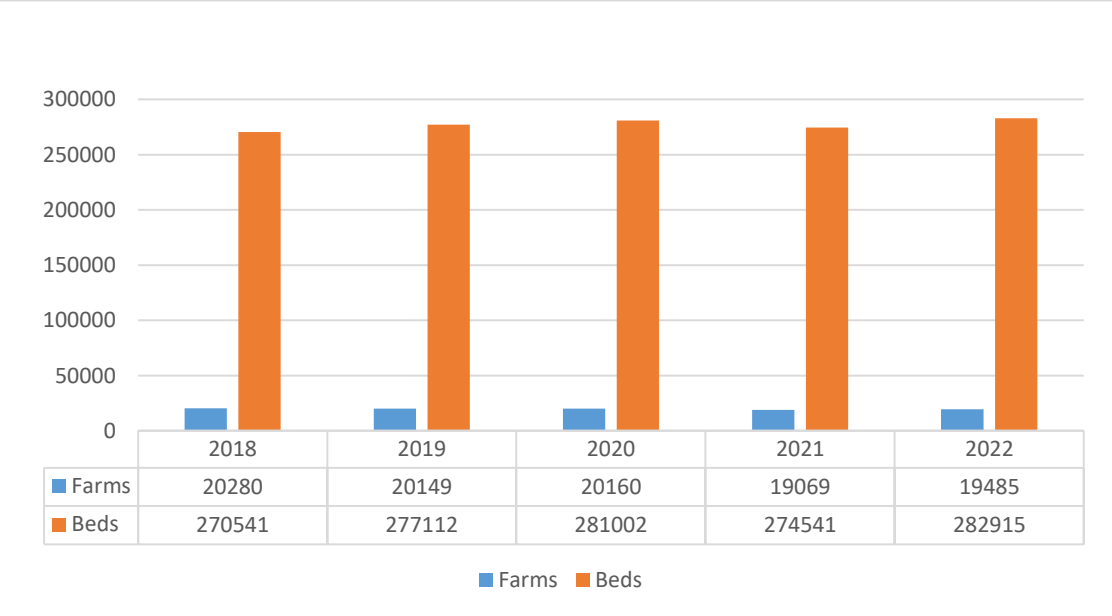
A more stringent national law, No. 96/2006, states that agrotourism can only be performed by the farmer and their close family members. Furthermore, rather than financial concerns, the fundamental criterion for establishing priority should be the proportion of working hours allocated to agricultural operations (Barbara Zanetti et al., 2022). Italy is divided into 19 regions and two provinces, each with its own set of legislation controlling agrotourism, agriculture, customs, and history (Fabio Maria Santucci, 2013)

Beginning in 2013, Italy adopted the trademark "Agriturismo Italia," which was followed by the introduction of a new categorization system. The brand denotes farms that follow existing norms and regulations. Its distinguishing emblem is a sunflower surrounded by a farm. Because of these characteristics, the sunflower, a lovely flower signifying recognition, an icon of Italian summer, a depiction of holidays, and the joy in its bright hues, has been designated as the categorization trademark. Farm classification, similar to hotel rating, strives to provide the public a thorough impression of the degree

of comfort, range of services (hospitality), and quality of the natural environment (nature, landscape, quiet) that each farm can deliver. In order to construct this framework, the Ministry of Agriculture cooperated with regional and national agrotourism organizations to perform significant research at both the national and global levels. The primary aim was providing insight into the tastes and needs of both Italian and foreign tourists in agrotourism. Each farm will be rated from 1 to 5, and its categorization level will be represented with an appropriate symbol (The Agriturismo Italia Trademark, 2013).

Agrotourism is rapidly expanding throughout Italy. However, this expansion has been unbalanced, with some regions seeing faster and more significant growth than others. The Tuscany area and the province of Bolzano, for example, account for one-third of all Italian agrotourism firms (Emilio Chiodo et al., 2019).

Figure 1. The number of farms and beds in Italy

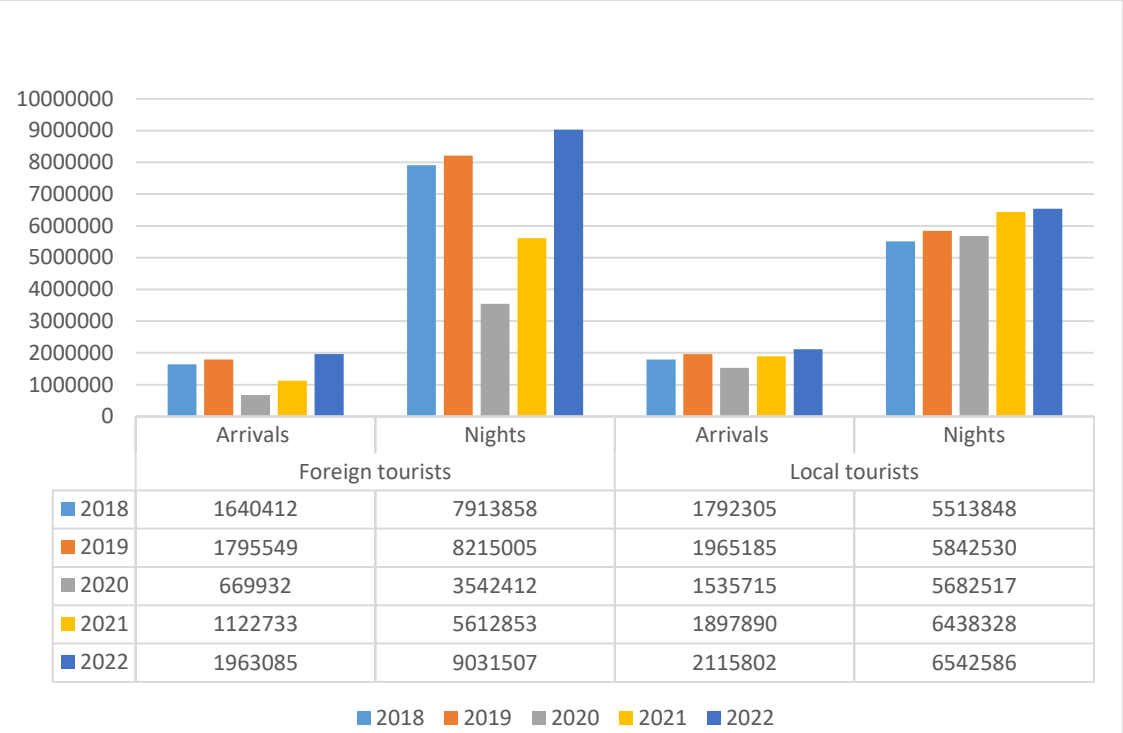


	2018	2019	2020	2021	2022
Farms	20280	20149	20160	19069	19485
Beds	270541	277112	281002	274541	282915

Source: Italian National Institute of Statistics

The data in Figure 1 demonstrate the entire amount of farms and beds in Italy from 2018 to 2022. Between 2018 and 2022, the total number of farms did not change much. There will be 4% fewer farms in 2022 than there had been in 2018. There were 270,541 beds in 2018; by 2022, the count had increased by 4% to 282,915. In comparison with the quantity of farms, the number of beds increased, with 2021 beds included. During the same time period, this amount of farms and beds did not considerably rise or decrease.

Figure 2. The number of local and foreign tourists in Italy



	Foreign tourists		Local tourists	
	Arrivals	Nights	Arrivals	Nights
2018	1640412	7913858	1792305	5513848
2019	1795549	8215005	1965185	5842530
2020	669932	3542412	1535715	5682517
2021	1122733	5612853	1897890	6438328
2022	1963085	9031507	2115802	6542586

Source: Italian National Institute of Statistics

Figure 2 shows how many local and foreign tourists stayed on farms and used services in Italy between 2018 and 2022. In general, the number of overnight guests (both foreign and domestic) greatly surpasses the plenty of tourists who utilize services. There are more arrival domestic tourists than international visitors. Foreign visitors were banned from visiting Italy for agrotourism due of the global COVID-19 epidemic in 2019, which had a severe detrimental impact on the travel and tourism business. There is no question that fewer visitors, both domestic and foreign, visited in 2020. However, data on overseas tourists shows that this loss is especially noticeable, with a 62% and 57% decline in arrivals and overnight visits from 2019 under post-pandemic conditions. Following the epidemic in 2022, there was a discernible increase in both categories, with a particularly substantial increase in international tourists. In comparison to 2019, there was a 193% rise in arriving tourists and a 154% increase in overnight passengers.

CONCLUSION

The article focused on the growth of agrotourism in Italy, traced its development and analyzed initiatives to promote agritourism in Azerbaijan. It is essential to point out that achievements of Italy in agrotourism were aided not only by its natural beauty, landscape, history, and culture, but also by a variety of initiatives such as the formation of an association, the classification of guest houses, and the passage of supportive legislation. Given experience of Italy in agrotourism and friendly relations of Azerbaijan with Italy, Azerbaijan has an opportunity to benefit from experience of Italy in this type

of tourism. Implementing these principles can have positive results in just a short period of time. Azerbaijan is notable for its multiracial setting natural beauty, diversified landscapes, hospitable population, current culture, rich history, and delicious cuisine. These elements function as drivers for the rapid growth of agrotourism. The formation of an agrotourism association may be viewed as a driving force in the expansion of this type of tourism. Some ideas can be offered to promote the growth of agrotourism:

- In order to execute pre-planned projects, the government should work closely with local citizens. Prior to project implementation, it is critical to examine the community's viewpoints, which are an important aspect in development of sustainability, particularly in agrotourism;
- Furthermore, there is a possibility to give assistance to farmers active in agritourism or those with a future interest in agrotourism by exempting them from income taxes for a particular period of time;
- Collaboration between public, private and governmental organizations will drive continued growth of this industry, and the government may facilitate such collaboration;
- It is critical to organize seminars and training sessions on tourism, agriculture, culinary skills, management of farms and sales;
- The Agritourism Association ought to coordinate with the State Tourism Agency, Ministry of Economy's Small and Medium Business Development Agency, Food Agency, Ministry of Ecology, Ministry of Health, Ministry of Agriculture, and Ministry of Emergency Situations and evaluations of activities of farms should be done in collaboration with these groups.
- Similar to Italy, categorizing of farmers in the Republic of Azerbaijan can be performed via the use of a star system or other methods. Farms can also be grouped based on the surnames of individual craftsmen, since many family members carry on their predecessors' professions.
- Furthermore, museums and parks concentrating on agriculture and agrotourism must be established inside the remote areas to fascinate tourists.

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PERSONNEL WORK PROCESS USING DIGITAL ECONOMY APPLICATION PROGRAMS

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Abstract: *Information technologies are emerging as systems that can meet the emerging demands of the business world in the conditions of increased competition and globalization. Today, with the help of information technology, it has become a value that can be multiplied and continuously produced and shared. Today, increased functionality with information technology has become the most important weapon of enterprises. Today, information technologies are used as the most important means of value creation, change, and renewal. The main purpose of the article is to determine the selection, training, and motivation of personnel for the digital economy. Also, the role of personnel emerging as a result of the digital revolution in the economy was particularly emphasized. The relevance of the study is that the increase in the labor productivity of the organization's employees and the increase in the efficiency of the personnel management system resulting from the use of digital technologies as a whole result in the increase of the competitiveness of the organizations.*

Keywords: *digital economy, digitalization phenomenon, digital technologies, academic research.*

INTRODUCTION

The globalization phenomenon that accompanied the development of information technologies and the post-industrial revolution affected economic and social structures as well as business life. The introduction of new technologies, the spread of industrial and service production on a global scale, changes in the management and organizational structures of enterprises, and the flexibility of production to meet the needs of consumers have changed work life at a high level. (AR, 2023; Əliquliyev, 2019)

Meanwhile, macro-level neoliberal policies, successive economic crises rising unemployment around the world, regulation, enterprise-level flexibilities, and human resource approaches have weakened the power of trade unions. A reflection of the digitization process in work life is the monitoring and management of the work environment through digital technologies. Monitoring the work environment through cameras and various sensors installed in workplaces and offices has security advantages. However, ignoring the privacy of a person in this regard, continuous monitoring of employees through cameras is a serious problem for personnel in the work process. (Armstrong's Handbook, 2015).

Digitization requires the adaptation and development of new knowledge and new work methods. Digital technologies are modern tools for the ever-changing way in which organizations employ, manage, and support people. (Barber, 2006)

Automation of many processes, increasing the speed of operation, various possibilities, and convenience - all these are positive aspects of digitalization. The negative aspects of this include making the management process more complicated, the lack of qualified personnel working with personnel management, and a large part of the collected data. (Bennet & Lientz, 2011)

The basis of the study is that the increase in the labor productivity of the organization's employees and the increase in the efficiency of the personnel management system resulting from the use of digital technologies in general result in an increase in the competitiveness of organizations. (Bohlander, et.al., 2010, p.231)

In the digital economy, such forms of work are gaining popularity, such as freelancing and outsourcing. According to the World Labor Organization, the number of remote workers worldwide is 17%, and in Japan and the United States, this number has already reached 40%. (Ceylan, 2014)

According to World Statistics data, 31% of job seekers wanted to work from home at the end of 2019 and the beginning of 2020. 14% of them are freelancers, and 17% are employees who are not on the payroll of companies. It is considered very necessary to use new modern approaches and take into account the features of this work in the management of a large number of employees - remote workers. (Ehnert, 2013; Ergin, 2019)

It was observed that the companies that allow their employees to work remotely from home are also the companies that have built the technological infrastructure to allow this in previous years and at least allow their employees to work remotely. The investments made by these companies in previous years in tools that support virtual work and communication have ensured that they can respond quickly to such a crisis. In the current situation, infected workers, even those who are suspected of not being infected, are naturally out of work during the diagnosis and treatment processes, which is a huge waste of time for office workers. (Rahmanov, 2022)

Companies should establish central decision mechanisms that can make quick decisions to protect their activities, identify, classify, and evaluate cash resources that may be suitable for the company, define digital economic scenarios, and define and protect liquidity elements in modeling the predicted financial effects of profitability. (Ilhami, 2019) In terms of financial sustainability, companies must maintain business continuity by digitally connecting with their customers, understanding and supporting their employees, developing solutions to supply chain challenges, building digital capabilities, and connecting with other businesses in the same ecosystem. In doing so, companies should aim to get out of this process unscathed, retaining both employees and customers. Digital visibility and the use of online sales channels have come to the fore in this area, and companies that can serve their customers with this sales channel have continued their business. (Reyhan, 2012; Taşdemir, 2014)

The article examines the following nuances:

1. Investigate the selection, training, and motivation of personnel for the digital economy;
2. To determine directions for improving the process of selecting personnel for the digital economy;
3. Investigate ways to strengthen staff potential;
4. Explore the role of personnel in the digital economy;

But how has the work process of personnel changed during the use of digital economy application programs? (Terhan, 2019)

The process that started with digitization and rapidly progressed toward the digital revolution reveals very significant changes in economic, social, and cultural structures. The phenomenon of digitization affects and changes the economic structure, production method, job and workplace

definition, and labor markets on the one hand, and at the same time shapes social life and cultural structure at a modern level. Central to these effects is the role that technology plays in data collection, storage, exchange, and use. (Marchington, 2016)

Digital technology has particular power because it improves the organizational, analytical, and managerial aspects of the production of firms and workers, creating value and reducing the importance of other work. In this context, digital technology has emerged as the most important driving force of today's economy. Although this situation greatly impacts workplaces and disrupts established business practices, it has the power to greatly improve information management and rule-based operations in workplaces. (Nur, 2016; Sabuncuoğlu, 2012)

Digitalization can be considered the main feature of the modern era due to the changes it has brought about in the field of economic, social, and cultural structure. While digital media is now at the center of global capital flows, digitization has spurred the convergence of disparate sectors. The biggest impact of information technologies and the digitalization process is seen in the economic structure. (Simon, 2011) While the phenomenon of digitization creates new jobs and new professions with technological innovations, work and work-related organizational structure, job instructions, and competencies, the spatial dimension of production of goods and services, production method, production process, marketing network, way of reaching produced goods and services, consumption concept, etc. it rapidly changes many things, in short, the economic structure. The revolution caused by this change is characterized as the fourth stage of the industrial revolution. (Susan, 2018)

The main goal of the "digital economic revolution" is to implement smart sales networks that can reflect the activity. The new process is based on highly automated forms of work, where human labor is used the least, but the highest labor productivity is achieved.

Although information technologies that have been developing since the last quarter of the 20th century have changed economic structures and work life, the digitization process that began in the 2000s has given a different speed to this change. Digitization is changing all business processes in general, in addition to increasing automation and changing work processes. (İlhami, 2019)

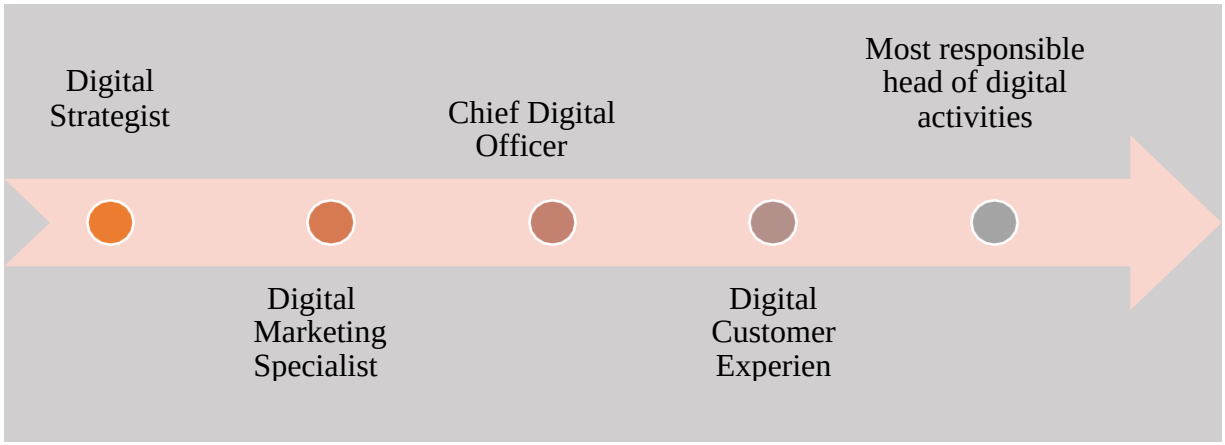
METHODOLOGY: ANALYSIS OF THE WORK PROCESS OF PERSONNEL IN THE DIGITAL ECONOMY

The change in organizational structures with the introduction of digital technologies requires a customer-oriented strategic work schedule. Indeed, digital transformation requires the creation of a core competence and mainly focused directly on the customer, so that the organization can better cope with the change in general. Therefore, the digitization of data, processes, and roles that make up the activity of an enterprise, brings about the digital transformation of business and business strategy, and at the same time leads to a change in the business model.

Thus, this period, which begins with digitization and continues with the digitization of work life, reveals the digital revolution, at the same time it leads to the expansion of the service sector, which leads to the disappearance of many professions.

The process of digital transformation is also changing company management and organizational structure. For example, at the management level is the "Chief Digital Officer" or CDO (Chief Digital Officer) for short, who may work under various titles such as Digital Strategist, Digital Marketing Specialist, Digital General Manager, or Digital Customer Experience.

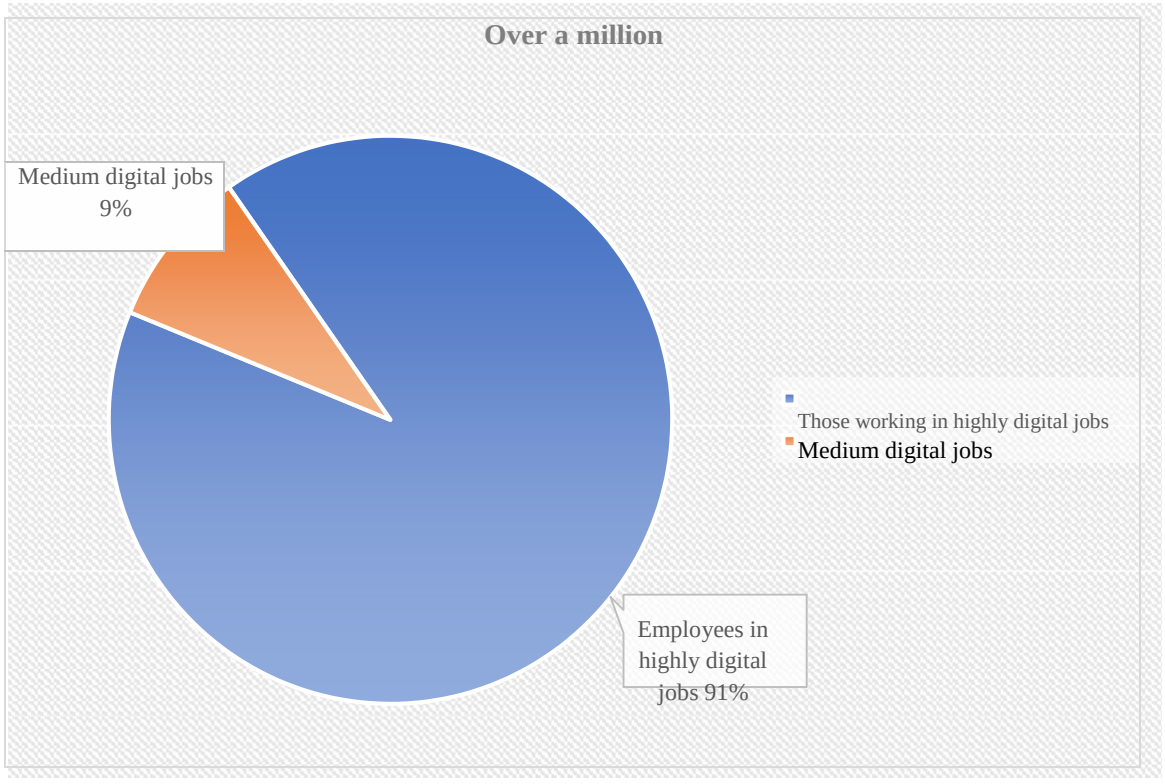
Figure 1: Organizational structure in economic digitization



Compared to 2020, employment in occupations with high digital content is seen to increase from 5.4% to 27% in 2022, and from 40.2% to 51.3% in occupations with medium digital content (http://www .erctr-az.gov-economic). On the contrary, the level of professional employment among personnel with low digital content fell from 55.7% to 21.1%.

In absolute terms, more than 32 million workers work in highly digital jobs, and about 66 million work in medium digital jobs.

Figure 2: Indicators of playback in digital working conditions



In line with these trends, digitally oriented-professions have greatly supported business transformation and creation in the past few years.

Specifically, of the 13 million new jobs created in the country since 2010, nearly 4 million require high-level digital skills, and nearly two-thirds of new jobs require either high or medium digital skills.

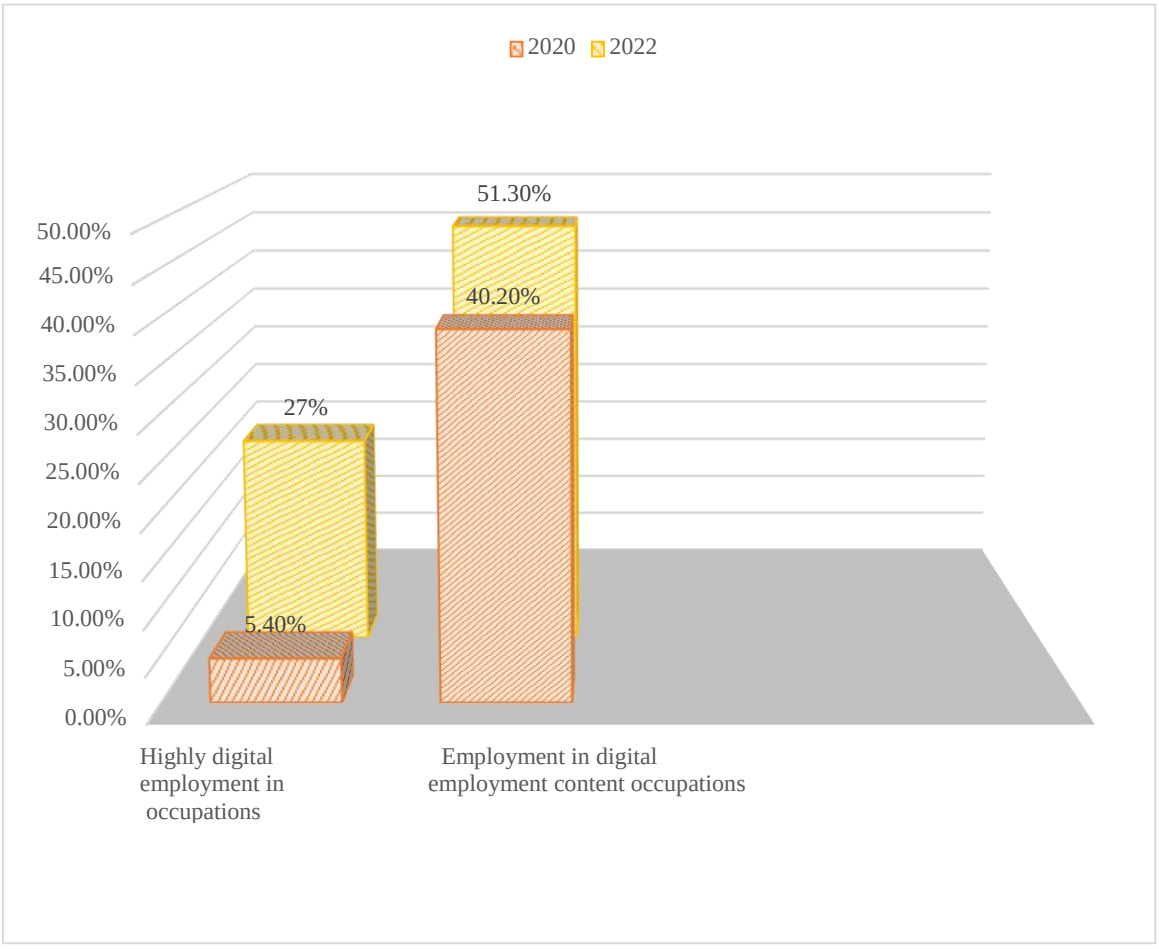
With the digital transformation process, even when the work hours are over, employees can access e-mail or other social networks while at home or on vacation. This takes working time beyond the concept of overtime. In addition, this situation causes adverse effects on employees.

Employees who have to check and respond to their e-mails outside of working hours are said to cause stress, exhaustion, sleep problems, and relationship difficulties, in addition to not being paid extra for these working hours.

Against this situation, it is recorded that trade unions have started to make special provisions regarding their collective agreements, and even in France, laws on this issue have already been prepared. Another dimension of digitalization of working life is the topic of "artificial intelligence" and robotic technologies. For example, automated teller machines in the banking sector and robotic arms used in various factories, especially in the automotive industry where human muscle power is stressed, have long replaced manpower.

What is new is the acceleration of the use of "artificial intelligence" and robots in smart companies, banking, healthcare, and many other areas that have emerged with the digital revolution, the creation of scenarios, and the intensification of discussions.

Figure 3: Professional employment of personnel



Academic research in recent years has shown that thanks to digitalization, individual workers can quickly see the nature and rewards of job change. Therefore, the spread of digital technology tends to have a significant impact on workers, firms, industries, economic and trade relations, labor markets, and entire regions. Important studies of labor markets in the 1970s, 1980s, 1990s, and 2000s show that workers who use computers at work earn more.

Based on our research to identify digital workforce competencies, we can divide digital workforce competencies into three groups:

1. Professional skills and information technology knowledge: This includes interpersonal skills, reliability, adaptability, critical thinking, lifelong learning, innovation, general communication, problem-solving, teamwork, information technology, mathematics and science, information law, and ethics.
2. Infoformation technology management and support: This includes digital marketing, information technology risk management, digital communication, information support, project management, and basic business knowledge.
3. Technical knowledge of information technology: This includes mobile technology and application, hardware/network, software applications, databases, English language skills to use information technology applications, basic information technology knowledge to conduct business, etc. belongs to.

DISCUSSION: INNOVATIVE METHODS IN PERSONNEL SELECTION FOR THE DIGITAL ECONOMY

The development of the digital economy, technological development, and demographic changes have a significant impact on the business world. It also affects the number, quality, and implementation of existing megatrends, and the skills workers will need to succeed in the competitive environment of the future. Although the timing and pace of this development will vary between countries, growth in the labor market is expected to affect both developed and less developed countries. In line with these changes, it is becoming increasingly important to ensure that employee competencies are effectively matched to labor market requirements.

In recent years, rapid technological changes, the introduction of new digital innovations in the production process, digitization of production and service areas, and initiatives such as, have begun to focus on work areas to attract talented employees with digital skills and information technology. Empirical evidence presented in a report published by the Organization for Economic Co-operation and Development suggests that the current labor market and economic changes have created a major imbalance between skills and supply. There is a great need for computer and electronics (knowledge and software, programming, and use) knowledge and decision-making skills in OECD and European Union countries. For this reason, businesses have difficulty finding employees with the necessary competencies to use new methods and work with new technologies. Based on the research, we can say that according to the Organization for Economic Co-operation and Development report, the new competence requirements that appear as a result of the increased use of digital technologies in the workplace and are considered necessary are divided into three dimensions:

1. General information and communication technology skills: This includes having general information and communication technology skills, such as accessing information online or using applications that can be used in everyday work life.

2. Specific information and communication technology skills: This includes programming, application development, and network management of products and services such as software, web pages, e-commerce, mathematical computing, and big data.
3. Complementary information and communication technology skills: Includes complementary skills such as processing complex information, communicating with colleagues and customers, solving problems, planning ahead, and quickly implementing a plan.
Effective and Innovative Employee Selection Methods.

Why use something like social media profiles to investigate selection decisions when there are more accurate ways to assess the skills and suitability of job applicants? The main reason for this may be related to the number and type of selection tests available. In this case, it is very important to choose the most suitable, innovative method for the work process. These include:
1. General Mental Ability

It is the best tool for employee selection. This approach is highly effective in predicting future performance in every type of business, at all job levels, and in every industry. General Intelligence can be assessed in a variety of ways, from 30-minute paper-and-pencil tests like the Wonderlic to more expensive online computer aptitude tests. Both computer-based and paper-and-pencil tests are equally valid, allowing organizations to choose the most appropriate approach.
2. Structured Interviews.

These are not standard interviews that start with "So tell me about yourself...". In structured or behavioral interviews, applicants are asked a series of specific, predetermined, job-related questions, and their answers are evaluated against detailed criteria. A "report panel" approach is often used here, where 2-3 trained managers ask questions and collect each response individually. After the interview, their ratings are compared to determine the consistency or reliability of structured job interviews. When responses are judged to be inconsistent, the interviewers discuss their basis and reach a consensus.
3. Situational judgment tests.

These tests are described as the multiple-choice equivalent of structured interviews. With this method, applicants are asked to choose how they would respond to various hypothetical situations related to the target job. The results indicate how that applicant will behave when faced with certain situations and decisions. The ability to predict how applicants will respond to complex decisions makes this method one of the best approaches for managerial and technical positions.

It is important to note that the combination of multiple tools or methods greatly improves the predictive validity of the recruitment process. For example, combining General Mental Ability tests with structured interviews will be more effective than using either alone. In addition, using any of these three methods is preferable to evaluating applicants' resumes and giving unstructured interviews or unvalidated pretests.

There are countless tools, methods, and approaches to making the right choices about decisions. However, based on decades of applied organizational research, the ones described above are the most successful, accessible methods for finding them. It is important to note that other valid methods are intentionally left out.

Human resources professionals who have direct responsibility for their employees must be prepared for these innovative human resources principles. If HR professionals can adapt to new roles, they can meet work-related demands and employee needs while gaining competitive strength.

Therefore, it can be said that human resource professionals and managers need to develop and expand their talent management approaches. As these approaches are developed, they need the ability to access innovative workforce models and alternative labor resources, modify selection criteria, and create age-appropriate contractual arrangements 58. In addition, new training and development models, as well as new motivation tools, must be prioritized to retain this workforce.
Implementation of personnel selection with such innovative methods will increase the work potential and will positively affect the future destiny of the company.

CONCLUSIONS

In conclusion, we must note that it is a well-known issue that the debates about the effects of the digitization process on work life or the digitalization of work life will intensify in the future, and research on this topic will create a certain wealth of literature.

Although digitization is an extremely important trend, there is some uncertainty about where this process will lead. Therefore, it is too early to describe this process as a transformation. Because this process is still ongoing and subject to various changes. In recent years, studies on the effects of the digitization process on work life have been characterized by more employment aspects of the issue. Some of these are predictions about the future.

Since HR performance evaluation was first studied, the most interesting and sought-after aspect of HR transformation has been the individual and organizational benefits. The studies provide an overview of the implications and benefits of digital HR. While digital ICT increases the engagement, competence, and harmony of employees individually, it reinforces ICT investments in an organizational context in terms of:

• Reorganizing ICT activities;
• By increasing the quality and efficiency of ICT services;
• By turning ICT functions into a strategic business partner, as well as providing benefits by reducing costs.

Performance appraisal systems supported by information technology provide ideal usability and increase success, especially for performance appraisals based on very different data sources, such as the balanced scorecard.
The digital transformation and therefore the process characterized as the fourth industrial revolution must be further developed to explore the topic in depth in different dimensions.
In In other words, to assess the impact of the digital transformation process on work life and industrial relations, including employment, it is necessary to keep work life to some extent "fixed" with possible economic, social, and cultural structures.

We can make the following suggestions regarding the selection, training, and motivation of personnel for the digital economy:

1. Preparation of a new strategic plan;
2. Taking measures to increase motivation among employees;
3. To use world experience in the digital economy;
4. Using the methods acquired by foreign companies in our country to conduct experiments in the innovation system, etc.

Considering all these proposals, taking measures for innovative progress in this field will not only accelerate the development of companies but also affect the economic dynamics of the country.

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ESTIMATION OF REGIONAL INNOVATION ACTIVITY

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Abstract: *In the article, the estimation of the regional innovation activity, the general methodology of the estimation of the innovation development of the regions in this direction were analyzed by the author. The innovation index was formed based on the principles accepted in the international world to assess the innovation potential. According to the comparative evaluation of Azerbaijan's innovation potential, an innovation index was found for each region, zones were ranked according to this index, and cluster analysis was conducted. The selected system of indicators allows us to evaluate the level of innovation development in different areas, and to analyze the factors affecting the innovation index in the regions.*

Keywords: *Azerbaijan, innovation, regional innovation, global Innovation Index.*

INTRODUCTION

Today, the formation of the innovation structure in the regions in Azerbaijan is still at the initial stage. The assessment of the regional innovation system (RIS) is still in the formative stage. Various scientists (A.Huseynova, and T.Aliyev) have investigated and evaluated the methods of regional innovation activity assessment in the republic in their studies.

The existence of numerous approaches to the assessment of RIS is due to the complexity of its structure. A special system of indicators should be developed to reveal the internal structure of the region's innovation-oriented economic system and to evaluate the interaction mechanisms of its main elements.

The main goal is to identify a more effective regional innovation system by conducting an estimation.

The "European Innovation Scoreboard" methodology, which we consider as a basis, determines the information source, the composition of criteria and indicators, organizational ways, and common rules for the analysis and evaluation of the scientific and technical complex on the basis of the innovation index.

The "European Innovation Scoreboard" methodology, which we take as a basis, determines the information source, the composition of criteria and indicators, organizational ways, and general rules for the analysis and evaluation of innovation potential on the basis of the innovation index. This methodology consists of 4 stages.

Figure 1. Let's explain each stage separately

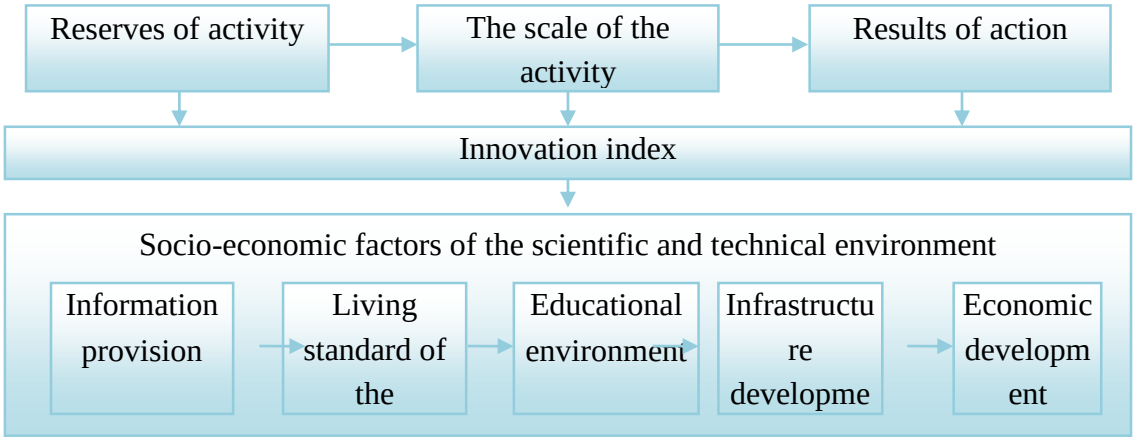


Figure 1. Indicator system of innovation activity
Source: author's work

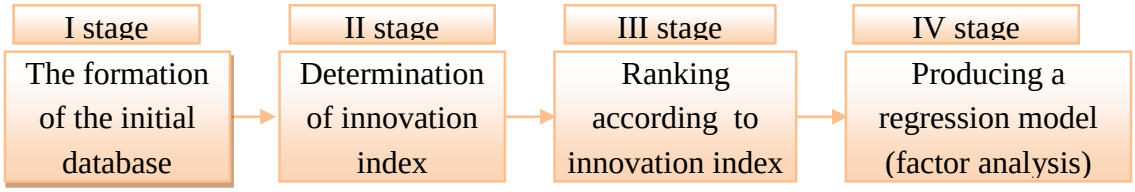
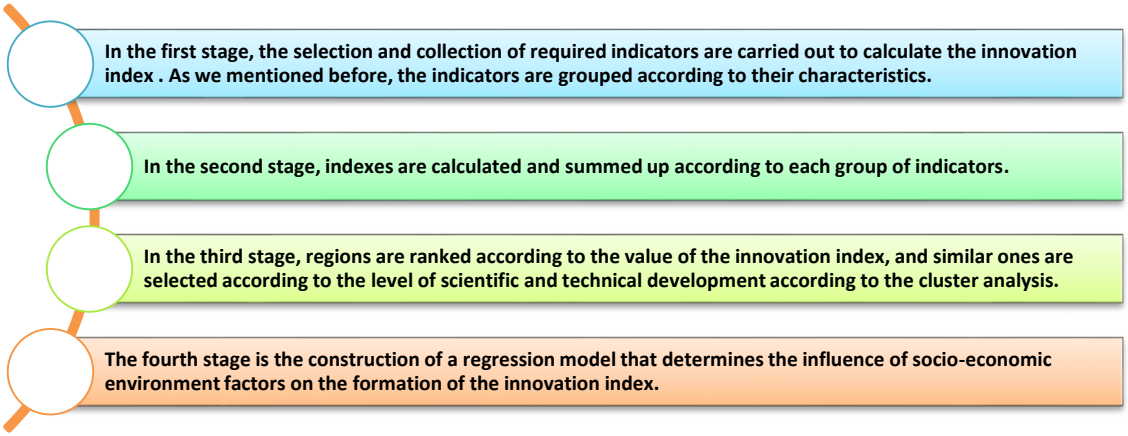


Figure 2. Stages of the methodology
Source: author's work



Source: author's work

In our case, regions are taken as objects. In fact, we consider states, ministries, organizations, research institutes, universities, etc. as objects. It depends on the existing issue. As mentioned, the system of indicators characterizes the innovation potential and socio-economic environment of the region. All indicators correspond to the statistical system (Huseynova, A., Mazanova, O. , 2013). During the development of the methodology, the development of innovation, the indicators of the socio-economic environment, their interrelationship and complex compatibility, the proposed indicators, and the methods of evaluation and analysis with the application of the system of indicators were considered.

METHODOLOGY AND ANALYSİS

The tool of this methodology is the multidimensional statistical method. We used the SPSS 17 statistical package and MS Excel spreadsheet as economic modeling tools. First of all, the used indicators are made comparable, in other words, a single scale of indicators is created.
Normalization of indicators is carried out by linear scaling methodology:

$$G_{nor} = \frac{G_i - G_{\min}}{G_{\max} - G_{\min}} \quad (1)$$

where G_{nor} – is the normalized value of the indicator; G_i – is the initial value, G_{min} and G_{max} – are the smallest and largest values, respectively.

The linear transformation procedure scales the data. All quantities are located in the interval [0; 1]. Such data is easy to interpret. The normalization procedure does not affect the results of the analysis, since our goal is a qualitative assessment based on the examination of numerical indicators.

The normalized values of the indicators are combined in the first level indicators corresponding to their functional structure. For example: first, the average value of the normalized indicators for subgroups is determined, and then a special index for the group is determined. In other words, the special index of the group ("Reserves") is calculated according to the average value of the normalized indicators of the "Labor reserves" and "Materials and technical base" subgroups of the "Reserves" group (Appendix 2).

Average indicators for groups ($\overline{G}_j$, j=1,2,3 indicate groups) are calculated by the following formula:

$$\overline{G}_j = \frac{\sum_{i=1}^{n} G_i}{n} \quad (2)$$

where G_i - is the i-th indicator included in the group, n- s the number of indicators. It forms the basis of the resulting ranking and cluster analysis. Special indices obtained $\overline{G}_j$ by groups allow to determine the innovation index. Special indices obtained by groups allow to determine the innovation index.The innovation index (I) is calculated as follows:

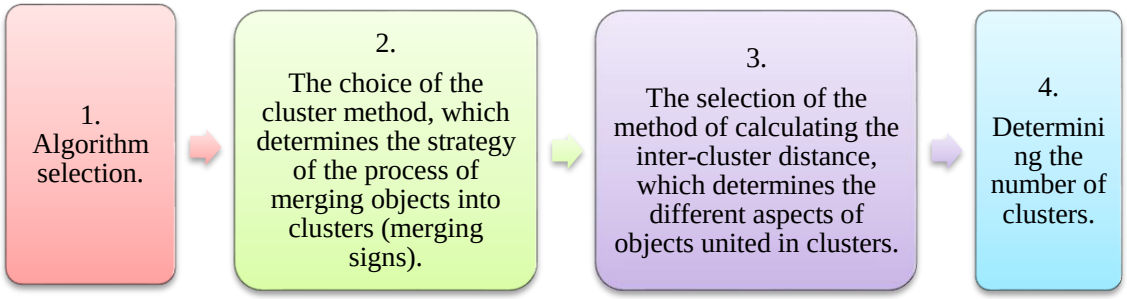
$$I = \frac{\overline{G}_1 + \overline{G}_2 + \overline{G}_3}{3} \quad (3)$$

where $\overline{G}_j$ - j=1,2,3 is the average price for groups.

The analysis of the division of objects is carried out according to the system of indicators selected on the basis of the reports on the standardization of indicators. Based on the ranked set of economic zones, they are grouped into clusters.

The cluster method is a multidimensional statistical procedure (Arzu Huseynova, 2022, pp. 867-875). This method arranges the objects in groups according to relatively similar characteristics based on the available information. The cluster analysis method consists of several steps:

Figure 3. Steps for the cluster analysis method



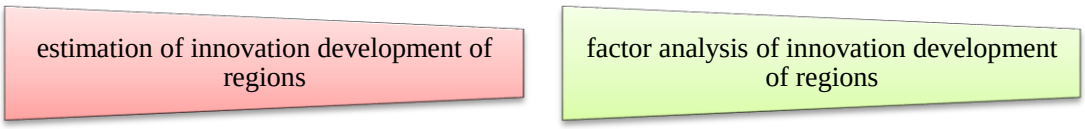
Source: author's work

In our case, since the number of objects is small, the hierarchy algorithm Ward method is chosen. The method of analysis allows us to analyze the factors. Here, too, indicators are initially normalized. Then they are checked.

Socio-economic factors can have both positive and negative effects on the environment. Therefore, they should be divided into two groups accordingly. The initial data prepared in this way can be used in the construction of the regression model. Then, the formation of a correlation model to determine the effect of the factor indicators on the final signs is necessary.

In the modeling process, the important indicators for the final signs are determined. The structure given for economic zones is divided into stages corresponding to the functional structure of the factor indicator. In the first stage, the influence of the education level on the innovation index; the level of information provision infrastructure elements of the region; standard of living; level of economic development, etc. the parameters of the reflective regression equation are calculated. The next stage of modeling is the calculation of variance and coefficient of determination for each factor characteristic. Based on these coefficients, a decision is made to include special indicators in the regression model and a pair regression model is built for each cluster. This model allows predicting the value of the innovation index, which depends on the change in the values of the factor indicators. Calculations were made according to two main methods:

Figure 4. Methods for innovation development regions model



Source: author's work

Both methodologies are based on the system of indicators characterizing the internal and external environment and socio-economic factors of RIS. The proposed methods use widely applied tools in the international world. In order to evaluate the regional innovation system, an innovation index was formed based on internationally accepted principles. According to the comparative evaluation of the innovation potential of Azerbaijan, the innovation index was calculated for each region (Arzu Huseynova 2022, pp. 867-875).

This methodology has been refined considering the national and specific characteristics of Azerbaijan, statistical indicators in this field, information that can be collected and processed, and the innovation potential of the regions, the system of indicators has been changed and calculated for Azerbaijan. Calculations were made on 2 blocks (reserves and activity scale), 4 groups, and 14 indicators. The special index indicator is denoted by G_{ijl} where i=1, 2; j=1, 2; and l depends on the number of indicators in each group.

Table 1. Division of the indicators system [Huseynova A.]

Block	Group	Division of the indicators system
Reserves	*Labor resources*	4
	Material-technical base	2
Scale	*Scientific activity*	6
	Innovation activity	1

Data were collected and calculated according to the methodology we mentioned. The calculation results are not much different from previous years. This is proof that there was no great progress in this field in the regions, the situation has not changed. The obtained results are given in the table.

Table 2. Innovation index by regions according to innovation development

Regions	**On reserve group I_1**	**On scale group I_2**	**Regional innovation index I**
Baku	0,355347	0,40469	0,380019
Nakhchivan	0,248108	0,228631	0,23837
Mountainous Shirvan	0,312987	0,048597	0,180792
Absheron	0,117459	0,234816	0,176137
Ganja-Kazakh	0,109372	0,225259	0,167315
Lankaran	0,143004	0,129577	0,13629
Guba-Khachmaz	0,087007	0,17371	0,130358
Aran	0,120869	0,104973	0,112921
Sheki-Zagatala	0,037363	0,145204	0,091283

As seen from the table, Baku is progressing in all groups.

The regional innovation system consists of 3 subsystems: regional policy, scientific-innovation policy, regional socio-economic policy.

According to the methodology mentioned above, Huseynova A.D.(Huseynova A.D.&Mazanova O.I., 2015, p. 54–72) presented the methodology for evaluating the influence of the socio-economic environment on the innovation development of regions. The evaluation was carried out on 4 factors (innovation development level, education level, population welfare level and infrastructure development level).

Table 3. Factor index (Арсентьев А.С, 2010)

№	Regions	Innovation development level index	Education level index	Population welfare level index	Infrastructure development level index
1	Baku	0,91	1	1	0,75
2	Absheron	0,50	0,28	0,21	1
3	Nakhchivan	0,28	0,24	0,20	0,41
4	Ganja-Kazakh	0,26	0,20	0,25	0,33
5	Aran	0,18	0,03	0,17	0,36
6	Mountainous Shirvan	0,17	0,03	0,13	0,33
7	Lankaran	0,16	0,04	0,18	0,27
8	Sheki-Zagatala	0,16	0,03	0,17	0,27
9	Guba-Khachmaz	0,14	0,02	0,15	0,24

As seen from the table, Baku is again sharply ahead.

The science and technology in Azerbaijan should be improved today. During the development of the national innovation system in the country, the development of scientific and technical potential and innovation in the regions is one of the essential issues.

Let's analyze the indicators of science in Azerbaijan.

Table 4. The main indicators of science by regions of the Republic of Azerbaijan

Economic regions	Number of ST organizations	Number of ST employees (people)	The volume of scientific and technical works performed during the year (thousand manats)	Total expenses incurred by ST (thousand manats)	Domestic expenses incurred by ST (thousand manats)	ST cost of fixed assets used (million manats)
on Azerbaijan	137	20 580	124 545,4	132 340,0	129 871,8	157,4
Baku	102	16292	93 745,5	108 212,0	106 042,6	137,2
Absheron	8	758	13 072,5	13 408,7	13 408,7	8,6
Ganja-Kazakh	8	2 364	3 016,4	3 712,5	3 712,4	1,2
Sheki-Zagatala	1	89	457,6	457,6	457,6	0,4
Lankaran	3	93	284,6	284,8	284,8	0,1
Guba-Khachmaz	2	140	759,2	759,2	759,2	1,3
Aran	3	6	51,1	51,1	51,1	0,5
Mountainous Shirvan	2	156	1 124,0	1 124,0	825,3	-
Nakhchivan	6	682	2 272,8	4 330,1	4 330,1	8,1

Analyzing the indicators of science in Azerbaijan, we observe that 76% of organizations engaged in scientific research are located in Baku.

For the calculation of the science index, it is necessary to bring the indicators given in Table 7 to the same unit of measurement. In other words, let's normalize the indicators and calculate the science index based on the average value of the normalized values of these indicators.

$$E\dot{I} = \frac{\sum_{i=1}^{n} E\dot{I}_i}{n} \quad (4)$$

where, $E\dot{I}_i$ – is a i-th indicator included in the group, n- is the number of indicators.

Table 5. Normalized values of science and science index by region

Regions	Number of ST organizations	Number of ST employees (people)	volume of scientific and technical works performed during the year (thousand manats)	Total expenses incurred by ST (thousand manats)	Domestic expenses incurred by ST (thousand manats)	ST cost of fixed assets used (million manats)	Science Index (SI)
Baku	1	1	1	1	1	1	1
Absheron	0,069307	0,046175	0,138977	0,123497	0,126025	0,062682	0,094444
Ganja-Kazakh	0,069307	0,144787	0,031649	0,033851	0,034543	0,008746	0,053814
Sheki-Zagatala	0	0,005096	0,004339	0,003758	0,003835	0,002915	0,003324
Lankaran	0,019802	0,005342	0,002492	0,002161	0,002205	0,000729	0,005455
Guba-Khachmaz	0,009901	0,008228	0,007558	0,006547	0,006681	0,009475	0,008065
Aran	0,019802	0	0	0	0	0,003644	0,003908
Mountainous Shirvan	0,009901	0,00921	0,011451	0,009919	0,007304	0	0,007964
Nakhchivan	0,049505	0,041508	0,023712	0,039561	0,040371	0,059038	0,042283

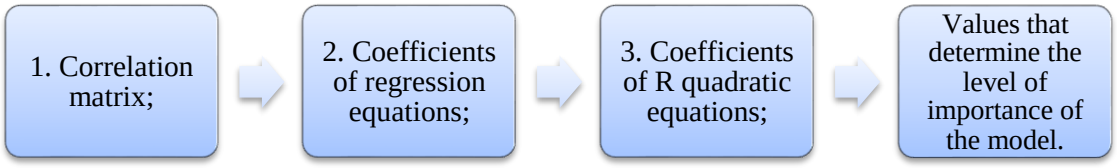
Note: Developed by the author

An unequal distribution of science in the republic and the low volume of scientific and technical works performed by regions during the year, the low share of innovation in the development of the economy of Azerbaijan's regions is a negative trend.

At the next stage, regression models showing the dependence between indicators included in different factor groups of innovation activity are built. As a result, equality was obtained for all blocks. As we know, regression analysis determines the relationship between dependent and independent variables. SPSS software was used to construct regression equations.

Here, the factor variable is given with the outcome variable in the input. But in the output:

Figure 5. Output



Source: author's work

The obtained regression equations and statistics are given in table 4.3. A linear regression model was constructed for the following indicators:

- ✓ G_{13} – Number of students per 1000 people;

- ✓ G_{23} – unemployment rate, %;
- ✓ G_{41} – Number of mobile phone subscribers per 1000 people.

Table 6. Linear regression equations for the factors group

A group of factors	A linear regression equation	Determination coefficient R	Darbin-Watson coefficient DW
Education level	$I=0,15+0,80I_{təh}$	$R^2=0,93$	1,575
The level of population welfare	$I=0,11+0,82I_{rif}$	$R^2=0,76$	0,831
Level of infrastructure development	$I=0,03+0,60I_{inf}$	$R^2=0,56$	1,530

Note that the coefficient of determination is completely dependent on the indicator of the innovation index, and since the Darbin-Watson coefficient is less than 2, it means that the autocorrelation is adequate for the indicators involved in the equation.

The coefficients of determination in the models of the dependence of the innovation index on the level of education, the level of welfare of the population, and the level of infrastructure development show that the innovation index depends on the indicators included in the model: the most on the level of education (93%), and the least on the development of infrastructure level (56%).

A multidimensional regression model was given. Here, the dependence of the innovation index with the indices calculated by factor groups is established:

$$I = 0,337I_1 + 0,332I_2 + 0,329I_3 + 0,01 \quad (5)$$

I_i – is a factor groups index, a_i – is their coefficient.

DW=2; R^2=1

When the coefficients of this equation are calculated, it is obtained that since the Darbin-Watcon coefficient is equal to 2, autocorrelation is not possible for the indicators involved in the equation. Therefore, this model cannot be a worker. It means that there is no general dependence of the innovation index on the whole group of factors.

Let's form the model using stepwise regression. In this model, the variables are entered into the equation one by one, and the coefficient of determination is above R^2=0,93 as a result of the first step regression model at each stage.

$$I = 0,15+0,80I_{təh} \quad (6)$$

where I_{edu} - are educational elements.

In the multidimensional regression model, the elements of education seem to be the main ones. Thus, 93% of the change in the innovation index depends on the educational elements of the region.

CONCLUSIONS

We can conclude that the field of science and technology in Azerbaijan should improve today. In the period when the national innovation system was developing in the country, the development of innovation potential and innovation in the regions was one of the main issues. The formation of the national innovation system requires the development of regions. As a result of the research, two

methodologies were adapted to Azerbaijan and calculations were made: evaluation of innovation potential development and factor analysis methodologies of innovation potential development. Both are based on a system of indicators that characterize the internal and external environment and factors of innovation potential.

The proposed methods use widely applied tools in the international world.

In order to justify the indicators, the studies conducted in the world on the basis of inter-country and inter-regional comparisons were studied, and based on those models, a system of characteristic indicators for Azerbaijan was selected and calculated.

The system of selected indicators allows us to evaluate the level of innovation development in different areas, and to analyze the factors affecting the innovation index in the regions.

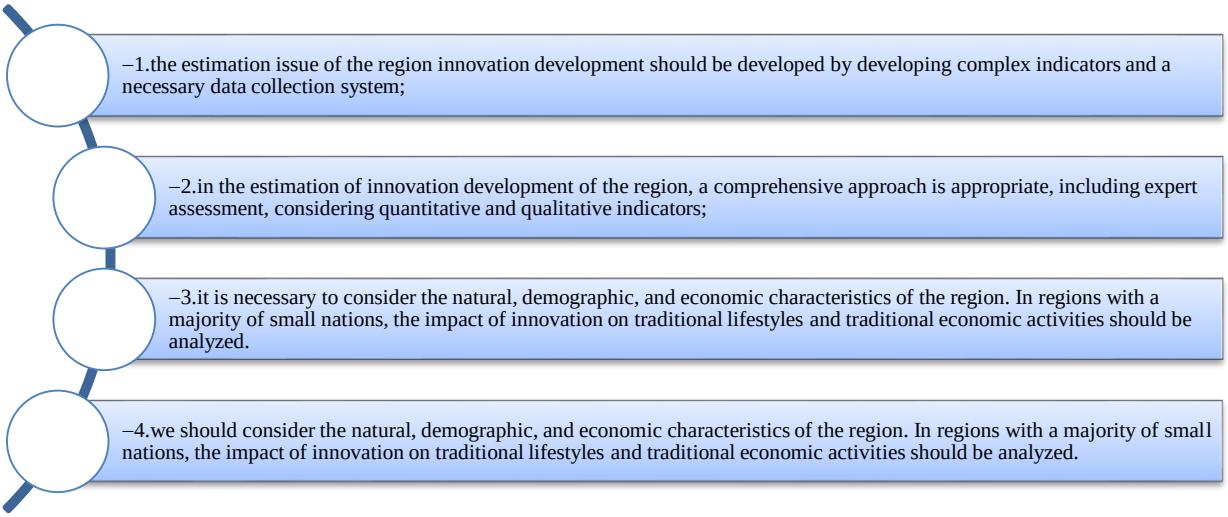
A methodical approach to the assessment of regional economic systems was proposed. The proposed approach considers the shortcomings of local experience and can be the basis for the development of management decisions related to innovation development and improvement of the efficiency of the economic system (Егорова М.В., 2009).

In the study, local and foreign methodological approaches to the assessment of regional innovation development were reviewed and analyzed, the general directions and general characteristics of methodical approaches to the assessment of regional innovation development were determined, and the innovation index was calculated for each region according to the comparative assessment of Azerbaijan's innovation potential.

The methodology used in the study was refined considering the national and specific characteristics of Azerbaijan, statistical indicators in this field, information that can be collected and processed, and the innovation potential of the regions, the system of indicators was changed and calculated for Azerbaijan. As a result of the conducted research, proposals were made to determine the role and competitiveness of the regions in the development of the economy of the republic.

The following results were obtained according to the results of the analysis of methodical approaches for the evaluation of the innovation development of the regions:

Figure 6. Results



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Thus, a comprehensive estimation of regional innovation development should be developed. The results of this evaluation can be the basis for the improvement mechanism of the state policy.

The proposed model is an efficient tool for the analysis of RIS. It allows us to assess the origin and structure of resource flows, and to predict the risks that occur during the operation and development of the system under the influence of external factors. This also creates profiles of the regional innovation development to determine the individual characteristics of the territories.

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INTERNATIONAL EXPERIENCE IN MEASURING THE DIGITAL ECONOMY

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Abstract: *The article discusses the importance and challenges of measuring the digital economy. It evaluates the overall benefits of the GDP framework and introduces new concepts to define the digital economy as an object of measurement. The concepts used to define the digital economy as an object of measurement are the following. In order to quantify the benefits associated with the digital economy, a new metric is introduced to formally link it to traditional GDP and the concept of gross income is used as the main indicator to assess its economic impact on the regional economy. The main methodological approaches for constructing relevant indicators are described. The methodology for measuring the digital economy and the prospects for improving the knowledge base are identified.*

Keywords: *Digital economy, measurement of economy, GDP, total incomes.*

INTRODUCTION

Digitalisation is "a general process beyond the industrial revolution that refers to the replacement of machines that depend upon humans and machines that do not depend upon humans by machines that can think for themselves, are intelligent and capable of working independently, participating in the production of sectors and causing fundamental changes in business life" (Yilmaz, 2020). The digital economy, meanwhile, is defined as "an economy that is extensively based on digital computer technologies" (Kalkınma Bakanlığı, 2018).

By renewing business processes in production, digitalisation supports the symbiosis of man and machine in working life in order to increase productivity and reduce production costs. However, the expected productivity gains are not keeping pace with the speed of the digitalisation process, despite the rapid pace of technological innovation and transformation. As any change in its own reality takes time to manifest its economic or social effects, these effects of digital transformation are expected to become more apparent over time. In particular, the adoption of digital by the public sector, the increase in the share of high-tech digital firms and the adaptation of business models to digital technologies should facilitate the adjustment of the productivity rate to the pace of digital transformation (OECD, 2021).

Measuring the Digital Economy

New Perspectives maps existing indicators across a range of domains, including education, innovation, entrepreneurship, and economic performance, against the current

policy challenges of the digital economy, as reflected in the OECD's Internet Policy Guidelines (2011).

The essence of the definitions is also influenced by the specifics of a particular historical period. The first definitions were based on contrasting earlier concepts such as the "information economy" and the related broader concept of the "information society". Don Tapscott (1996), for example, stated that the digital economy encompasses two types of economic activity. The first type, informational, involves basic tasks such as uploading static information to online resources; the second type, communication, includes activities made available by the Internet.

The definition of a concept reflects the times and current trends, especially in the field of technology. Early interpretations (Mesenbourg, 2001, Tapscott, 1996) focused on Internet technologies, which became a kind of technological mainstream of the 1990s, at least in the global North.

A number of works provide specific interpretations, but current approaches are generally simplified versions of the definition of the digital economy as a "digitally based economy" (EC, 2013).

The measurement of the digital economy is a priority, given the increase in the number of economic activities that are made possible by digital technologies and the consequent growth in their economic importance. But there are many challenges: High quality data is needed for good policy making, fiscal policy and resource allocation. At the moment, this component is lacking in the digital economy and, as a result, it is unlikely that public policies will be fully supportive of the development of the digital economy (House of Commons, 2016).

Challenges of the digital economy

There are several obstacles to measuring the digital economy:

- Definitions/frameworks: As the discussion above shows, definitions of the digital economy are very diverse and sometimes inconsistent. This does not in itself make it difficult to measure the digital economy, but it does make comparative analysis difficult. The same definitions that cannot draw a clear line between the traditional and the digital economy also make the initial measurement difficult (OECD, 2014).
- Data quality problem: Currently, especially in developing countries, there is a fundamental problem with the data being collected - it is either missing or unreliable. This is exacerbated by further innovation - data collection always lags behind technological progress.
- The cost problem: Moore's Law and similar phenomena - "my watch has more computing power than the computer that launched Apollo" - mean that the cost of the same amount of ICT power, storage capacity, etc. is constantly falling. Something similar can happen with types of ICT-related services, which also undergo qualitative changes that do not always affect their value; the emergence of free products (such as Wikipedia) that still add value is relevant (House of Commons, 2016, OECD 2016).

- Adjustments are needed to take this into account, but this is no longer relevant to science (OECD 2014, 2016). The virtuality of the digital economy: Many types of digital economic activity do not immediately produce a finished product. Some of these types of services may be intermediate at the business-to-business or consumer level; there may be difficulties in calculating value added; and digital services are delivered in virtual space and therefore may not be easily traceable, especially when there is cross-border e-commerce6 or the digital consumer-as-producer phenomenon (House of Commons, 2016, OECD, 2016, WEF, 2015).
- Some researchers argue that these obstacles make measuring the digital economy using traditional methods of economic analysis "not only incomprehensible, but unrecognisable" (Sheehy, 2016). At present, unresolved difficulties mean that the size of the digital economy is "substantially underestimated".

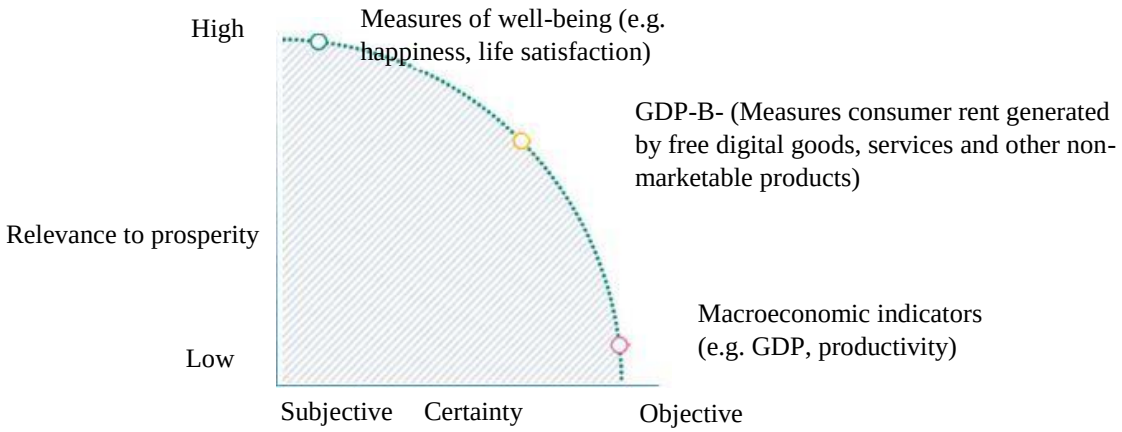
RESEARCH METHODOLOGY

Policymakers use GDP data to make decisions about everything from infrastructure to R&D, from education to cybersecurity. Regulators use this data to make policy decisions that affect technology companies and others. Because the benefits of digitalisation are dramatically overlooked, most of these policies remain divorced from reality. For example, a study by Felix Eggers of the University of Groningen found that Facebook has created $225 billion in unrecognised value for consumers since 2004. If we start from the fact that digital products and services are growing at an incredible rate in our economy, we better understand the need to solve this problem as soon as possible.

The main reason why the digital economy is under-represented in GDP is that GDP is defined in terms of the price people pay for a product or service. Therefore, with few exceptions, if the price of a product or service is zero, its contribution to GDP is also zero. However, many of us use free digital applications such as search engines and online maps much more than we use their paper versions.

In order to measure these benefits related to the digital economy, a new measure was developed to map them onto traditional GDP in a formal way. This new measure is called GDP-B, due to its reliance on GDP to consider the advantages (instead of the cost) of new and free goods (Brynjolfsson, et al., 2019). GDP-B was developed by Erwin Diewert as a way to complement GDP in order to capture the welfare gains of new and free goods, together with Felix Eggers and Kevin Fox. It is recommended that policy makers and managers use this measure of GDP-B when focusing on the welfare of the consumption side of the economy, instead of the production side. They found that the average annual GDP-B growth in the US since Facebook's inception in 2004 would increase by between 0.05 and 0.11 per cent if Facebook's benefits were included. While our GDP-B estimates are not as precise as GDP measurements, they at least attempt to directly measure economic well-being, which in the digital age is not adequately captured by GDP. Our measure of GDP-B remains within the neoclassic framework, reflecting only the private economic benefits related to the digital revolution (Collis and Brynjolfsson, 2020, Brynjolfsson, et al., 2019).

Figure 1. Spectrum of well-being measures



Source: https://www.brookings.edu/wp-content/uploads/2020/01/WP57-Collis_Brynjolfsson_updated.pdf

Macroeconomic indicators are easy to measure, but they only tell part of the story, and well-being measures provide a more realistic picture of how consumers are faring, but they too may be subjective. By considering a combination of measures, including our proposed GDP-B, policymakers, regulators and managers would be better placed to make decisions (Figure 1).

To estimate the total income of digital economic activity, we use the following formula (Glinsky, et al., 2011):

$M = M_T + M_1 \times \frac{1}{1-R}$ (Formula 1)

where M - total income (direct and indirect, taking into account the multiplier effect) from digital activities in the region;

M_T - direct economic effect from digital activity (the amount of funds generated by the digital economy in the first round of circulation of funds, included in the GRP of the region) ;

M_1 - the part of the proceeds (income) of the digital economy that has an impact on GRP (the volume of GRP caused by orders of digital activities) ;

$M_1 = \frac{Y \times Q_T \times (V_T - Z_{T\text{i}})}{X}$ *(*Formula *2)*

V_T - volume of produced products and services of the digital economy in value terms (the value of goods and services of the digital economy);

$Z_{T\text{i}}$ - volume of expenditures for the purchase of goods and services for digital production from other enterprises (cost of goods and services of the digital economy);

Y - gross regional product;

X - gross domestic product;

R - coefficient reflecting the degree of closedness of the regional economy and reflecting the relationship between two consecutive circles of circulation of digital economy funds in the region;

Q_T - the share of digital economy costs remaining in the national (regional) economy (Lovelock, 2018, Katz,2017).

RESULTS

The basis for the calculations is the estimation of MT - the amount of funds generated by digitalisation in the first round of circulation, included in the GRP of the region (direct economic effect from digital activity). As the main indicator for assessing the economic impact of digitalisation on the region's economy, this methodology is based on the concept of total income from the digital economy. The total income is understood as a set of annual benefits, both direct and indirect, received by the region as a result of digital activities and is expressed in value terms (Glinsky and Serga, 2021, Glinsky et al. 2011). This is a measure of how much money is spent by digital businesses, digital infrastructure businesses, information and communication businesses, and non-digital businesses on production, consumer goods, and services. Moreover, the indirect income for the region from digital activities is only the part of the expenditure (direct and overall cost) which stays within the region.

The following points should be taken into account when calculating total revenues from the digital economy (Glinsky and Serga, 2021):

1. The gross value added by the type of economic activity 'information and communication activities' (annual calculation of GRP) is the volume of funds generated by digitalisation in the first cycle of funds circulation.
2. Expenditure on the services of third parties used in the production of information and communication services is assumed to be equal to the volume of expenditure on the purchase of goods and services for digital activities from other enterprises (costs constituting the cost of the digital product).

Multiplier effects in monetary terms can be estimated using multipliers, especially on gross domestic product.

CONCLUSIONS

The study focuses on the methodological issues involved in assessing the contribution of digital economy activities to national and regional revenues, discusses possible methods for assessing the digital economy, and specifies the points to be taken into account when calculating total revenues.

In conclusion, the digital economy is a transforming power for the global economy and has considerable potential for revenue generation. However, there are a number of barriers to its development, the overcoming of which is essential for the full realisation of its benefits. Accurate definition and measuring their effects on GDP are essential for informed policy and economic analysis. Policy makers, regulators and managers can make better decision-making by evaluating a range of measures together, including the proposed GDP-B. Focus not only on price but also on the value created.

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ENHANCING BANKING SYSTEMS THROUGH BLOCKCHAIN TECHNOLOGY: A CURRENCY SITUATION STUDY

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Abstract: *Blockchain technology, initially designed for cryptocurrencies like Bitcoin, has emerged as a powerful tool in the financial sector. This study explores its potential integration into the Albanian banking system. The Albanian banking sector, like others worldwide, faces challenges in currency management, security, and efficiency. The research assesses how blockchain can address these issues and aligns with Albania's existing regulatory framework. The study begins with an overview of Albania's banking sector, highlighting key regulations and practices. It emphasizes the limitations of traditional banking systems, particularly related to transparency, security, and cross-border transactions. Blockchain technology's key attributes, such as immutability and transparency, are examined as potential solutions. Specific blockchain applications in Albania, like cross-border payments, digital identity verification, and supply chain finance, are considered. The comparative analysis evaluates how blockchain can enhance efficiency, reduce transaction costs, and increase access to financial services in the Albanian banking system. It also highlights the need for regulatory adjustments to accommodate this technology. Challenges, including regulatory compliance, cybersecurity concerns, and interoperability, are addressed, along with strategies to mitigate them. This research provides a comprehensive view of the opportunities and challenges of blockchain technology in Albania's banking system, aiming to inform policymakers, financial institutions, and stakeholders about the potential benefits of adopting blockchain solutions while considering regulatory adjustments to create a secure and efficient financial landscape in Albania.*

Keywords: *Blockchain Technology, Albanian Banking System, Financial Operations and Permissioned Blockchains.*

INTRODUCTION

Blockchain technology has emerged as a disruptive force in the global financial industry, offering potential solutions to various challenges faced by traditional banking systems. This literature review aims to provide insights into the application of blockchain technology in the banking sector, specifically focusing on currency management and financial operations. Additionally, it will shed light on the regulatory framework and current currency management practices within the Albanian banking system. Numerous studies and case analyses have explored the various applications of blockchain technology in the banking sector. Blockchain's role in facilitating secure and transparent transactions, particularly cross-border payments, has been a subject of extensive research. Studies by Tapscott and Tapscott (2016) and Mougayar (2016) have highlighted the benefits of blockchain in reducing transaction costs, settlement times, and counterparty risks. Furthermore, Kshetri (2017)

emphasized blockchain's potential to foster financial inclusion by providing secure and accessible banking services, even in underserved regions.

In the context of the Albanian banking sector, this study seeks to build upon this existing body of knowledge by investigating how blockchain technology can address the specific challenges and opportunities within the Albanian financial landscape. It will analyze the potential alignment of blockchain solutions with Albanian financial regulations and operational practices, offering valuable insights for policymakers, financial institutions, and stakeholders aiming to harness the transformative power of blockchain while considering necessary adjustments to regulatory frameworks. This research aims to provide a comprehensive view of the opportunities and challenges presented by blockchain technology in the Albanian banking system.

CURRENCY MANAGEMENT AND FINANCIAL OPERATIONS

Currency management, a critical aspect of banking operations, involves the efficient handling of fiat currencies, liquidity management, and currency exchange. Blockchain's application in this domain has attracted attention due to its ability to streamline processes and minimize operational risks. Research conducted by Böhme et al. (2015) and Natarajan and Ali (2017) have explored blockchain's role in optimizing liquidity management through real-time settlement systems and tokenization of assets. These studies indicate that blockchain can enhance the liquidity and management of currencies within the banking ecosystem.

Regulatory Framework and Currency Management Practices in Albania

The Albanian banking system operates within a specific regulatory framework influenced by national laws and international standards. To understand the context in which blockchain technology may be integrated, it is essential to analyses the existing regulatory environment and currency management practices in Albania. The Albanian Financial Supervisory Authority (AFSA) plays a pivotal role in overseeing the banking sector's compliance with regulations. The Banking Law of Albania, as of the last knowledge update in September 2021, provides the legal framework for banking activities in the country. Currency management in Albania encompasses currency issuance, exchange rate policies, and foreign exchange market operations. The Albanian central bank, the Bank of Albania, is responsible for formulating and implementing these policies.

BLOCKCHAIN TECHNOLOGY

Blockchain technology has gained prominence in the financial sector as a potential solution to various operational challenges. To assess the suitability of blockchain for the Albanian banking system, it is imperative to evaluate its technical aspects, including scalability, security, and interoperability with existing banking systems. Additionally, we will explore specific blockchain platforms and solutions that could be relevant in the Albanian context.

Scalability

Blockchain technology's scalability has been a subject of concern, particularly in public blockchains like Bitcoin and Ethereum. These platforms face limitations in transaction throughput and processing speed, which can hinder their use for high-volume banking operations. However,

several blockchain projects have focused on addressing scalability issues. Solutions like sharding, layer 2 protocols (e.g., Lightning Network for Bitcoin), and consensus algorithm enhancements (e.g., Proof of Stake) have shown promise in increasing blockchain scalability. It is crucial to assess the scalability of blockchain platforms and solutions in the context of Albanian banking operations to ensure they can handle the expected transaction volumes efficiently.

Security

Security is a paramount consideration in the banking sector. Blockchain technology offers inherent security features, such as cryptographic encryption and immutability, which can enhance data protection and transaction security. However, blockchain is not immune to security threats, and it is vital to assess the risks associated with its implementation. Potential security risks in blockchain include smart contract vulnerabilities, 51% attacks (for proof-of-work blockchains), and private key management. The assessment should explore how these risks can be mitigated and how the use of blockchain can improve overall security within the Albanian banking system.

Interoperability

Interoperability is a critical factor for integrating blockchain technology into the existing banking infrastructure in Albania. Many blockchain solutions operate on distinct networks, and achieving seamless interaction with legacy banking systems is essential. Interoperability protocols and standards, such as Interledger Protocol (ILP) and Token Taxonomy Framework (TTF), aim to bridge the gap between different blockchain networks and traditional financial systems. The assessment should examine how these interoperability solutions can facilitate the integration of blockchain technology into the Albanian banking ecosystem.

Advantages of using Blockchain in the Banking System

The technical assessment of blockchain technology in the Albanian banking context must focus on scalability, security, and interoperability while exploring blockchain platforms and solutions that align with regulatory requirements and operational needs. This evaluation will inform the feasibility and potential benefits of adopting blockchain within the Albanian banking system.

- Blockchain Offers Potential Benefits: The evaluation of blockchain technology indicates that it holds significant potential for enhancing various aspects of the Albanian banking system, including currency management, security, and efficiency. Its inherent features, such as immutability and transparency, can address existing challenges.
- Scalability Remains a Consideration: While blockchain scalability has improved with the introduction of various solutions, it remains a consideration, especially for high-volume banking operations. Careful selection of blockchain platforms and scaling solutions is crucial to ensure they meet the demands of the Albanian banking sector.
- Security Enhancement: Blockchain's cryptographic security features can enhance data protection and transaction security within the Albanian banking system. However, it is essential to be aware of potential vulnerabilities, such as those associated with smart contracts and private key management, and implement robust security measures.

- Interoperability is Key: Interoperability between blockchain networks and existing banking systems is critical for successful integration. Interoperability protocols and standards, such as ILP and TTF, should be explored to ensure seamless communication and data exchange.
- Customization for Regulatory Compliance: Blockchain platforms like Corda, Hyperledger Fabric, and Ethereum Enterprise offer customization options to align with regulatory requirements in Albania. Tailoring blockchain solutions to meet specific regulatory standards is essential to ensure compliance.
- Consider Permissioned Blockchains: Given the regulated environment of the Albanian banking sector, permissioned (private) blockchains or consortium networks may be more suitable than public blockchains. These solutions provide control and privacy while benefiting from blockchain technology.
- Mitigating Risks: Implementing blockchain in the banking system should be accompanied by robust risk management strategies. Identifying and addressing potential risks associated with blockchain adoption, including regulatory compliance and cybersecurity, is crucial.
- Pilot Projects and Regulatory Adjustments: To fully realize the benefits of blockchain technology, pilot projects should be initiated to test its feasibility in specific banking operations. Regulatory adjustments may be necessary to accommodate blockchain innovations while maintaining a secure and compliant financial ecosystem.
- Collaboration and Education: Collaboration between banking institutions, regulatory authorities, and technology experts is essential for a successful blockchain adoption journey. Furthermore, continuous education and training programs can help stakeholders understand and harness the potential of blockchain technology effectively.
- Long-term Vision: The adoption of blockchain technology in the Albanian banking sector should be viewed as a long-term strategy. As the technology continues to evolve, it is essential to adapt and refine blockchain solutions to meet the changing needs of the financial industry.

CONCLUSIONS

Blockchain technology offers a promising avenue for improving currency management, security, and efficiency within the Albanian banking system. Blockchain technology holds substantial promise for enhancing various facets of the Albanian banking system, including currency management and operational efficiency. However, scalability and interoperability remain challenges to address. Security measures must be robustly implemented, and customization for regulatory compliance is essential. Consideration of permissioned blockchains, pilot projects, and regulatory adjustments is prudent. Collaboration and education are key to successful adoption, emphasizing a long-term vision for blockchain integration in the Albanian banking sector.

Furthermore, the potential advantages of implementing blockchain in the Albanian banking system extend beyond the specific focus areas mentioned. Blockchain technology can also foster financial inclusion, offering secure and accessible banking services in underserved regions. It has the potential to reduce settlement times, lower transaction costs, and minimize counterparty risks. Moreover, it enables efficient cross-border payments, easing international transactions for businesses and individuals. To fully harness these benefits, it is essential for the Albanian banking sector to engage in continuous research and development, staying attuned to blockchain's evolving landscape.

Embracing this technology requires a proactive approach, with financial institutions and regulatory bodies working together to create a supportive environment. This collaborative effort, combined with ongoing education and training initiatives, will empower stakeholders to make the most of blockchain technology's transformative potential.

In conclusion, in spite of the challenges that arise, the incorporation of blockchain technology into the Albanian banking sector demonstrates substantial potential. Through the thorough scrutiny and proactive pursuit of the factors and opportunities outlined, Albania stands poised to establish a financial landscape that is not only more efficient and secure but also more inclusive. Such efforts harmonize with prevailing global trends within the financial industry.

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IMPLICATIONS OF ARTIFICIAL INTELLIGENCE IN HEALTHCARE IN DEVELOPING COUNTRIES: PERSPECTIVES AND CHALLENGES

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Abstract: *The integration of Artificial Intelligence (AI) and Machine Learning (ML) technologies into the healthcare sector has catalyzed transformative changes across the globe. This comprehensive article delves into the multifaceted impact of AI and ML on healthcare quality, data management, and clinical practices. Moreover, it examines these trends within both a global context and the specific framework of the Republic of Georgia. The purpose of this study was to specify the most important implications of AI in healthcare for developing countries and to assess perspectives and challenges of implementation. At the first stage, desk research was performed. Fifty relevant scientific articles and reports were identified, by key words, with utilization of various scientific bases and analyzed. Moreover, the major findings of the desk research, regarding implications of AI in healthcare in developing countries and challenges were used for the qualitative research. More specifically, in-depth interviews (overall 10) were conducted with various stakeholders of Georgia's healthcare system and two focus-group discussions (FGD) were moderated with medical professionals and specialists. The purpose of in-depth interviews and FGDs was assessment of attitudes and perceptions of major stakeholders about AI implementation and utilization. According to the reviewed literature, perceptions and attitudes of stakeholders are very important for the successful implementation. However, this issue is not evaluated sufficiently, especially in developing countries. According to the results of the study AI can have substantial economic benefit for the developing countries, with consideration of the monetary savings, improved level of healthcare quality and increased patient safety. As the findings of the qualitative research demonstrate attitudes and perceptions of the doctors and important stakeholders represent a challenge for the successful implementation of AI. Consequently, it is strongly recommended to centralize and prioritize this issue on a system's level in the process of policy and strategy design.*

Keywords: *AI in healthcare, implications of AI in healthcare, AI for healthcare management, AI implications in developing countries.*

INTRODUCTION

The convergence of AI and healthcare has ushered in a new era of medical innovation. AI-powered clinics and intelligent medical systems are revolutionizing healthcare practices, ranging from diagnosis and treatment to data analysis and administrative efficiency. These advancements hold great promise in enhancing healthcare quality and accessibility while optimizing resource utilization.

Transforming Healthcare Landscape AI clinics represent a paradigm shift in healthcare service delivery. Through machine learning algorithms, patient data can be analyzed rapidly and accurately, aiding in early diagnosis and predictive treatment strategies. Global initiatives in AI clinics are addressing the shortage of medical professionals, particularly in remote areas, by providing virtual consultations and intelligent diagnostic tools.

Another area where AI's impact is far-reaching is healthcare quality. It not only assists medical professionals in making accurate diagnoses but also supports personalized treatment plans based on individual patient profiles. Machine learning algorithms, when trained on vast datasets, can identify hidden patterns in patient data, leading to optimized treatment strategies and reduced adverse effects. One of the areas of healthcare quality where AI is showing promising results is hospital-acquired infection rate reduction. Recent study conducted in Mayo Clinic found that risk prediction for Hospital-Acquired-Infections (HAI) with utilization of AI model can estimate risk of infection per individual patient, based on patient's clinical features and characteristics of similar patients. This model was trained on 38,327 unique hospitalizations and a distinct model for surgical site infection prediction was trained on 18,609 hospitalizations. Accordingly, researchers conclude that this model could enable hospitals to prevent early detection of HAIs, which in turn can result in decreased length of stay, mortality, and costs (Wolff et al., 2020).

It is well acknowledged that costs of medical care and national expenditures in this regard are dramatically increasing in all countries of the world. Among several causal factors, increasing life longevity and increased number of chronic patients carry substantial part. Even though there is a lack of compelling scientific evidence justifying cost-efficiency of utilization of AI in healthcare (Khanna et al., 2022), it still can be forecasted to cause substantial savings, according to the effectiveness and process optimization it demonstrates (Mathias, 2023). Regarding cost-efficiency of AI in healthcare, special attention should be paid towards the Internet of Medical Technology (IoMT). IoMT represents the fastest growing sectors of IoT market, predicted to reach 176 billion US dollars by 2026 (Shah&Chircu, 2018). The most popular area of IoMT utilization is remote patient monitoring and such directions, as glucose monitoring, heart rate monitoring, depression and mood monitoring, Parkinson's disease monitoring, IoT connected inhalers, ingestible sensors, connected contact lenses and robotic surgery (Rizwan et al., 2017).

To return to the topic of healthcare quality mentioned above, according to the report delivered at the conference for the Association of Professionals in Infection Control Epidemiology utilization of IoT for hand hygiene "showed a 61.4% decrease in HAIs (Hospital-Acquired-Infection) across 10 hospitals that use technology" (www.cleanhands-safehands.com). Hand hygiene is one of the most important areas in infection control in hospitals and one of the most challenging, as well, about compliance from medical personnel. To illustrate this technology, in the badges of clinicians there is Bluetooth technology, which communicates with IoT sensors affixed to soap and sanitizer dispensers in patient care areas. Once a clinician walks into or out of a patient's room, IoT sensors detect this, and doctors have a certain number of seconds to dispense sanitizer or soap. If they don't dispense, real-time voice reminder sound reminds saying "please sanitize". In case of rooms where patient has Clostridioides difficile the voice changes to "soap

and water only" upon exit, as sanitizer does not kill C. difficile spores. Furthermore, according to the data from ten hospitals, from the same study it has shown prevention of 372 total infections per year, translating into 9.5 million US dollar direct cost savings and 39 lives saved each year (Fitzpatrick, 2020).

Literature review

In the realm of healthcare, the integration of artificial intelligence has been a subject of profound investigation by healthcare experts. An array of seminal works and scholarly articles underscores the paramount significance of amalgamating technologies to propel the advancement of healthcare. These scholarly works provide a comprehensive view of the contemporary landscape of artificial intelligence within the healthcare domain, underscoring its capacity to revolutionize industry. Specifically, it demonstrates its potential to enhance diagnostic capabilities, individualize treatment strategies, and elevate the quality of patient care. Additionally, these scholarly contributions conscientiously recognize the multifaceted challenges of ethical, regulatory, and technical nature that necessitate meticulous consideration to facilitate the broad and conscientious adoption of artificial intelligence in healthcare.

To be specific, one of these foundational papers by Topol provides an overview of the potential of AI in healthcare, from diagnostics to treatment recommendations (Topol, 2019). It emphasizes AI's ability to augment and improve human clinical decision-making. - "Artificial Intelligence for Healthcare: On a Par with Human Clinical Decision Making?" In the research process, Manu Agarwal Senior Manager – Growth, as a knowledgeable and cooperative contributor, has facilitated the acquisition of valuable insights and information. Furthermore, the report featured on the Markets and Markets (Markets and Markets, 2023)) presents a notable projection for the artificial intelligence in healthcare market. According to this report, the market is poised for substantial growth, with an expected transition from USD 14.6 billion in 2023 to a noteworthy USD 102.7 billion by 2023. This growth trajectory is underpinned by a projected compound annual growth rate (CAGR) of 47.6% during the stipulated forecast period.

Justus Wolff et Al's article "The Economic Impact of Artificial Intelligence in Health Care" presents a systematic review of cost-effectiveness studies related to the economic impact of artificial intelligence (AI) in the healthcare industry (Wolff et al., 2020). The central objectives of the study are to assess the quality of these studies and to highlight areas for potential improvement. This article offers a valuable review of the state of economic impact assessments in the context of AI in healthcare. It highlights the need for more robust and comprehensive studies to better inform decision-making in this rapidly evolving field.

Judy Mathias article "Use of AI to predict risk of HAIs" reports on a study conducted by researchers at the Mayo Clinic Arizona, which focuses on the development and evaluation of an artificial intelligence (AI) model for predicting the risk of healthcare-associated infections (HAIs) (Mathias, 2023).

The study aimed to create an AI model capable of estimating individualized risk for HAIs by considering a patient's clinical characteristics and those of similar patients. This article presents

promising results from the application of AI in healthcare, particularly in the context of HAIs. The AI model's ability to outperform traditional models and reduce costs is a significant advancement in the field. The findings highlight the potential of AI to enhance patient care and reduce the burden of HAIs on healthcare systems, underscoring the importance of continued research and development in this area.

Additionally, "Challenges and Opportunities for Machine Learning in Healthcare" - Obermeyer and Emanuel (2016) discuss the potential of machine learning in healthcare while also highlighting challenges, such as bias in algorithms and data privacy concerns (Ghassemi et al., 2020). Literature review effectively captures a range of perspectives on AI and machine learning in healthcare. It emphasizes the potential benefits of AI in improving patient care, reducing costs, and enhancing clinical decision-making. However, it also acknowledges the challenges related to bias, data privacy, and the need for more comprehensive economic impact assessments.
Enhancing healthcare quality through AI is an ongoing process that holds immense promise for improving patient outcomes, reducing healthcare costs, and enhancing the overall healthcare experience. It is essential for healthcare providers to continue to research, develop, and implement AI technologies while ensuring they meet the highest standards of accuracy, privacy, and ethical considerations.

The exponential growth of healthcare data necessitates advanced management strategies. AI and ML play a pivotal role in processing and analyzing these massive datasets to extract meaningful insights. Predictive modeling, data-driven decision-making, and patient risk stratification are some of the areas were AI shines in healthcare data management.

Machine learning algorithms are redefining clinical practices by enabling early disease detection, prognosis prediction, and treatment response monitoring. These algorithms continuously learn from new data, evolving their accuracy over time. AI's ability to analyze multi-modal data, such as medical images and genomics, opens avenues for precise diagnostics and treatment personalization. In the Georgian healthcare landscape, where certain diseases are more prevalent due to regional factors, AI-driven clinical practices can offer tailored interventions. This approach can significantly impact disease management, reduce treatment costs, and improve patient outcomes. The implementation of AI and ML in healthcare is not without challenges. Ethical concerns, data privacy, algorithm bias, and the need for healthcare professional engagement require careful consideration. Striking a balance between human expertise and AI's capabilities is essential. In the global context, including Georgia, fostering interdisciplinary collaboration between technologists, medical professionals, and policymakers will be crucial in harnessing the full potential of AI in healthcare.

Methodology

The purpose of this study was to specify the most important implications of AI in healthcare for developing countries and to assess perspectives and challenges of implementation. At the first stage, desk research was performed. Fifty relevant scientific articles and reports were identified, by key words, with utilization of various scientific bases and analyzed.

Moreover, the major findings of the desk research, regarding implications of AI in healthcare in developing countries and challenges were used for the qualitative research. More specifically, in-depth interviews (overall 10) were conducted with various stakeholders of Georgia's healthcare system and two focus-group discussions (FGD) were moderated with medical professionals and specialists. The purpose of in-depth interviews and FDGs was assessment of attitudes and perceptions of major stakeholders regarding AI implementation and utilization. According to the reviewed literature perceptions and attitudes of stakeholders are very important for the successful implementation. Nevertheless, this issue is not evaluated sufficiently, especially in developing countries. Furthermore, the FGDs were conducted online using Zoom platform, led by an experienced moderator using appropriate „Discussion guide" and supported by a research assistant. The assistant was pre-trained in FGD method and specific aspects of transcript preparation.

A total of ten in-depth interviews were conducted, six interviews were face-to-face and four by video calls. The average duration of an interview was 50 minutes. Based upon informed consent all discussions and in-depth interviews were audio/video recorded and transcripts prepared based on them. Transcript data were analyzed using 'content-analysis' methodology. Analysis started immediately after the FGDs were conducted and in-depth interviews ceased, respectively. Consequently, 'main ideas' or 'themes' were summarized and highlighted using 'concept map' approach.

Results

In the specific context of healthcare research in Georgia, a burgeoning landscape is emerging as the country embarks on its initial forays into exploring the applications of artificial intelligence (AI). This research trajectory represents a pioneering effort, marking Georgia's first exploration of the multifaceted possibilities of AI within the healthcare domain. It highlights the country's dedication to leveraging technological advancements to enhance its healthcare infrastructure and services. Within this research landscape, Georgia seeks to comprehensively evaluate the potential and implications of AI technologies in healthcare, a venture that is characterized by its novelty and forward-looking orientation. As the country takes these initial steps, the aim is to discern how AI can be effectively integrated to not only augment healthcare delivery but also to address the unique healthcare challenges that are intrinsic to developing nations. This pioneering research signifies a promising journey for Georgia as it seeks to harness the transformative power of AI to optimize healthcare practices within its specific national context. This exploration is poised to lay the foundation for a deeper understanding of the applications, benefits, and potential limitations of AI in healthcare, fostering a rich research landscape within the country and contributing to the global discourse on AI in healthcare.

The utilization of AI in developing nations carries substantial potential to enhance the quality of healthcare services and broaden healthcare access. Nevertheless, this endeavor is currently grappling with fundamental challenges. These obstacles include a deficiency in public health infrastructure, a shortage of adequately trained healthcare professionals, and a prevalent

apprehension of job displacement, as underscored in Joshi et al.'s recent study (2022) (Joshi et al., 2022). The fear of potential job loss among healthcare professionals engenders skepticism and mistrust towards AI and related technologies, thereby impeding their effective integration into healthcare practices, as noted in de Abreu et al.'s research (2021), as cited by Joshi et al. (2022).

These challenges collectively constitute the primary impediments to the successful adoption of AI in developing countries. Nevertheless, there is potential for a more harmonious alignment of expectations between healthcare professionals and AI technologies. Moreover, fostering collaborative co-creation in the design and implementation of AI systems holds promise in mitigating these hurdles. This notion is consistent with findings in a systematic literature review by Hogg et al. (2023) which addressed AI's role in healthcare (Hogg, 2023). It is important to highlight that a notable gap exists in research pertaining to AI in healthcare within the context of developing countries, as indicated by Hogg et al.'s review. Further exploration of this subject may yield valuable insights to overcome these challenges and enhance the integration of AI in healthcare within developing nations.

Also, Healthcare systems in developing nations frequently grapple with a chronic shortage of medical personnel. AI applications hold promise in addressing this persistent workforce deficit. The World Health Organization (WHO) acknowledges that the rapid integration of AI technology in healthcare comes with a set of notable challenges. One significant concern lies in the potential lack of comprehension regarding the intricate workings of AI technologies, often referred to as the 'black box' problem. This lack of understanding can lead to the risk of patient harm. Additionally, AI technologies, especially those reliant on machine learning processes, are susceptible to biases inherent in the model itself and the data used for training.

Furthermore, AI applications in healthcare frequently involve access to sensitive personal information. Consequently, there is a pressing need to establish effective measures for safeguarding and responsibly managing this data, as well as overseeing the purposes for which AI is deployed in the healthcare sector.

The primary highlights revolve around three substantial challenges in the integration of AI in healthcare: a deficiency in transparency, regulatory and governance complexities, and a fundamental lack of comprehension among healthcare practitioners and patients.

Developing countries, including Georgia, often encounter challenges related to the geographical distribution of healthcare professionals and the adoption of modern technologies and AI in healthcare. According to the opinions of the respondents, in the Georgian context, AI empowered digital health platforms have the potential to bridge healthcare disparities between urban and rural regions. Like many other developing countries, Georgia’s healthcare system faces a challenge of medical professional asymmetry. More specifically, 70% of healthcare professionals work in the capital city and only 30% of the medical personnel serve the rest 70% of the country’s population in the regions. Telemedicine empowered by AI can connect patients (even in the most distant areas of the country) with medical experts, overcoming geographical barriers and improving access to specialized care. Moreover, interdisciplinary approach and value-based healthcare are the most accentuated aspects of the healthcare systems, that should be met for

patient-centered care, better outcomes, and higher quality of treatment. In Georgia, as in most developing countries, many regions and rural areas do not have specialists such as endocrinologists, ophthalmologists etc. This results in fragmented care and lack of care continuity. However, telemedicine provides a platform to offer multidisciplinary team approach to the patients living in rural areas. Even more, shortage of specialists in certain areas represents significant challenge in Georgia's healthcare system, as well as in other developing countries. "Brain drain", migration of talents to developed countries leaves developing countries scarce of highly qualified specialists. With the application of AI optimization of resources becomes available. For instance, in telemedicine settings with AI involvement preliminary diagnosis can be made with analysis of various images, scans and recordings of lung and heart sounds. And human intelligence should be used only for special cases. This frees time for specialists for more significant cases and decreases time for diagnosis for the patients.

Rather interesting topic emerged in the Focus Group discussions. According to the opinions of some respondents, there can be a trend observed in the displaced population – forced to leave their places of residence after the wars in August of 2008 and in 1990s. Healthcare specialists from the Samegrelo region (where large number of displaced citizens is concentrated) shared findings of several charity check-ups conducted in this population. According to their observations, there is a trend of increased oncological disease prevalence among these individuals compared to other citizens in the same region. One of the suggestions is that increased levels of stress these individuals underwent through, could contribute to greater exposure to oncological conditions. Nevertheless, this fact needs further in-depth research and implementation of AI can support trend identification, disease prediction and prevention. With a diverse population and a wide spectrum of health conditions, AI-driven analytics can aid in tailoring treatment approaches to the country's unique demographic and epidemiological landscape.

Another area for AI's potential is enhancement of healthcare quality in the provider sector. Government of Georgia envisions to position the country on the global medical tourism market, as a destination country. However, to realize this vision one of the central requirements is to offer adequate healthcare quality to medical tourists. Currently, Georgia's provider sector faces many challenges regarding healthcare quality, like many other developing country contexts. Therefore, respondents accentuated the role of AI as a solution to the number of problems in this regard. To illustrate, utilization of AI for the early prognosis of infections in hospitalized patients could significantly decrease costs of the treatment of complications and save more lives. Even though electronic medical records are not fully implemented in all clinics, this process will be completed soon. Georgia's nascent electronic health records system can benefit immensely from AI-driven data management solutions. By effectively organizing and analyzing health data, the country can identify emerging health trends, improve clinical research, and facilitate evidence-based policy formulation. The greater problem, in this scope, is a lack of data analytics. Respondents extended this topic further on the national level. According to the representatives of non-governmental organizations, working with the ministry of healthcare and involved in various projects, data from different registries (birth, oncological etc.) and digital platforms in the country are not processed

and analyzed adequately, thus living serious potential for evidence-based decisions unrealized. Consequently, implementation of AI is sought as a solution to this problem on a provider, as well as on a state level.

Another area of concern in Georgia's healthcare system is polypharmacy and excessive instrumental or laboratory investigation – "overmedicalization over-investigation". According to the respondents this problem also could be solved, and patients could benefit from AI utilization. To cite one of the respondents – "currently, the ministry of healthcare cannot control this problem as more than 90% of clinics are private, for-profit. The only way to correct this problem is to leverage control and regulatory capacity. And this can be achieved only by creation of evidence pool and data analytics. To identify trends in medicine prescription and "treatment behavior"". Moreover, through the identification of mentioned trends and data analytics with AI total healthcare expenditures can be decreased and quality of treatment enhanced. Still another direction in healthcare quality for the prevention of infections and complications is hand hygiene. Respondents weren't familiar with AI empowered solutions for hand hygiene compliance (mentioned above, in the literature review findings). During interviews and FGDs this information was shared with them by researchers. Most of the respondents found this technology very useful for Georgia's context.

One of the significant challenges in Georgia's healthcare system is a lack of therapeutic education and self-management among chronic patients and parents of the children with chronic diseases. Among the respondents were two experts with several years' experience in diabetes research. To illustrate their opinion regarding AI's role in patient education – "we conducted several studies to assess the needs and problems of the patients with diabetes, adults, and children. One of the biggest problems in this regard is lack of education among parents of children having diabetes and adult diabetic patients. Diabetes is a disease which heavily depends on self-management and behavior change. Lack of knowledge hinders serious behavior change and outcomes are much worse. If we could use AI, to increase access to the newest information for them results could be much better". According to the discussion, with utilization of generative AI tools access to up-to-date information can be increased and digital libraries (video library as well) can be created. This concerns other chronic conditions as well, where modification of risks is possible with self-management and behavior change. Once personalized health content generation becomes possible patients can easily get information tailored to their specific condition. To continue the topic of chronic diseases, which represents a significant burden for the country's budget, introduction of AI empowered chronic disease assistance platforms can also improve health condition of patients and quality of life. To illustrate, one of such digital applications, on a global market, is Dario, where AI can assess/recognize mental and physical state of the patient based on voice recognition and text comprehension technologies, directs patient accordingly to the relevant specialist and offers additional assistance. This kind of applications customized to Georgian patients can decrease healthcare expenditures on top of the benefits mentioned above. Among the participants of FGDs were two professionals working on mental wellness issues (one psychiatrist and another- representative of NGO working on mental health). During discussions,

the significance of deteriorating mental health of the population was discussed and alarming rate of emerging problems such as anxiety disorders and panic attacks were mentioned. It should be noted that prevalence of mental problems dramatically increased after COVID-19 and after the war in Ukraine. As Georgian population underwent two wars in 1990s and in 2008, war in Ukraine caused significant re-traumatization among citizens. Official statistics do not illustrate the real situation in this regard, as due to stigma and cultural issues the number of individuals suffering mental problems is much greater. According to the respondents, implementation of solutions, such as AI coupled with Virtual Reality Goggles and Biofeedback devices can bring substantial results for the treatment of patients with different phobias, post-traumatic-stress disorders (PTSD) and anxieties. It should be noted that neurofeedback devices empowered with AI diagnostics is newly introduced on Georgia's market and has attracted attention of patients and specialists in very short period of time. It should be outlined that none of the respondents of interviews and FGDs mentioned robotic surgeries among listed significant AI implications in healthcare.

In developing countries, the adoption of AI in healthcare is often driven by the need to address resource constraints, access issues, and the delivery of cost-effective care. The specific technologies used may vary, but the common goal is to leverage AI to improve healthcare access, quality, and efficiency. AI can help these countries maximize their limited healthcare resources and enhance the overall health outcomes of their populations. It's worth noting that while these technologies offer significant promise, their successful implementation in developing countries may also face challenges related to infrastructure, affordability, and regulatory frameworks. Nevertheless, the potential benefits in terms of improving healthcare access and quality make AI an important focus for healthcare development in these regions.

However, despite all the benefits and potential implications of AI in healthcare that were discussed during the study, challenges and skepticism among the respondents should also be mentioned. During the FGDs, healthcare specialists expressed concerns regarding replacement of doctors with AI and machine learning. Moreover, skepticism and fear of change were evident in the discussion process and in the concerns that were expressed. It is well known and researched how this kind of attitudes and resistance to change, as well as fears hinder innovations, especially in regard with implementation of new technologies. Another challenge named by the respondents was lack of flexibility and coordination of efforts on a system's level in the country. More specifically, many processes in scope of digitalization of healthcare are hindered by a lack of collaboration among different ministries and state units. Still another challenge named in FGDs and interviews is deficiency of specific and clear vision of government concerning digitalization of healthcare and AI. Moreover, absence of the relevant technological infrastructure, weak regulatory system and loose monitoring from the government's side were named as substantial hindering barriers for effective implementation and utilization of AI in healthcare.

To summarize, despite these challenges, there is growing recognition of the potential benefits of AI in healthcare for developing countries, including improving healthcare access, quality, and efficiency. Efforts are underway to overcome these obstacles through international partnerships, capacity-building initiatives, and the development of AI solutions tailored to the

specific needs and resources of these regions. For the effective realization of AI's potential in healthcare the following requirements should be met – clear and specific vision and strategy should be developed by the government. Furthermore, Government in a flagmenship role should coordinate collaboration and integration of efforts among various ministries and institutions in order to develop technological infrastructure and framework in the country. Provider sector and all the stakeholders should be involved from the very initial stage of AI implementation - vision and strategy development etc. Even more, encouragement and stimulation of the provider sector should be thought to enhance AI adoption by the private clinics and hospitals. As for the provider sector, management of clinics need to consider and utilize change management principles for the effective transformation. To illustrate, so called "champions" – specialists supporting and enthusiastic about AI implementation should be engaged actively in the groundwork processes to change attitudes and perceptions of the personnel in favor of technological progress.

CONCLUSIONS

AI and machine learning have brought about transformative changes in healthcare quality, data management, and clinical practices on a global scale. In Georgia, these advancements hold immense promise in overcoming healthcare disparities and optimizing healthcare delivery. As AI continues to evolve, a harmonious integration with human expertise will pave the way for a future where healthcare is not only technologically advanced but also empathetic and patient centric.

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MODERN TRENDS IN BUSINESS IN THE FUNCTION OF BUSINESS SUCCESS

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Abstract: *The aim of this paper is to point out the importance of new trends in the business of modern organizations. Emphasis is placed on the processes that characterize modern organizations, namely: globalization, sustainability, information technology and modern organizational structures. The paper analyzes the extent to which modern organizations fit into the trends of globalization and sustainability, and the extent to which they apply modern information technologies and organizational structures. In order to have a more successful analysis, the advantages and disadvantages of these trends have been identified. The paper shows that the successful operation of modern organizations depends on the degree to which they have managed to master these trends and implement them in their business strategies. All these processes result in connecting and networking organizations, developing democratic relations in management and decision -making, which has a positive impact to greater employee motivation and more efficient business.*

Keywords: *modern trends, globalization, information technologies, sustainability, organizational structure*

INTRODUCTION

A modern and dynamic market requires constant changes in the way organizations operate and their adaptation to these changes. Many organizations find the answer to the dynamic environment by introducing and applying some of the modern trends or even applying more of them. Organizations apply a certain trend depending on their wishes and needs. Timely introduction of a trend is one of the main keys to success, because trends can only be successful if they are applied in the given circumstances. Otherwise it will not have the desired effect within the organization. For this reason, organizations need to be very careful when introducing them, because it can have greater consequences than benefits. In the sense of the above, the paper first analyzes competitiveness, as a feature of modern organizations. Through the implementation of trends in their business strategies, organizations will be competitive in the modern market.

The paper identifies strategies that organizations can use to acquire and maintain competitiveness. Furthermore, the important characteristics of modern trends are presented, namely globalization, sustainable development and information technologies and their impact on the business of organizations. In this context, the importance of modern organizational structures in shaping organizations was especially emphasized. This is because new trends require newer organizational structures. The paper presents some of the newer forms of organizational structures, namely: team organizational structure, network organizational structure and externalization of activities. At the end of the paper, concluding remarks are given that refer to the treated issues.

1. Competitiveness as a feature of modern business

Competitive advantage is a characteristic that distinguishes one organization from another, i.e. striving to gain an advantage over others. This is a characteristic that makes an organization better and more successful than others, because it can better meet its own needs and the needs of others. Today, competitive advantage is increasingly difficult to achieve, and even more difficult to maintain because we live in a turbulent time in which changes are happening every day. Achieving and maintaining a competitive advantage means that companies adapt to global trends in doing business on the global market, which means: high quality goods and services, diversity of the workforce, entrepreneurship, etc.

Given that the main purpose of the business strategy of the company gaining and maintaining an advantage over the competition, it is clear that with the change of business conditions, the strategies with which companies appeared on the market must be reconsidered. Therefore, organizations can take some of the strategies to gain a competitive advantage (Robbins et al., 2014).

- Strategy of industrial organization - involves the analysis of the impact of external factors and making strategic decisions based on them. According to Porter, the factors that affect the organization are: the bargaining power of customers, the bargaining power of suppliers, the existing rivalry, the danger of the existence of substitute products.
- Resource - based strategy - involves the analysis of resources and starts from the fact that the company's resources are crucial for gaining and maintaining a competitive advantage. This strategy involves developing and using unique organizational resources and capabilities. Resources include all financial, physical, human, intangible and structural-cultural assets that an organization uses to produce and deliver products and services to its customers. Also, resources need to be scarce, difficult to imitate and copy. However, the weakness of this strategy is that resources change their properties over time. In that sense, what is valuable today may not be tomorrow. Also, new technologies make it easy to copy what is not possible today, so it can happen that the organization cannot use its resources in the best way.
- Guerrilla strategy, means that the competitive advantage of an organization is current, because the environment is characterized by change. According to this strategy, in order for an organization to be successful, it must be ready to quickly and constantly surprise competitors with strategic actions in order to throw them off balance.

Each of these strategies indicates the need to gain and maintain a competitive advantage in its own way. However, all together they say that it is necessary to constantly analyze both the external and internal environment of the organization, then use unique resources and capabilities to take advantage of all the positive changes and protect yourself from negative changes. Maintaining a competitive advantage is even harder than gaining it. This means that other organizations have failed to reach that business level by applying strategic analysis and business strategies in order to jeopardize the acquired competitive advantage (Porter, 2001; Huggins & Izushi, 2015; Drobyazko et.al., 2019).

2. Contemporary trends in the business environment

2.1. Globalization

Globalization can be defined in different ways, but simply put, globalization is connecting people and their cultures in different areas: economic, technological, informational, political and cultural. Globalization means connecting world markets, creating a global market and facilitating the flow of people, ideas, goods, capital and technology. It is believed that there are various factors that encourage the process of globalization, primarily the accelerated growth and development of science and technology, the emergence of multinational companies, global problems and the liberalization of relations (Cingula et al., 2016). Globalization has intensified the intensity of relations and established a global way of thinking. Today's global lifestyle requires constant investment in knowledge, advances in technology, research and development. Companies that do not get involved in the globalization process in time lag behind in development. Therefore, it is rightly said that the world has become one big "global village" because through the process of globalization it opens more and more, but in that way it decreases accordingly. The explanation lies in the fact that, as an idea, globalization refers to the "reduction of the world" with the strengthening of awareness of the world as a whole (Rizescu & Tileagă, 2017).

The goal of globalization is to improve all aspects of life through its actions, so it is important to emphasize its positive aspects. The positive aspects of globalization have an impact on economic, technological, political and cultural aspect of society. In economic terms, globalization is through free trade, increased exports, increased revenues, reducing production costs, accessing new and cheaper resources, enabling economic growth and development for many countries. It enabled the penetration of new products and services on the market, removed barriers between the markets of different countries, increased competitiveness and thus innovation. Politically encouraged cooperation between different countries as a joint work on the same goals similar values. In terms of technology and culture, thanks to fast access and flow of information, organizations achieve more efficiency communication with customers and partners. The progress of the countries, the greater the inflow of money, the living standard of the people and their purchasing power also increased. However, globalization also has negative sides: the departure of labor from certain countries, excessive profits and power are enabled for companies that have a large amount of capital, pronounced inequality between underdeveloped and developed countries, etc. (Deardorff, A & Stern, 2002).

The biggest advantage, but also the disadvantage of globalization is the great competition on the market. Since organizations no longer trade on the national but on the world market, there is also a lot of competition. With so much competition, it is very difficult to break through and stay competitive. If an organization takes advantage of all the positive aspects of globalization, globalization can be a very positive thing for it (Bresser Pereira, 2010). Therefore, theoretically, globalization is a complex phenomenon that has two sides, but provides equal opportunities for all. However, the question is to what extent and in what way individual countries will take advantage of the positive and avoid the negative sides of the globalization process.

2.2. Sustainability

Sustainability is a trend that has been constantly present, especially in recent times. The concept of sustainability arose based on the need to change attitudes towards the environment and less and less available renewable and non-renewable resources. Its essence is to achieve not only economic, but also social and cultural development that does not endanger the environment . All this is aimed at meeting the needs of the current generation, without compromising the ability of future generations to meet their own needs.

Companies are generally facing the same challenge as finding a business opportunity to develop sustainable solutions. Achieving sustainable development at the global level requires systemic changes that support sustainable development. Companies should incorporate the concept of sustainability into their business practices in order to survive in the market. However, many do not understand what this involves and how to initiate the systemic changes that are needed. Therefore, public administrations have a key role to play here as they need to steer the markets towards sustainable development and encourage companies to transition towards sustainable development. It is necessary to develop regulations that encourage companies to be efficient and respect natural resources (Lubin & Esty, 2010).

2.3. Information Technology

It is known that the success of a company depends on a well-organized information sector. In the broadest context, information technology means" use of computers for storage, calling, transmission i manipulation of data and information" (Varian, 2003).

The business value of information technology is based on automation of business processes, providing information for decision making, and connecting companies with customers and providing productivity tools efficiency (Proctor, 2011).

A well-organized and well-built information system enables easier management. The Internet, as a modern technology, improves the coordination of all functions in companies. Modern information technologies enable easier and faster access to information in all areas (production, health care, science, culture). In this sense, the introduction of information technology provides greater transparency, speed and simplicity and flexibility. The basic issues that inevitably arise in this context are the provision of security and the timely provision of information about the user. However, a large number of companies have an unmatched system of needs with the number of computers, which certainly leads to increased costs and reduced quality of work. This shows that network management and end-user service are underestimated in some organizations and that more attention needs to be paid to this issue (O'Neill & Salas, 2018; Dickson, G.W., & DeSanctis, 2000).

Given the above, companies should proactively respond to all challenges. In that sense, there are different methods and all of them are aimed at economic growth, investment in human resources, increased use of information technologies, especially the Internet, etc. The management of companies in developed economies will respond differently to these challenges compared to the management of developing countries. Experience shows that in developing countries, it is necessary to ensure greater state participation through the creation of a favourable legal environment as well as financial resources (Haag, Cummings & Dawkins, 1998).

3. New tendencies of organization design and their implementation

Successful business operations are not possible if managers do not follow the latest business trends. Traditional organizational forms functioned well within an environment that was stable and predictable. However, in a dynamic environment such as today, they can jeopardize a company's business. In order to overcome the uncertainty, the change of traditional organizational structures and the creation of new organizational structures will significantly improve the existing business. In the continuation of the paper, we will present new organizational structures that have proven to be good forms of lending to modern companies.

3.1. Team organizational structure

Team organization is a newer form of organizational structure in which teams have the main place. This organizational structure aims to break down centralized and hierarchical structures and, through team development, create flexible and dynamic structures. Therefore, the basic characteristic of a team organizational structure is dynamism. Team organization removes the boundaries of division of labour and makes the organization much more flexible. In order for an individual to be part of a team, it is necessary to have the following characteristics: ability to cooperate and communicate, ability to resolve conflicts, ability to set goals and manage change, ability to plan and coordinate (Stevens & Campion, 1994).

Given that the team is a small group of people who have common goals and who work together to achieve them, teamwork brings a number of possible solutions, successful coping and increased availability of relevant information (Cirella, 2021; Daft, 2000).
Teamwork is a professional orientation for many companies. Today, companies feel the need to perform their tasks with several employees and thus increase the speed and quality of their products and services. These requirements for companies create a need for teamwork.

A team can also be described as a product of goal, establishment, development and results. Therefore, in order for teams to exist, two conditions need to be met, namely: there should be as many members in the team as possible to maintain interconnectedness, while the second condition refers to the joint responsibility of all members in achieving goals (Senge, 2000). Like any other organizational structure, team organization has its advantages and disadvantages. Some of the advantages are: Fast decision making, improved exchange of information between team members, willingness to compromise, easier development of level ideas, better morale of employees and enthusiasm for their involvement, improved exchange of information between team members, easier development of new ideas and solutions to existing problems. The disadvantages of the team organizational structure are: the possibility of conflict, a lot of time and resources spent on agreements and meetings, unplanned decentralization (Nancarrow, 2013).

3.2. Network organization

A network organization is a form of organization that is most closely related to a virtual organization. Namely, it is a network through which a virtual organization is built. Networking is emerging in response to increasingly complex business conditions and increasing changes in the way we do business.

Unlike modern forms of organization that open the organization inwards, the network organization breaks all boundaries between organizations by opening them outwards. There is no structure in a network organization, and members of the organization may have mild hierarchical relationships. The network is dominated by relationships of cooperation, exchange of knowledge, skills, information, technology, human resources, etc. That is understandable because the most common reasons for joining the network are: exchange of resources, cost reduction, risk sharing, access to markets, protection of innovations, etc. Starting from the degree of dislocation of activities and management methods, Miles and Snow distinguish three types of networks, namely: internal, stable, and dynamic networks. Porter's value chain concept, which groups all activities in the company into primary (incoming logistics, production, outgoing logistics, marketing, and service) and support activities (procurement, development technologies, resource management, and enterprise infrastructure), served as the basis for building a network organization. (Porter, 2001) Namely, managers can use the value chain to look at all the activities they perform and keep those in which they can achieve competence and dislocate other activities to other organizations. So, organizations are oriented to their core program and release less effective and inefficient functions. The bottom line is that every member of the network produces what is better than others that is the competition. At the same time, by involving external collaborators, border organizations become open. According to this concept, they distinguish are modular, virtual, and open organizations.

Network organizations have certain advantages, which are:

- efficient production, ie. the network allows production to be carried out at lower operating costs.
- efficient organization, ie. the network form reduces the middle layer of managers and employs a smaller number of workers.
- flexibility - an important advantage of networks is the possibility of fast responding to changing environmental demands.
- market and resources - the network provides access to markets, and that as for the supply of cheaper raw materials and labour, as well as in terms of marketing products and services.

The disadvantages of network organization are: the problem of coordination of activities, lack of equal control of all employees, difficulties in motivating employees, and difficulties in building employee loyalty. However, as long as the company is sufficiently independent and strong, there is no need to invest in a network organization (Miles & Snow, 1995; Moliterno & Mahony, 2011).

3.3. Externalization of activities

Externalization of activities is the transfer of activities that were performed within the company to external partners, who will now perform them instead of the parent organization. Which activities will be outsourced depends on the company's strategic commitment. Companies can outsource basic activities, such as information technology, human resource management, etc. They can also externalize ancillary activities, such as cleaning, nutrition, and so. Which of these activities will be considered important depends on the activity of the

company. Having in mind the above, we distinguish two types of externalization of activities: separation of basic activities and separation of secondary activities (Sarwat & Abbas, 2021).

The most important reason why several companies decide to outsource certain activities is the advantages of externalization. This process allows companies to concentrate on those activities that work best, while all other activities can be transferred to external partners. In that case, the company will externalize all those activities that do not achieve satisfactory results in the long run and thus get rid of operational problems. Since external operators can often do business at a lower cost than the company itself, companies can significantly reduce their costs. Since interpersonal relationships are very often the cause of poor results in companies, in this way problematic situations among employees are avoided. Outsourcing improves quality, improves company focus, increases flexibility, and reduces risk (Kalleberg & Marsden, 2005).

Externalization of activities has recently become one of the most used business structures, precisely because of the transfer of activities to external partners and the automatic reduction of workload within the organization (Pellicelli, 2018).

CONCLUSIONS

The development of technology, but also the growth and development of human knowledge, encourages changes to which organizations need to adapt. This can result in a change of mindset within organizations, the introduction of new technologies, changes in organizational structure, and many other changes.

With the advent of globalization, the world market is expanding, and with it, more and more competition is emerging. In an environment where there are a large number of competing organizations, the organization must stand out from others in some of its characteristics. In that sense, organizations should apply certain business strategies to remain competitive.

Monitoring modern trends in the organization, if they are adequately implemented in business strategies, can have very great advantages and positive effects on the overall business of the organization. Thus, by taking advantage of these trends, which are highlighted in the paper, organizations can achieve better business results, a better quality of final products or services, and reduce operating costs. For an organization to successfully implement trends, it is first necessary to identify its needs and priorities. After that, the positive effects of these trends should be used. Careful selection of the trend opens up many positive opportunities for organizations, about what they need, given all the conditions that surround them.

To implement new trends in modern business, it is necessary to have flexible organizational structures as well as an environment that will be suitable for their implementation. In that sense, the environment should be open to the environment. Since companies operate in a dynamic environment, it needs to be open to environmental influences. Only as an open system, the company can accept new knowledge from the environment and turn it into useful knowledge. Furthermore, the company must be value-oriented. These are values related to employees, shareholders, and consumers. In this

way, employees will be motivated to learn and acquire new knowledge that they will apply in the companies in which they work.

Since the acquisition of new knowledge implies the application of new methods of work, new ideas, and new products, it is necessary to accept the risk of the unknown. Therefore, it is necessary to develop employees' feelings and attitudes about accepting the possible mistakes and risks, and thus a positive attitude of employees towards change. Certainly, since employees are the most valuable resource in a company, investing in human resources should be their focus. This is because modern society is a knowledge society that is the most suitable environment for the development of new trends in modern companies.

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DIGITALIZATION OF EDUCATION IN AZERBAIJAN

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Abstract: *In the 21st century, in the conditions of information abundance, management, that is, management of education, which is the basis of the state, society, and all economic development, is the most important issue. In modern times, all educational institutions are exposed to digital globalization in one way or another. Given the rapid development of information and the number of educational institutions due to high development and increase in student knowledge, technology increases the need for constant updating. Accelerating the implementation of digitization in the field of education in Azerbaijan is considered one of the urgent issues. In this situation, it is important to establish a mutual relationship in the field of globalization education, which has a mutual goal, to help the schools and universities of Azerbaijan. In this process, it is necessary to apply information technologies related to the use of changes, modern information and communication technology tools, databases, and provision with modern telecommunication tools at all stages of the digitization process of education and in the training content. The article analyzes the main directions of the application of digitization in education in Azerbaijan and shows the characteristics of the digital educational environment.*

Keywords: *information society, artificial intelligence, distance education, digital transformation, innovation.*

INTRODUCTION

The development of ICT leads to faster and faster communication between people in the world, the deepening of globalization processes in the economic and socio-cultural fields, and the role of information in all spheres of society and economy.

The new relations formed in the modern era have determined the transition of humanity to a new stage of development - the information society. Information and knowledge form the basis and purpose of the information society we mentioned, through which the digital world is formed. (Knox, 2019). Digitization of education means the use of various programs, applications and other digital resources for e-learning, both remotely and directly at school or university. In addition, digitalization applies not only to educational processes, but also to organizational processes. For example, the same

electronic diaries and journals, as well as the ability to write an e-mail to the teacher instead of calling or coming to school in person, are also elements of digitization. It is no longer possible to imagine and talk about education without digitization. Because the digital internet environment has become an integral part of our life. (Humbatov, et al.,2020). Therefore, it is necessary to use the development of information technologies more effectively in the field of education. Those who do not keep up with what is happening will face many problems. This problem reveals the situation: today it is almost impossible to realize education without using new educational technologies. (Sarsici & Celik 2019)

DISCUSSIONS

1. The process of digitization in education

Educational institutions in the world and in Azerbaijan should build their presence on the basis of the above-mentioned changing innovations. The public goods produced by educational institutions must be desirable in the labor market. Studies conducted in the field of education show that the purely theoretical education, which is not enriched with practical knowledge and skills as a result of scientific and technological progress, innovations, and modernization, is already losing its fundamental importance. The application of new information and educational technologies of the century requires the use of progressive forms of methodical materials corresponding to the modern world level along with the organization of the teaching process and active teaching methods. Thus, digital technical skills transcend education, both academically and pedagogically.

Electronic textbooks incorporate the advancements of modern technology, subject matter, design and artistic qualities, while limiting the use of paper. Graphical images are an attractive approach for students to learn better. By providing a visual representation of the subject, students grasp the concept better. The most difficult topics can be presented in a simplified way with the help of such images: Appropriate programs help students to better understand new materials thanks to graphic images. (Ivanova,2015).

Due to the start of the coronavirus pandemic, the trend of digitization of education has shown itself in our country as well as in the world. Schools and universities everywhere have switched to distance learning, affecting almost all students, their parents and teachers. With the onset of the pandemic, the process of digitization in education has developed rapidly. The size of the educational technology (EdTech) market proves this once again. The educational technology (EdTech) market is growing rapidly and, according to the World Economic Forum, it will reach $342 billion by 2025.

2. **The current state of digitization of education in Azerbaijan**

Important work is being done in Azerbaijan in the field of digitalization of education, construction of new ICT infrastructure, and application and modernization of modern technologies. As a result, educational institutions are provided with basic ICT infrastructure. During the pandemic, the "Virtual School" platform for distance education has been launched in our country. By the end of the 2020-2021 academic year, the number of students registered on the platform reached 1,426,721, the number of teachers reached 128,186, and the number of active users reached 1,123,126 (www.stat.gov.az).

Through the electronic services created in Azerbaijan, the admission of students to schools, the recruitment of teachers and principals, the transfer of students from school to school, the organization of various competitions and Olympiads, the electronic submission of applications, certificates, etc. are already done through online platforms. In addition, we can note that currently work is being done in the direction of the digitalization of the issuance of educational certificates and diplomas. Currently, information about employees, pupils, and students working in general education and higher education institutions operating in our country is recorded centrally, and statistical analysis and electronic management are carried out through the educational information system. Deployed systems generate data on about 2 million people every day.

The portals www.e-derslik.edu.az and www.video.edu.az are regularly updated by the Ministry of Education to create innovative content in the Azerbaijani language. New electronic textbooks, teaching aids, interactive exercises, television lessons on general and professional education, video lessons for teachers, 3D animation videos, video lessons of the STEAM project, Khan Academy lessons and video lessons with an evaluation system have been added to these portals (www.edu.gov.az), In addition, 96% of the country's educational institutions are connected to the Azerbaijan Education Network and are provided with a single and secure network infrastructure. Currently, the Azerbaijan Education Network is working towards the transfer of educational institutions to high-speed fiber-optic communication.

Storage and analysis of information about students and teachers in educational institutions in a single database, electronic management, preparation of statistical and forecast reports based on collected data is carried out through the information system of higher and secondary education. Accordingly, the registration of students in higher and secondary educational institutions in our country is carried out electronically through the single electronic services portal of the Ministry of Education (portal.edu.az).

Based on the conducted research, it was found that a number of higher education institutions joining the Azerbaijan Education Network have access to the GEANT international academic network, the world's largest research and development network, so they can take advantage of the research potential of this resource. It should be noted that the GEANT network allows all participants to join together for scientific activities and joint research, as well as to develop joint educational programs. In our country, the service of reviewing citizens' applications by the Ministry of Education is gradually being carried out online, the reception of citizens in the format of video communication is widely used. The main goal of the Ministry of Education in implementing online admission of citizens is to provide timely and quality services to citizens and promptly respond to citizens' questions about education. Therefore, the system of citizen appeals has been improved in order to increase accessibility and convenience for citizens. "Citizens' applications" service has been created on the portal.edu.az portal, which combines electronic services in the field of education in a single window, where everyone can submit and track their application to the Ministry of Education and its subordinate institutions. As a result, compared to the submission of written applications, the time required for filling out the application and responding to the citizen's application has been reduced by more than half. Starting from 2021, the registration of students in higher and secondary educational institutions and the issuance of certificates of study will be carried out electronically through the single electronic services portal of the Ministry of Education (portal.edu.az). In addition, transfer of students by higher

education level, recognition of qualifications of foreign countries in the field of higher education, and online verification of the authenticity of educational documents are carried out electronically.

The Virtual School platform implemented in our country in 2020-2021 due to the spread of the pandemic period has succeeded in collecting enough information about the educational process of pupils and students. Thus, the national evaluations held twice on the platform in that period enabled the creation of a database of students' exam results. The algorithm was developed depending on the time students spend on the "Virtual school" platform, the tools they use on the platform during distance education, and the exam results of these students. This algorithm allows you to digitally monitor and analyze the educational performance of students and predict their future education. Therefore, the use of artificial intelligence and machine learning technologies can serve to make immediate and long-term decisions in the field of education. In this direction, relevant studies in the field of education continue in our country. (Digitalisation Webinar, 2020)

Digitization in education affects not only the direct training process, but also the system of certification of students' knowledge level. This is currently used as an electronic record of student activity in many schools and higher education institutions. Thus, as a result of digitalization in education, it is possible to follow the daily page of the higher education institution on the Internet, to view the subjects and the student's class schedule for a semester, to view the attendance data and summary data of students in weeks, missed classes, registration of students' grades in educational semesters, total scores for the current year and previous academic years can be calculated.

3. **Effectiveness of digitization of education in Azerbaijan**

Digitization of education in Azerbaijan and the effectiveness of digital technologies have shown themselves as follows:

- digitization in education facilitates organizational tasks.
- digitization makes education more convenient for schoolchildren and students.
- the online mode provides access to a wider variety of educational content than the traditional format.
- the virtual environment allows you to practice real-life skills in a safe environment.
- learning in a digital environment provides an opportunity to collect and analyze data to further improve the educational process. (Hajiyeva et al.,2021)

4. Problems arising from the application of digitization in education

As we mentioned above, there are high results related to the application of digitalization in education, but there are also problems in our country. They are mainly the following:

- people who have no experience of using the internet and digital resources find it difficult to study online. Some people are not aware of the useful possibilities of digitization and use the smartphone only for entertainment, while others, although they are aware of such possibilities, cannot learn to work with applications without outside help.
- some part of the population does not have computers or other devices necessary for online education and high-quality Internet connection.

Thus, taking into account the dynamism of the era, such as the knowledge economy, or rather, the commercialization of knowledge, artificial intelligence, the emergence of new professions, some

of them joining history, and taking into account the research-oriented character of the development of education and teaching, it is necessary to meet the demands of great responsibility, accountability, and result orientation on educational institutions. falls. (Valentina et al., VI International Forum on Teacher Education)

Like all countries of the world, Azerbaijan has been affected by global trends related to the development of digital technologies. Today, the application of digitalization, which changes the economic and social development models of developed countries, has put serious issues before us. In addition to being the basis for the development of new fields, digitization also performs important social functions and makes significant contributions to the solution of existing problems in society. (Armila et al., 2022)

The main factors of the digitization process are the availability of relevant jobs, along with highly qualified specialists. This requires the cooperation of education and the digital economy, making it inevitable.

According to the conducted research, we can say that science in the information society is being updated rapidly, to regulate the growing amount of information and to use it as a basic science and resource, the study and use of the aspects of Informatics and its parts: Elmmetrics, Webometrics, Cybermetrics and Bibliometrics also stimulate the development of science and educational institutions. is one of the main factors. In addition to all this, one can also mention the contrasting features of the digital world. (Hajiyeva,2018)

5. **Requirements for the development of education in the country**

Diffusion of information, against the background of globalization of capital and the knowledge economy in which intellectual capital surpasses physical capital, further increases the commercialization of knowledge. Improving the management system with information using the databases of higher education institutions increases the confidence that the public good will meet the desired requirements. The quick and flexible implementation of such an educational system, database and management brings the following requirements for the development of education:

• improving the quality of the educational process, improving the structure of transferred knowledge and achieving high-level qualification of graduates with higher education;

• development of modern teaching technologies and orientation of the education system to modern standards and innovative programs;

• integration of educational environment, scientific research and business circles (especially in university complexes);

• development and implementation of various forms and systems of continuous and additional education;

• strengthening the potential of innovative scientific and technical research in educational institutions;

• creation of wide opportunities for the business activity of higher education institutions (granting the status of an independent institution, a public person, etc.) (www.researchgate.net).

• ensuring the necessary freedoms and using preferential capital funds, etc.

Objective factors for the management of educational institutions with information, existing information bases, at the same time, the use of evaluation and monitoring information bases can help and, as a result, help to improve pedagogical processes.

6. **Innovative educational projects implemented in Azerbaijan**

Currently, one of the important directions among the innovative educational projects that are being implemented in the country in the direction of modernization of education is the electronicization of state documents on education. In this regard, on February 5, the President of the Republic of Azerbaijan Ilham Aliyev signed a Decree on the implementation of the Law of the Republic of Azerbaijan dated December 18, 2020 "On Amendments to the Law of the Republic of Azerbaijan "On Education".

According to the law, persons who have completed any stage and level of education in an educational institution (except doctorate) are supposed to be given a state document on the relevant education created in the form of an electronic document in the "Education Centralized Information System" in accordance with the legislation. Also, persons who have not completed any stage and level of education due to various reasons will be given a certificate of relevant education created in the form of an electronic document in the "Education Centralized Information System" in the manner determined by the relevant executive authority. (Law of the Republic of Azerbaijan "On Education", 2009).

The aforementioned works will create wide opportunities such as the complete digitalization of the process of preparing and issuing educational documents in the country with the application of the latest technologies, verification of the authenticity of electronic documents from any place through a single verification portal, and permanent storage of educational documents in electronic resources.

The digitalization of educational documents, which is the first in the world in our country, which advanced countries are in the preparation stage, is not only a great achievement in the field of education, but also an important contribution to the digitization of the country. Application of such an innovative approach allows Azerbaijan to take more leading positions in international rankings. In addition, it is planned to provide information in the electronic educational documents in Azerbaijani and English languages. This will simplify the process of recognition and verification of educational documents in foreign countries, thereby enabling our country to participate more closely in the integration processes in the modern world.

The digitization of education leads to the acquisition of knowledge, skills, and habits, especially in the field of lifelong learning. In this process, we can see a shift from technique, competition and currency to innovation, stimulation, empowerment and quality. (Armila, et al., Postdigit Sci Educ).

CONCLUSIONS

The issue of digitalization of society, life, and education is increasing day by day. Today, the field of education is actively developing and has created conditions for the creation of a digital environment. In the sphere of education, electronic instructions and educational platforms are applied. But to use modern digital technology, it is necessary to have durable and quality content. It is

important to be aware of the positive or negative effects of other countries when a country is starting to use digital technologies. (Digitalisation Webinar,2020)

The main direction of the implementation of the digitalization of education project is the introduction of digital technologies and platforms, education, as well as the creation of a motivation system for the necessary development. Digitization of education allows access to the best data processing system for schools, universities, colleges.

As a result of the conducted research, we should note that digitalization is changing the education system in Azerbaijan as well as in the whole world. But that doesn't diminish the value of what we teach in the classroom. The process of digitization in education requires the integrated use of visual learning and online learning methods. So we have to do both learning methods in parallel.

In addition, the digitization of education is the most reliable and correct step towards the future, so it directly serves the content of education, as well as improving its quality. Therefore, it is necessary to more intensively implement the process of promoting the use of modern technologies in the field of education in the country.

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INTERNATIONAL TRADE POLICIES AND MARKETS

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Abstract: *In this paper, is presented an overview of the evolution of international trade, emphasizing its role in enabling the international division of labor and a brief examination between Albania and Western Balkan countries foreign trade. The development of foreign trade is intrinsically linked to liberalization, which, in turn, fosters connectivity and mutual economic interdependence among nations. The performance exhibited in both exports and imports plays an important role in fostering sustainable development within the country's economy. Active engagement in these initiatives broadens Albania economy specialization possibilities but, simultaneously, necessitates a commitment to enhancing competitiveness. This development has been shaped by economic, social, political, and cultural factors, with significant advancements in recent decades due to industrialization, advanced transportation, globalization, and the emergence of multinational corporations. Trade indicators for each country serve as a reflection of economic development and mutual benefit. The international markets of foreign countries serve as platforms for both generating additional income through exports and fulfilling the domestic economy's requirements through imports.*

Keywords: *International trade, exports, imports, etc.*

INTRODUCTION

Society's development is significantly bolstered by the institution of the social division of labor, which initiates within the framework of the family unit and progressively extends into colonial and state structures, ultimately culminating in the contemporary globalized landscape. Central to this societal evolution is the practice of trade, serving as the primary conduit not only for interpersonal communication but also for the exchange of goods and commodities among individuals. This exchange, governed by the mechanisms commonly referred to as markets, plays a pivotal role in facilitating economic interactions.

As human communities expanded and states emerged, a compelling need arose for the exchange of products and services between these entities. Consequently, novel mechanisms for facilitating trade on an international scale came into existence.

The division of labor, marked by the specialization in the production of specific goods on an international scale, engenders connectivity and mutual economic interdependence among nations. The transition to international trade required gradual development over centuries, ultimately reaching an elevated state in recent decades. It has promoted greater interdependence between countries as well as integration and cooperation between various nationalities and

business organizations. Recognizing the importance of international trade for a country's development is essential. A nation that successfully promotes exports over imports tends to exhibit a higher economic standard and an improved per capita income. Conversely, countries with an import-heavy trade balance often face economic challenges and diminished living standards.

The research methodology integrated both the analytical method, focusing on a detailed examination of recent and prior literature relevant to the subject, and the comparative method, which enabled comparisons to be made as needed.

Policies and factors affecting international trade

Trade costs are frequently regarded as a restraining factor in the advancement of global trade(Anderson & Eric van Wincoop, 2004). These costs encompass all the expenses involved in facilitating the movement of goods to their final destination, encompassing not only the marginal costs of producing the goods themselves. Within the view of this definition, trade costs has various components, which consist of distance-related costs, trade policies, transportation expenses, communication costs, procedural expenditures, and infrastructure outlays.

Geographical distance has been overlooked in traditional growth theories, focusing more on national characteristics and technological progress. However, proximity and neighboring countries significantly impact economic activities (Carrère & Schiff, 2003). Nations farther from economic hubs may face developmental challenges. Distance affects production, income (trade, investment, technology), directly raising transportation costs and creating trade barriers (Berthelon & Freund, 2004). Proximity to global markets enhances resource utilization and economic opportunities, emphasizing the importance of geographical location in shaping economic development.

Trade policy is a set of legal decisions that directly influence a country's imports and exports of goods and services (Motta & Onida, 1997). These policies come in various forms, with the most prevalent being customs duties or taxes levied on imported goods and import quotas that impose quantitative restrictions on specific products (Kim, 2010) . Restrictive trade policies are prevalent globally, occasionally concealed or nuanced. One example of the intricate dynamics of international trade discussions is the ongoing pressure from the U.S. government on Japan to limit the import of Japanese automobiles into the country.

A tariff is essentially a tax, or duty, levied on a commodity as it crosses national borders (Balassa, 1965). Import tariffs, which are taxes imposed on imported goods, are the most common form of tariffs (Kostecki & Tymowski, 1985). Less frequently encountered are export tariffs, imposed on goods destined for foreign markets. Developing countries, such as Ghana for cocoa exports and OPEC13 for oil exports, sometimes employ export tariffs to bolster revenue or intentionally create global shortages, thereby raising the price of their exported products.

ALBANIA'S FOREIGN TRADE

Foreign trade holds a significant position within the overall economic landscape, particularly in the foreign sector. This aspect is of vital importance for smaller economies, such as Albania. In recent years, Albania's foreign trade has undergone substantial changes, marked by a shift toward liberalization, leading to alterations in its principal indicators. Despite the global economic crisis, the Albanian economy managed to maintain stability in its macroeconomic indicators.

The performance exhibited in both exports and imports plays a vital role in fostering sustainable development within the country's economy. Additionally, it influences the trade balance, essential for addressing global competition. The growth rate of exports serves as a crucial data, indicating the stability and sustainability of the economy and its competence in international markets. However, this indicator is significantly influenced by the international economic environment. As a result, even though it is a useful indicator, its validity is strongly dependent on external factors.

Additionally, the countries strong trade relationships, remittances, and banking sector ties with Greece and Italy expose it to the consequences of debt crises and sluggish growth in the euro area. These external factors contribute to Albania's economic vulnerabilities and call for prudent management to navigate these complexities effectively.

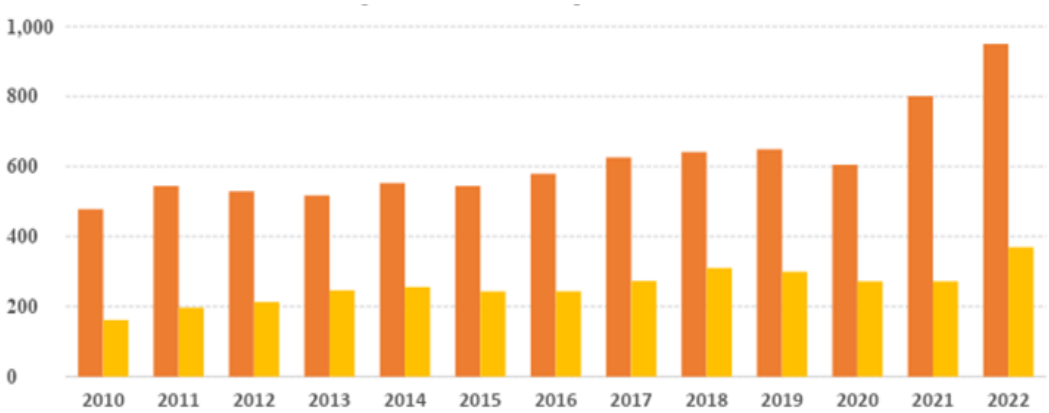
International trade in goods of Albania for the period 2010-2023

Trade in goods within the Balkan region has shown significant improvement. In the 10th month of 2022, Albania's trade with the five neighboring countries accounted for 10% of its total trade, up from 6.5% in 2010 (Instat, 2022). Notably, Albania has transitioned to a trade surplus between 2018 and October 2022, except in the case of Serbia. Albanian exports have taken precedence over imports in Kosovo, North Macedonia, Montenegro, and Bosnia-Herzegovina. However, with Serbia, the second-largest trading partner, the trade deficit has continued to expand.

Challenges persist as businesses contend that trade procedures have not experienced substantial simplification. It's important to recognize that long-term competitiveness may be at risk if support for the agriculture sector is not prioritized.

Accurate foreign trade statistics is important for the Albanian economy, influencing economic policies and enabling in-depth analysis of market developments for various goods. This data provides valuable insights into trade dynamics and helps guide decision-making in the realm of international trade. As illustrated in Figure 1, which depicts the dynamics of trade among Western Balkan countries and Albania.

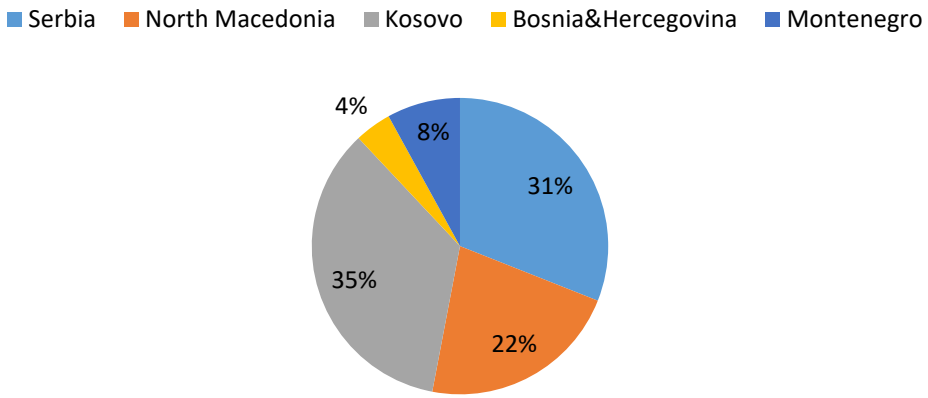
Figure 1. Trade among Western Balkan countries and Albania



Source: Revista Monitor (2022).

From 2018 through the end of October 2022, Albania has consistently achieved a trade surplus with the five Western Balkan countries, except for Serbia. This trend underscores that Albania's exports have been expanding at a faster pace than its imports. As illustrated in Figure 2, which show the weight of Albania's total trade with each of the Western Balkan countries.

Figure 2. Weight of Albania's total trade with each of the Western Balkan countries



Trade with Serbia and Kosovo experienced the most significant growth, while with the other neighboring countries, the increases were more moderate. A closer examination of the data reveals that trade with Serbia was notably bolstered by annual increases in imports of beverages, alcohol, dairy products, and live animals (Instat,2022). This insight sheds light on the specific drivers of trade dynamics between Albania and these Western Balkan nations.

CONCLUSSIONS

Initiatives aiming at liberalizing and facilitating trade on a regional and global scale have been effortlessly incorporated into Albania's economy. Participating actively in these projects increases Albania's economic specialization opportunities while also requiring a commitment to

improving competitiveness. Each nation's trade indicators show how economically developed and mutually beneficial each nation is. Today's market facilitates the exchange of products, ideas, concepts, and financial assets by embodying a complex web of relationships that have been established within certain temporal and physical frameworks. It's important to remember that the development of the market depends on imported goods and services providing clear benefits over those made in the country.

Government size is another variable positively related to trade, implying that the higher the performance in fiscal freedom and government spending, the more bilateral trade increases. Fiscal freedom is a direct measure of the extent to which the government allows individuals and businesses to keep and manage their income and wealth. A government can impose fiscal burdens on economic activity through taxation or by creating public debt which is then repaid through taxation. This means that the better the government performs in this index, the more bilateral trade increases. Also, excessive government spending carries a risk for commercial activity because an increase in public debt imposes high taxes on businesses. So the higher this variable is evaluated, the more inclined we are to evaluate commercial activity. Market openness is also a variable that positively helps bilateral trade. This means that the removal of tariff and non-tariff barriers would help intensify bilateral trade. In conclusion, international trade has been critical to the development of the world economy and civilization. Over time, a variety of political, social and economic factors have influenced its evolution; in the modern age, globalization has been the primary driver. Since trade balances have a significant impact on a nation's economic growth, they remain important metrics.

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MANAGEMENT OF SUSTAINABLE DEVELOPMENT AND ENVIRONMENTAL PROTECTION

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Abstract. *Unifying the concept of social, economic and ecological development, the new development paradigm was established under the name of sustainable development. Sustainable development should harmonize sensible consumption of natural resources with their protection and ensure a more equitable division of wealth and equal economic development at the global level. Within such a context, science and environmental education constitute the precondition for our joint future. As regards the contents, this paper provides a precise and comprehensive overview of theoretical features of environmental pollution and sustainable development, as well as the most important aspects of environmental and natural resource management. For effective control of environmental pollution to be possible, it is necessary to consider the ethical foundations of environmental economics in particular, and special attention is paid to in the paper. A significant part of this work is devoted to criticism of uncontrolled economic growth and the inefficiency of the state in controlling environmental pollution. Knowledge management for the purpose of sustainable development and development of international regulations on the environment are also included.*

Keywords: Sustainable development, management, environment, pollution

1.Introduction

The Brundtland report defines sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Sustainable development policies include institutional measures and measures and activities in the field of environmental protection that protect the environmental system, the economic and social system as a single unit, as well as a set of principles of economic and social sustainability. Institutional measures include the areas of good governance, access to information, the fight against corruption and supervision over the implementation of measures and activities. Measures and activities in the field of environmental protection refer to the integration of the environmental protection dimension into development programs and projects in the programming or design phase, as well as monitoring the achievement of goals in this area. Measures in the field of economic sustainability refer to various sectors - energy, forestry, agriculture, water management, and others. Measures in the area of social sustainability include poverty reduction, gender, cultural and social policy, cooperation with the civil sector, and others. If development is to be sustainable in the long term, economic and sustainability

policies must be harmonized with institutional arrangements, measures and activities in the field of environmental protection.

What is sustainable development? Sustainable development represents a general direction, an aspiration, to live in a world in which economic, technological and cultural development is harmonized with the needs of the development of society and the capacity of the environment.

The World Commission on Environment and Development in the report "Our Common Future" indicates the danger, for people and our planet, of the policy of economic growth without taking into account the possibility of regeneration of the planet Earth. In 1987, this commission defined sustainable development as development that meets the needs of the present without denying future generations the ability to meet their own needs. Sustainable development is a long-term concept that indicates the need to create a balanced relationship between three seemingly opposing areas that must ensure environmental responsibility, economic profit and a society of equal opportunities in the future. This concept of sustainable development represents progress for environmental policy, because it explains the connection between environmental, economic, social and cultural problems within which environmental protection problems should be considered (conservation of natural resources, biodiversity, circulation of matter, emissions of harmful substances, sustainable use of land, timely and effective problem solving, aesthetic value of nature), if we want to solve them professionally and in a socially acceptable way.

1.1 Problem, subject and object of research

The rapid growth of the population in the last hundred years, the strengthening of the economic activity of mankind, the development of international trade, and the increasing needs of mankind for energy and material goods, have had, and will continue to have, negative consequences on the quality of the environment. Ecological problems have taken on dramatic proportions because they directly affect people's health and threaten the survival of life on Earth. Harmful ecological and economic consequences for the environment are manifested not only in the area of pollution and depletion of natural resources necessary for life, but also in the area of a complete reduction of the quality of the environment in certain areas where life and economic activity cannot continue.

The economic prerequisite has already reached or exceeded important limitations related to the source, that is, to the natural capacity of the country. Parts of the Earth have already been damaged or destroyed, so there is practically no place where traces of human existence cannot be noticed. From the center of Antarctica to Mount Everest, waste materials dumped by humans can be clearly seen, and the quantities are increasing. It is not possible to find a sample of ocean water without seeing traces of human waste. Toxic substances and compounds of heavy metals have already accumulated within the marine system, and one fifth of the world's population breathes air more toxic than the standard recommended by the World Health Organization (WHO).

In the eighties of the last century, it became obvious that environmental degradation has become one of the main obstacles to economic development. Economists of environmental economics, a new scientific branch of economic sciences, assume a significant role in considering the mutual effects of economic growth and environmental quality. By means of environmental protection policy, they try to integrate the solution of environmental issues. Through the economics of the environment, economists strive to express the functions of the environment in monetary terms in order to be able to show the mutual relationship between the goals of economic policy and the goals of environmental protection policy.

In such an environment, the concept of steady or sustainable development was created. Accepting such a conception of development, the economy must be trained for a new organization in relation to the use of natural resources and new state economic and environmental protection measures. The economy must set new goals for environmental protection, but also anticipate and reduce the negative consequences of state policy in environmental protection. In such new environmental conditions, the economy has to deal more with research and development projections, taking into account the growing interest in environmental protection.

In order to achieve this, it is necessary to investigate basic environmental problems, mutual influences of economic growth and environmental quality, as well as the impact of environmental protection policy on economic growth. As environmental protection is an expensive activity, it is necessary to find an objective measure of environmental pollution, so that the costs for environmental protection are lower than the benefits of economic growth. At the same time, it is necessary to know the entire economic-ecological instrumentation that is available for environmental protection policy.

Although for a long period of time current phenomena are scientifically studied and current problems of environmental pollution are solved on a global scale and numerous institutional and instrumental activities are undertaken. All these activities are undertaken with the aim of affirming and operationalizing the idea of global sustainable growth and development of all activities and encourage the management of sustainable development, which would be directly in the function of creating basic assumptions for the creation of individual and social well-being. The described issue and the determined problem of the research on the current phenomena of the relationship between management and sustainable growth and development determined the scientific framework for the subject of the research as a project task: To investigate the current theoretical and applied phenomena of the principles, instruments, laws and theories of sustainable development, systematically formulating the results of the research on the causes and the consequences of global environmental pollution, the most important determinants of environmental management, the mission of educational systems in global sustainable development, the legal framework of sustainable development management, and concludes the management of sustainable development in the 21st century.

The problem and the subject of the research refer to two interconnected objects of research: management and sustainable development.

1.2 Hypothetical framework

Research problem, subject and object of research, the purpose and goals of the research on the current phenomena of the relationship between management and sustainable development, to which this work is dedicated, determined the scientific paradigm for the hypothetical framework:

The main hypothesis is the hypothesis of knowledge and skills about the most important pollution of the environment, sustainable development, management, about the legal framework of sustainable management development, management of sustainable development, which represent the creation of a basic reference for looking at the management of sustainable development for the 21st century in all activities.

The main hypothesis set in this way included several auxiliary hypotheses:

1. Scientifically based knowledge about the causes and consequences of global environmental pollution and the mission of ecological policies and ecological systems in global sustainable development represent a theoretical framework for the study of numerous current phenomena of sustainable development management.

2. Knowledge and understanding of management in general, and especially the functions and specifics of environmental management, enable the management of all potentials, resources and capacities in all activities and the creation of basic assumptions for global sustainable development.
3. Good knowledge of the most important pedagogical meanings of educational systems represents a scientific paradigm for the ecological education of children, students, students and adults in the system of lifelong learning and education, but also for the appropriate management of knowledge in the function of global sustainable development.
4. An adequate amount of knowledge and understanding of legal rules and legal institutes, national, international, coercive law, autonomous law, directives and recommendations of the European Union, declarations, programs, and environmental documents enables not only environmental managers but also others: teachers, scientists, politicians, entrepreneurs, intellectuals, experts of various professions, to create basic assumptions for micro, macro and global sustainable growth and development.

1.3 Purpose and goals of the research

The goal of the research is closely related to the previously determined research problem. Based on the review of ecological and economic problems of environmental pollution and the determination of the interaction between economic policy and environmental protection policy, the need to involve environmental economics economists is determined to solve environmental problems. It wants to prove that only a new philosophy of development can ensure smooth and sustainable development.

Accordingly, the new role of the state and companies in environmental protection and the function of management in environmental protection are investigated. The purpose is to draw the attention of the holders of the state environmental protection policy to the need for an effective fight against environmental pollution, providing them with information on the international environmental protection policy in developed countries and countries in transition. As the state's environmental protection policies are based mainly on environmental taxes and incentives, and these on damage assessments and benefits from environmental protection, it is desired to provide a framework for the objective determination of environmental damages, i.e. setting an environmental protection policy and the development of environmental management.

Bearing in mind the aforementioned and the fundamental mission of this work, the purpose and goals of the research were determined: to investigate the increasingly important meaning, principles, rules, instruments, phenomena about the most important problems of sustainable development management and to define the research results and present them in this paper.

1.4 Evaluation of previous researches

The first serious study by R. Carson called Silent spring (Silent spring, New York, 1962) scientifically indicated the endangerment of flora and fauna and the problem of human survival on Earth. In that study, the environmental problems of our planet are pointed out, but economic growth is not discussed in detail.

The economic aspects of the environment are also covered by P. Nijkamp in the book Theory and Application of Environmental Economics (Amsterdam, 1978), in which he discusses the functional and methodological problems of the environment from an economic point of view. He rightly points out that the increase in the use of natural resources and materials causes an increase in

national welfare and at the same time increases the waste of production and consumption, that is, further degradation of the environment.

Studies by English author David W. Pearce et al. Economics of Natural resources and the Environment (London, 1990) and the American author Berry C. Field's Environmental economics (New York, 1994) also include the economic aspects of environmental protection and determine the subject and work methods of the new scientific discipline of environmental economics.

The books New Direction (Zagreb, 1995) by S. Schmidheiny and Green Inc (London, 1995) by F. Cairncross indicate a new environmental policy implemented in the economy of developed countries. Those books show with numerous examples and quotes that the environmental policy is being integrated step by step with the economic policy of states and companies and that a friendly relationship with the environment is developing.

Finally, it is necessary to mention the study by the author Ratko Zelenika, who in the book Science of Science (Rijeka, 2004) defined and clearly presented the basics of economic research and determined the methodology of scientific-research work, which to a considerable extent helped shape this work methodologically and in terms of content.

1.5 Scientific methods

The following scientific research methods were used in the processing of the topics discussed in this paper in appropriate combinations: inductive and deductive, methods of abstraction and concretization, methods of generalization and specialization, methods of definition and classification, historical method, logical method, and as the most frequently used and most significant methods of analysis and synthesis in determining the appropriate necessary knowledge of environmental managers and applying it to their education and training programs.

2. Significance of Environmental Pollution and Sustainable Development

The strategic threat of human civilization to the global environment has led to negative trends in all environmental indicators. Thus, the trends of forest loss and species extinction are accelerating, climate changes are occurring, and with them natural disasters, water is running out, and soil erosion is causing more and more damage.

Technical and technological growth, which is based on the strong development of science, constantly accelerates the growth of productivity, and contributes to the constant increase in production, and thus to the ever-increasing depletion of natural resources. Strong economic growth, especially in certain developed countries, has created global politics and growing differences between the rich and the poor. With its modern technological capacities, the economy has created the illusion of "unlimited power of economic growth and non-distinction between the terms growth and development (Šebić, 2002). Pollution of the atmosphere and oceans on a global scale is taking on worrying dimensions, and the decline in food production and the growth of genetically modified food are causing hunger and concern. All this points to the imbalance that has arisen between human development and the environment. Civilization's great need for natural resources and weak environmental balance have led to an ecological crisis of global proportions.

But, the most dangerous threats to our global environment are not only the mentioned threats, but the way in which we experience this crisis. Scientists must continuously research environmental and development problems, but this must not diminish our action to "do something now"; the balance between development and the environment must be restored and greater personal responsibility must

be taken for the destruction of the global environment.

Free market economics, arguably the most powerful tool of civilization, ignores the value of environmental goods (clean air, water, healthy forests, etc.). It cannot see, and even less economists can measure the value of these goods, because there are no points of contact between macroeconomics and the environment. All this indicates that it is necessary to scientifically and professionally point out development and environmental problems with objective information. Therefore, it is very necessary to change the overall human awareness towards one's own natural environment, and especially towards ecological systems. It is necessary to reduce the entropy of the Earth's ecosystem and create a new philosophy of development that will be in the interest of man, but not for man to destroy the ecosystems without which he cannot survive. In other words, we have to move to sustainable development.

As already pointed out, development and economic policy in the search for a balance of economic activities exerts a strong pressure on the environment and creates an ecological imbalance on Earth. These pressures are primarily reflected through economic development activities, but also through uncontrolled demographic development in certain parts of our planet. All this points to the fact that through scientific research, public discussions and ecological and moral pressures, political structures on the international and national level will be forced to regulate the use of ecological goods and pressure on the increasingly "sensitive" environment.

2.1 Anthropogenic causes of environmental pollution

Finally, today it is clear that the market cannot automatically (independently) regulate the imbalance of ecosystems, and future development and economic policy are aimed at cooperation with environmental protection policy, namely (Schick, 2015):

- Through appropriate legislation to protect natural resources (water, forests, arable land, sea) from exploitation that is driven primarily by profit and short-term economic interests.
- By conducting an industrial policy that should be planned for long-term development.
- Through state institutions that should encourage comprehensive research on resource and energy management, especially in energy-intensive branches, in order to gain comprehensive scientific insight into the state and perspectives of resource productivity growth. On the basis of such a study, it is possible to start planning the rate of growth of resource productivity until 2025, and create measures of encouragement and monitoring.
- Through the planned income, which should allocate more funds for education and science, considering that knowledge is the basic resource for the effective disposal of natural and human capital in the 21st century.
- They are in line with the precautionary principle, which is one of the foundations of managing a complex adaptive system like the economy.

In conclusion, it could be emphasized that the global environmental problems created by the global economy can be solved successfully only by the active role of the state, the international community and the global economy, and not only by the open market and its laws.

2.2 Rapid population growth and urbanization

From the time of the appearance of man to 1945, it took more than ten thousand generations for the population to reach two billion. And now, in the span of one lifetime, the world's population has grown from two billion to more than 6 billion. While the world population at the beginning of the century numbered 1.6 billion people, today it has grown to 6.67 billion people, and it is predicted that

by 2050 there will be around 9.2 billion people living on Earth.

At the beginning of the new era, the population of our planet took 600 years to double, and at the beginning of the 19th century, the population doubled in 80 years, and today it doubles in 35 years; it only took 12 years for the population to increase by one billion, which is the shortest period so far (Črnjar, 1997).

What kind of pressure on the environment is caused by such an "explosion" of the population can be represented by the fact that at the beginning of the 20th century there was hardly any talk about environmental problems, and today we are talking about an ecological crisis of global proportion.

During much of human history, the world's population grew very slowly. Growth rates began to increase slightly during the 17th and 18th centuries as death rates decreased. The highest rates were recorded during the 20th century and reached a peak of 2% in the period from 1965 to 1970. From 1950 to 2007, the world population increased by about 2.6 times. In the period from 2005 to 2010, the growth rate at the world level will be 1.17% and is predicted to decrease to 0.36% by 2045-2050. year (table 1).

Table 1. Projections of the total population and population growth rates in the world, developed countries and developing countries (in the period from 1985 to 2050, medium variant)

Year	**Total population (in millions)**		
	World	**Developed countries**	**Developing countries**
1985	4855	1 115	3 740
1995.	5 719	1 175	4 544
2005.	6 515	1 216	5 299
2015.	7 295	1 245	6 050
2025.	8 011	1 259	6 752
2035.	8 587	1 260	7 327
2050.	9 191	1 245	7 946
Average annual population growth rate			
1985 – 1990	1,73	0,60	2,60
1990 – 1995	1,54	0,45	1,83
1995 – 2000	1,37	0,32	1,63
2000 – 2005	1,24	0,36	1,44
2005 – 2010	1,17	0,28	1,37
2010 – 2015	1,10	0,20	1,28
2015 – 2020	1,00	0,14	1,17
2020 – 2025	0,88	0,08	1,30
2025 – 2030	0,75	0,03	0,89
2030 – 2035	0,64	-0,01	0,75
2035 – 2040	0,54	-0,05	0,64
2040 – 2045	0,45	-0.08	0,54
2045 – 2050	0,36	-0,10	0,44

Source: World Popula on Prospects: The 2006 Revision, Popula on Division of the Department of Economic and Social Affairs of the United Na ons Secretariat, hp://esa.un.org/unpp

Urbanization is a process that developed rapidly after the Second World War in developed countries and in development countries. It is a fact that at the beginning of the 20th century there were 11 million cities on Earth, but in 1975 in 2005 there were 190, and today there are more than 200. In 2005, about 20 cities had more than 10 million inhabitants, with about 70% of them in developing countries.

Cities are a very sensitive ecological system and, as a rule, require imports of food, energy, water, etc. That is why the natural creation and expansion of cities is a very sensitive ecological, economic and social problem today, especially in poor and underdeveloped countries. Today in developed countries 70-80% of the population lives in urban areas. Regardless, estimates indicate that cities will continue to develop rapidly in the future, especially in developing countries, to frightening dimensions.

2.3 Industrial and technological revolution

In the entire world, fossil fuels (oil, gas and coal) still make up the largest part of the fuel. Among them, coal consumption is predicted to grow the most, primarily due to the growth in demand from the energy sector in China and India. Such trends lead to a constant increase in global carbon dioxide emissions - up to 57%. China is the world's largest emitter of carbon dioxide, while India became the third polluter by 2015. By 2030, China will almost catch up with Europe in terms of emissions per capita.

Because of all this, the global energy policy should be an integral part of the overall economic policy and environmental protection policy. Directing energy development to alternative energy sources (sun, wind, sea) can contribute to reducing environmental degradation in the future.

When talking about renewable energy sources, the World Energy Organization (IEA) distinguishes between: hydropower, fuel from renewable materials, waste (including biomass and used energy from waste), and others, including geothermal energy, solar energy, wind energy, and wave/tidal energy (OECD, 2007). High technologies can cause a revolution in terms of reducing environmental pollution, but in addition to all other activities that society needs to undertake. It is important to create conditions that will enable the transfer and application of technology. The development of new technologies and the speed of their spread among industrial and developing countries is the most important means for the structural changes that are expected in industry and in environmental protection (Pokrajac et al., 2015). Through the process of innovation of new technology, new products and production processes are created that enable the increase of people's well-being, creating environmentally friendly products and production processes.

2.4 Accelerated development of traffic and traffic infrastructure

Traffic is a part of human activities and significantly affects its quality, enriches and enriches human life, but at the same time causes many bad environmental consequences. However, the impact of traffic affects the environment by constantly increasing the emission of harmful substances into the air due to the constant increase in the number of vehicles and the consumption of motor fuels, as well as accidents during transportation. Harmful environmental consequences of traffic have different characteristics and modes of action. Modern society wants to keep the harmful consequences of traffic under control and reduce them with regulatory measures. The main impact of traffic on the environment is related to the emission of greenhouse gases, local air pollution, noise and traffic congestion. Traffic activity also creates significant external costs associated with traffic accidents, and depletion of non-renewable energy sources (especially fossil fuels).

2.5 Large quantities of all types of waste

It is important to point out that the attitude of modern man towards the global environment is in a major crisis, as evidenced by the large quantities of waste that are removed from cities and businesses. Large amounts of waste very often end up in nature or in the oceans. Today, man has started to drown in that "river" by relying for too long on the old strategy of "out of sight, out of mind". There are several problems associated with procrastination. In addition to taking up more and more valuable land, it also causes air, water and soil pollution, releasing carbon dioxide and methane into the atmosphere, and chemicals and pesticides into the soil and groundwater, which poses a danger to human health, plants and animals. New sanitary landfills are constructed in such a way that they have an impermeable bottom and sides, that seepage water and gases are monitored and drained, and that the quantity and composition of the material that is disposed of is continuously monitored.

Another form of waste disposal is thermal treatment, which is an effective but relatively expensive way of processing municipal waste. Another option for waste management is recycling, as far as that is concerned, the European Union has set conditions for constantly increasing the amount of waste that is recycled.

2.6 The development of mass tourism

Tourism, by its meaning, is "a completely new spatial-socio-economic phenomenon of the 20th century" and is a major user of space, and especially depends on the quality of space and environment. In its development so far, tourism has experienced numerous external and internal changes, starting with different forms and means used, to the change in scope and spatial dimension in which it developed, and to the different functions it had in certain social arrangements. As long as tourism was relatively small in number and disproportionately distributed over space, and was understood as "passive tourist leisure", the impact of such tourism on the environment was not a particular problem. When tourism took on massive proportions, when masses of people began to move mainly to spatially concentrated tourist destinations, and when there was a sudden change in the way tourists behave - when tourism turns from passive to active and tourists begin to "consume" nature and natural resources - tourism acquires negative characteristics.

"Tourism has become one of the most relevant spatial-geographic phenomena and, along with industrialization and urbanization, it is one of the strongest factors of pressure on space and the most fatal causes of nature degradation precisely in these areas where nature is the most beautiful, the most attractive, and the most valuable from a tourist point of view, but also the most sensitive.

Despite the fact that tourism, in addition to all the positive economic, social, cultural and ecological advantages it brings, threatens the quality of the environment, perhaps more than any other sector. The greatest pressures of tourism on the environment are mainly the result of the concentration of tourist activity in a relatively limited space and time. A particularly big problem in tourism is the increase in housing density during the summer, so for example the housing density in Monaco increases by 765%, 383% in Malta, 207% in France, 157% in Italy (Trumbić et al., 2005). In addition to the inevitable pressure on the space, certain tourist activities significantly endanger the environment, e.g. excessive visits to sensitive areas, hiking, driving cars in the countryside, building golf courses and the like. In order to be able to develop successfully, tourism requires a quality and clean environment, and its development threatens the quality of that environment every day. The solution to that problem should be sought in the so-called "sustainable tourism development" which will establish a positive relationship between tourism development and environmental protection.

2.7 Natural causes of environmental pollution

Although natural causes of environmental pollution are part of the evolution of our planet, they often turn into natural disasters due to human influence. Natural phenomena threaten and disrupt relationships in the environment. Natural disasters have always been a great danger for people and their material goods. While in the past natural disasters were caused solely by evolution, today these natural disasters are also influenced by human activity. Natural disasters take many human lives and cause great material damage. In the following text, we will mention some natural phenomena that occur as natural disasters, but we will not discuss these phenomena in detail (Ahmet, 2017):

1. **Soil erosion** is a natural process as old as the Earth itself. It is a process caused by various natural conditions, but also by human activity. As with some other natural processes, man accelerated that process with his activity. Soil erosion has become a worldwide problem because it affects large areas and causes irreparable damage.
2. **Floods** they are most often caused by heavy and long-lasting rains and sudden melting of snow. Unlike erosion, floods do not occur suddenly and can usually be predicted.
3. **An earthquake** usually occurs suddenly and causes numerous human casualties and destruction in urban areas. There are about 100,000 earthquakes a year on Earth. There are two seismic areas subject to more frequent earthquakes: one is the so-called European-Trans-Asian, and the other is Pacific.
4. **Volcanic eruptions** recorded during the previous period are often repeated with their own characteristics.
5. **Fires** they occur as a consequence of natural phenomena and often develop into natural disasters.
6. **Droughts and winds** they are natural causes of environmental problems. They are the result of climate change that occurs due to the evolution of the Earth, but also due to human activity and environmental pollution.

2.8 Other causes of environmental pollution

It is a fact that people live better and worse at the same time. The environment is becoming more and more polluted every day, more dangerous for people's health and life, and plant and animal species are increasingly being destroyed and disappearing. Developed countries exploit almost the entire wealth of the Earth, while poor countries continue to live in poverty and in a polluted environment.

The ecological crisis, considering the disruption of the balance between human society and the natural environment with a catastrophic perspective, can in a certain way be considered the deepest crisis in the history of the preservation of the human species. Therefore, environmental problems, and especially the crisis, open up the deepest questions of human survival. The question is often asked why a crisis of such proportions occurs in the first place, and whether there are opportunities to overcome the crisis through conscious intervention, that is, by applying a strategy to solve it (Ahmet, 2017).

As is known, the crisis itself is an expression of modern commodity production and its competitive nature in which capital engages scientific, technical and technological power. The struggle for efficiency, and thus quantitative growth, takes on a degree of depletion, pollution and destruction of the environment that threatens human survival on Earth. In addition, there is an increase in the birth rate worldwide, which, with its exponential tendency, also calls into question survival itself.

All of the above indicates that the disturbed balance between progress and nature must be achieved by building a new "macro-ethics" whose basic principle would be responsibility for the survival of humanity and the ecological systems it desperately needs, i.e. nature.

3. Limited scientific, technical and technological possibilities of society

Problems of underdeveloped countries, i.e. developing countries, or as it is commonly called "third world countries", are getting bigger. More than one and a half billion of the world's population lives in conditions of extreme poverty. Often with an income below one US dollar. It can be said that about one third of humanity lives in conditions of misery and on the border between good and evil.

Because of the above, as well as because of the structural crisis affecting the world economy, it is difficult to imagine that something more could be done individually to save the environment.

The global economic crisis caused by the growth of energy, food, inflation, unemployment, indebtedness, increasing exploitation of natural resources and increasing pollution of the global environment calls for cooperation and association, calls for social sensitivity and greater aid to poor countries. Only in this way can global environmental problems begin to be solved.

The eternal question arises "what are the material possibilities of society to solve global environmental problems, especially in the era of global economic crisis?" Regardless of the above, a special plan is needed right now that combines comprehensive, long-term and targeted financial assistance to developing countries in order to transfer new technologies necessary for the permanent economic progress of those countries (Milović, 2013). Those countries need help in stabilizing the population and its education, and at the same time industrially developed countries must speed up the transition to ecologically sustainable development. The Global Environmental Facility (GEF) at the UN can be one of the mechanisms for achieving common goals, especially for helping underdeveloped countries.

And just as importantly, developed nations must be prepared to lead by example; otherwise the third world will not want to accept the necessary changes – even in exchange for substantial aid".

Today, in many cities and countries, there are not enough material possibilities to solve environmental problems. How to secure food so that the population can survive is still a priority problem, and solving environmental problems is on the second plan. The material capabilities of society significantly influence the solution of environmental problems, so it can often be said: it is richer and safer for the environment (Ilić-Krstić, 2016).

"In the last twenty years, the relationship between man and the environment has fundamentally changed, although even today most people are not aware of this new relationship. This is partly because the relationship is global, and many people are not used to such a way of looking at things. As urgent environmental problems require immediate action, more and more people and experts have begun to think in terms of long-term and global actions. In doing so, one tries to predict the future of our planet, different scenarios are worked out, the current situation is analyzed and one wants to predict the state of environmental problems in the future.

3.1 Global climate change and its consequences

The role of climate in shaping human history is very complex, and historians often attribute to it a decisive role in the development of human history. History proves that climate changes are most often caused by evolutionary changes on Earth or major natural disasters (volcanic eruptions, etc.), and in the last ten years by human activity.

We thank the so-called Life on Earth. "natural greenhouse effect". Without it, instead of the average 15ºC, the arctic cold of -18ºC would prevail on the Earth's surface, i.e. 33ºC lower temperatures (Todic, 2016).

In 2000, the total global annual emission of CO2 was about 7 billion tons, and already in 2050 it is predicted that it will reach about 20 billion tons, which will depend on the state of economic growth and environmental legislation.

The consequences of global climate change will cause terrifying climate disasters during the next century, some of which are already underway. The strength of the impact strongly depends on the rise in temperature, which is one of the strongest indicators of global climate change. Consequences of climate change include increased risk of floods and droughts, melting glaciers, rising sea levels, loss of biodiversity, threats to human health and damage to economic sectors such as forestry, agriculture, tourism, industry, insurance, etc.

3.2 The disappearance of the ozone layer and its consequences

The ozone problem is partly confusing. Namely, ozone appears at two levels in the atmosphere: in the stratosphere and the troposphere. It is a gas that occurs naturally, and in the stratosphere it collects as the ozone layer and is similar to a thin belt around the Earth. There, the concentration of ozone is positive because it protects the Earth from the sun's ultraviolet radiation, so it absorbs about 77% of the radiation. At the same time, ozone that is deposited at a lower atmospheric level, in the troposphere, can have a harmful effect on health, vegetation, etc., and is also involved in the general process of acid rain formation. Although the creation of tropospheric ozone is natural, it can also be enhanced by the interaction of various other gases and compounds.

Ozone (O_3) is a blue-white gas composed of three oxygen atoms in a molecule. It is created naturally in the upper layers of the atmosphere - in the stratosphere, with the help of ultraviolet radiation from the Sun. At the beginning of the 70s, scientists determined that chlorofluorocarbons (CFCs), popularly called "freons", are the main cause of ozone formation. Scientists have made a dramatic discovery in Antarctica. They estimated that in the period from September to October 1986, the ozone layer over Antarctica decreased by 50% compared to the 1960s. This resulted in the creation of a large "hole", the size of which is roughly equal to the land area of the United States. The hole appears to recover on its own after a period of time has passed since parts of the ozone layer have disappeared, but later reappears.

The disappearance of the ozone layer leads to increased solar radiation, which is why skin cancer is more common. These diseases are on the rise in the world, but it is uncertain how much this increase is affected by the reduction of the ozone layer. Based on experience, the rule of thumb is that a 1% reduction in the ozone layer causes an increase in ultraviolet radiation by 1 to 2%, and the incidence of skin cancer by 3 to 4%. Other health effects have not been proven.

In 1996, all industrialized countries were supposed to stop the production and use of CFCs, and should switch to their substitutes.

3.3 Ecological "boomerang" of irresponsible human behavior towards nature

For responsible human behavior towards the planet Earth, it is very important that the organizational behavior of society, i.e. togetherness, because the solution to environmental problems and the boomerang effect is possible only in the cooperation of different subjects, not in domination and exploitation. The lack of joint responsibility for the future development and ecological problems of the Earth can lead us to an economic-ecological disaster.

4. Sustainable Development: the Challenge of Civilization

Therefore, the root of the crisis lies in the goals of human activity (socio-economic development) and the way man converts natural capital (natural values) into his private capital.

The World Conference on Environment and Development held under the auspices of the UN (Rio de Janeiro, 1992) definitely accepted the concept of sustainable development as the only known solution to the problems of development and environmental protection.

Therefore, the concept of sustainable development is based on economic and ecological starting points and principles, whereby some authors emphasize the principle of sustainable development, while others emphasize the principle of ecological sustainability. In other words, some authors approach sustainable development from an anthropocentric point of view, while others observe it from an ecocentric point of view (Saks, 2014).

Unlike other types of management, management of sustainable development assumes different knowledge and skills acquired by studying social sciences (especially economics, environmental economics and strategic management) and different areas of natural sciences (ecology, biology, technology, systems theory, etc.).

Sustainable development should be understood as the result of individual action of consumers, entrepreneurs, conservationists and states that strive to achieve individual goals with the intention of jointly considering and waiting for a better future.

The term sustainable development cannot, therefore, be defined only as an economic activity that satisfies present and future generations, but sustainability should be understood as the infinite survival of the quality of systems that ensure life (air, water, soil, flora, fauna) as well as the existence of infrastructure and institutions that distribute and protect ecological systems with appropriate regulations (Prica, 2014).

5. Knowledge management in the function of sustainable development

The role played by faculty studies in global sustainable growth and development is based on the fact that almost every faculty studies current environmental problems and problems of sustainable growth and development. Namely, such issues are studied in special compulsory or optional programs, or in special thematic units of the respective programs.

Doctors of multidisciplinary sustainable development sciences (that's a colloquial phrase) should be creators, faculty professors, scientists, top managers, ministers, bearers, competent experts of all initiatives, all activities, all measures, all rules, all declarations, all directives, all programs, of all projects with the theme of the environment, ecology, sustainable growth and development in the broadest sense of those terms.

Although knowledge has been a fundamental source of long-term economic growth since the Industrial Revolution, what differentiates its meaning today as a generator of growth is that information and communication technology has exponentially accelerated the shift to a knowledge economy, enabling information codified in digital form to be transmitted over long distances with low costs (Gašić, 2013).

A society that has educated people can more easily accept and react more quickly to the changes occurring in its environment, and it is also prepared for the challenges that the future will bring. In contrast, in a society where human potential and knowledge are not given meaning, there is a danger of lagging behind modern development. Such a danger also threatens Montenegro, which is at a critical moment of choosing a strategy for future development.

5.1 Sustainable Development Management

There seem to be reasons in principle for not having enough information or foresight to design institutions that could successfully solve very complex problems. Despite everything, a lot can be done to make the level of sustainability of this civilization higher than it is today. Just because one does not know how to create a truly sustainable society, does not mean that measures cannot be taken to make them less unsustainable (Adžemović, 2016).

The inevitable process of transition to sustainable forms of development determines the direction of human development and shapes our way of life, and thus the way of doing business. And yet, until now, a large number of business people have passively watched the solution (Dresner, 2008). Development must be directed towards production that satisfies human needs with minimal consumption of energy and other resources in the entire life cycle of the product per unit of satisfying human needs. The parameter of each product must be its eco-efficiency, that it has value and creates benefit, in relation to the costs and burdens on the environment.

There is no unique way of defining sustainable consumption, but in most documents that discuss it, it is defined as the use of services and products that correspond to basic needs and contribute to a better quality of life, while minimizing the use of natural resources and toxic substances, as well as the emission of waste and pollution during the life cycle of products or services, so as not to jeopardize meeting the needs of future generations.

If the definition of sustainable development is accepted, which includes economic, ecological, social and technological sustainability, as well as the possibility of the situation of certain types of capital (manufactured, natural, human, social), which will provide future generations with at least such an opportunity or capacity to achieve well-being as previous generations had, ideas of sustainable development becomes applicable and can be introduced into the basis of the entire economic policy. The implementation of such an economic policy, which will aim to guide development in accordance with the principles of sustainability, has the following assumptions (Krstić et al., 2017):

- political will for sustainable development at the highest levels of state administration,
- appropriate structure of state administration and local self-government, good communication and exchange of information between different levels of management and between different bodies at individual levels,
- development decision-making in which economic goals are determined in parallel and connected with social goals of environmental protection and improvement,
- education for understanding the links between economic policy and the environment and decision-making in accordance with the principles of sustainability.

In recent years, Montenegro has begun to fulfill some of the conditions that bring it closer to the proposal of sustainable development: legislation is being developed, a critical mass of knowledge has been reached, and the behavior of entrepreneurs is also changing. The political will for sustainable development is still questionable. Therefore, they need to strengthen institutions, better enforce laws and interdisciplinary problem solving. Instead of a comprehensive solution to the problem, the approach to individual elements of the environment (air, water, soil) still prevails in Montenegro, which is also visible in the existing legislation.

In every sector of the economy, there are ways to approach the path of sustainable development. However, when determining the policy that will follow such a path, it is necessary to avoid a sectoral approach and determine the priority directions of development at the level of the entire economy. That's why an interdisciplinary way of solving problems should be applied here as

well and the way of decision-making should be changed so that the goals of protecting and improving the environment are equal to other goals of the development policy and that all interested groups and parties are included in their adoption.

One of the main goals of Montenegro, development policy and accession to the European Union. This, among other things, also means that the legislation and environmental protection standards should be harmonized with the legislation. The framework and guidelines for harmonization represent the so-called overview of the current state of the environment. One of the conditions for starting accession negotiations, which is set for the candidate countries, is the adoption of a National Strategy for the Adoption and Implementation of the Current State of the Environment. In partnership with the EU, the Strategy should be implemented in all candidate countries before accession. That document establishes the priorities and goals that must be met before accession and the time plan for further activities until full alignment.

"In the European context, Montenegro has a relatively well-preserved environment, however, the degree of its protection is still lower here than the average of European developed countries. Environmental protection is largely the result of the lower presence of "heavy" industries in the overall industrial structure, but investments in environmental protection are lower than in developed European countries. Responsible behavior, however, requires constant care for all subjects of the environment - soil, air, water, sea and biological diversity.

It should be emphasized that the entire system of upbringing and education should be adapted to the concept of sustainable development of Montenegro. A process of constant learning and research should be opened. Therefore, there must be a new ("revolutionary") view of the world that would like to unite economic, social and ecological needs, capital, labor, natural resources into one harmonious whole, convincing, realistic and thought out in every detail.

CONCLUSIONS

Although Montenegro has a long tradition of internationally recognized scientific excellence, the commercial application of scientific results and the economic benefits resulting from them have been very small so far. In Montenegro today there is no appropriate infrastructure for technology transfer, but without it, it will not be possible to achieve the desired transfer of knowledge from the academic sphere to the economy. The role of the state and the public sector in encouraging the transfer of knowledge and technology is necessary and justified because innovation, the spread of knowledge and technology create significant positive social effects. State investments are needed to create conditions for research work and higher education, as these are areas where advances in funding can yield significant positive results.

Only on the basis of a broad base of scientific and educational institutions and demonstrated political will, as well as connecting different interest groups, can it be designed and implemented in quality in the future sustainable development strategies of Montenegro. Achieving growth, development, social inclusion and fairness are elements of prosperity that require simultaneous and coordinated action in a number of strategic areas. Drivers of the development moment whose lack or incompleteness at this moment directly inhibits faster development are: non-existent entrepreneurial climate, unfinished processes of privatization and restructuring, and unfinished transformation of the state into a service for citizens and entrepreneurs. Furthermore, the synergy of progress and prosperity requires permanent binding elements: macroeconomic stability, openness, an effective financial market and sustainable development.

In conclusion, it can be pointed out that, unfortunately, Montenegro is surviving a serious economic-ecological crisis, partly imposed as a global crisis, and partly as a consequence of the fact that for many years no reforms were implemented and no investment was made for planned economic-ecological development. It is clear that the small and relatively underdeveloped Montenegrin economy and society is still far from scientific and detailed design of its future development. But, if the future is not designed, it will spontaneously move in an unknown direction. That is why it is necessary to convincingly and realistically, bearing in mind the Montenegrin reality of development, human needs, but also the Montenegrin reality of natural capital, devise and affirm the concept of sustainable development based on the principles of integral sustainability in Montenegro. Montenegro won its freedom and now it has to win a development path that will enable it to rank with the most economically and ecologically advanced countries. Unfortunately, there is no time to wait, what is required is quick and well thought out action by all structures of Montenegrin society. This is the only way to leave a developed and ecologically protected Montenegro to yourself and future generations.

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EMPOWERING SMALL BUSINESSES IN GEORGIA: ACCESS TO FINANCE, ECONOMIC RESILIENCE, AND SUSTAINABLE GROWTH

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Abstract: *The role of small businesses in the global economy is pivotal, characterized by their flexibility, rapid adaptability, and significant contribution to job creation. Small businesses worldwide often need help securing funding, particularly in regions with the most pronounced financing gap. The article discusses small business financing, emphasizing the importance of capital access and the challenges posed by limited options. The COVID-19 impact underscores the critical role of financial support for small business resilience. Georgia serves as a case study, exemplifying the concerted efforts of government agencies and international organizations in promoting small business development. The article examines initiatives like "Enterprise Georgia," the Rural Development Agency, and the Innovation and Technology Agency. The banking sector's role in facilitating small business growth and the significance of financial awareness initiatives is examined. The article highlights various measures, including the credit guarantee scheme and commercial banks' role in enhancing financial access and awareness. Green banking and capital market development for sustainable economic growth are emerging priorities. Green financing initiatives and partnerships with organizations like the Fund for Green Growth exemplify a growing commitment to sustainability.However, the article also emphasizes the need for a comprehensive approach to capital market development in Georgia to diversify financing sources and reduce reliance on the banking sector. In summary, this article underscores the indispensable role of access to finance in sustaining small businesses worldwide, focusing on the proactive efforts and collaborative endeavors in Georgia, providing a blueprint for enhancing small business development and financial sustainability.*

Keywords: *access to finance, Small businesses, financial awareness, green banking, capital market development.*

INTRODUCTION

Small business is the driving force of the market economy; it plays an essential role in developing the global economy. Small businesses' flexibility and decision-making autonomy allow entrepreneurs to respond to changes in the environment quickly, expand to new markets, consider customer requirements, quickly change directions, and ensure the creation of new jobs because they are the leading employers in developing countries. It is the beginning of the process of stabilization of the economic situation. Improving access to finance for small businesses is a topic of great interest to policymakers and academics.

The government, financial institutions, and donors invest in programs to finance small businesses. The priority direction of the development of the economic system of Georgia should be the creation of appropriate conditions for starting a small business and its development. The existence of the mentioned vision will be reinforced by the coordinated actions of the public and private sectors in crises, which stimulate the growth of access to finance for businesses and the mobilization of finance, in particular, during the Covid-19 pandemic, on the one hand, banks offered the opportunity to borrowers to benefit from the condition of deferring the fulfillment of obligations (National Bank of Georgia 2023), on the other In turn, the government provided tax subsidies, which would allow businesses to reduce costs (Government of Georgia, 2020).

In order to increase access to finance, the Ministry of Economy and Sustainable Development of Georgia created development-oriented agencies. These are Georgia's Innovation and Technology Agency, Enterprise Georgia, and Rural Development Agency, whose primary goal is to promote small and medium-sized businesses and strengthen competitiveness. Agencies provide financial support to small businesses. Starting a business in Georgia is easy, as the World Bank's 2020 study shows. Georgia ranks 7th among 190 countries regarding ease of business, while Georgia's neighboring countries are far below this indicator. For example, Armenia ranks 47th in the rating. Due to the ease of business in Georgia, the number of startups is high. According to the results of the July 2023 survey of the National Statistics Service of Georgia, a total of 949,779 enterprises are registered in Georgia, of which 233,864 enterprises are active, including 198,812 registered small businesses. Accordingly, small and medium-sized enterprises in Georgia make up 97% of economic entities. A significant part of the population of Georgia is employed in small businesses. The number of employees is 313,125, which is 43% of the total number of employees. These indicators confirm that small business plays a significant role in the development of the economy and employment (Geostat, 2023).

For business, it is necessary to mobilize a certain amount of money for development. For the smooth functioning of current business activities, it is crucial to pay off the current obligation quickly, purchase technologies, establish a modern entrepreneurial culture, and introduce international quality standards. These factors are related to business sustainability, measured by one of the indicators, financial leverage, which means financing assets with debt. Proper cash management and the ability to meet current liabilities on time can contribute to the financial sustainability of a company and reduce its dependence on short-term debt. Although modern entrepreneurial culture is not directly related to financial leverage, it can indirectly affect a company's ability to attract investors or secure financing. A strong entrepreneurial culture that encourages innovation can make a company more attractive to lenders or investors, increasing the financial sustainability of the business. Modern technologies contribute to the adequate performance of small and medium-sized businesses. Due to a lack of cash flow, they must use outdated technologies, affecting their competitiveness.

Unlike Georgia, external financing sources, especially bank loans, are more accessible to small businesses in Poland. In Poland, at the end of 2020, the percentage of firms that did not have liquidity problems reached a historical high. More than 62% of companies reported that they had cash liquidity at least at a safe level (i.e., 20%), and more than 94.5% of enterprises paid their credit obligations on time. There is also a relatively sustainable growth trend in the volume of long-term loans for small and medium-sized businesses (OECD-library 2023).

It should be noted that today's world is actively discussing issues of sustainable development, the main component of which is eliminating environmental damage. The green economy model, which reduces environmental risks and ecological problems, aims at sustainable development and reducing negative environmental impacts. Green economy financing programs are becoming more relevant. Currently, banks do not separate green loans in their analytical data. A taxonomy of sustainable financing was created under the leadership of the National Bank of Georgia, which involves granting loans according to the classification of activities, which means that business activities will be classified according to green, social, or sustainable development criteria. The sustainable financing taxonomy aims to provide financial support to businesses.

Small businesses can use financing methods such as a loan from a bank or obtain grants from various donor organizations to accumulate the necessary funds. There are no diversified sources of access to finance in Georgia, and the primary way for business is bank loans or leasing. It is also worth noting that bank credit for entrepreneurs is minimal; as a rule, the smaller the business, the more it cannot meet the credit requirements for securing the loan; it cannot even confirm the income. Entrepreneurs are forced to apply to microfinance organizations and take loans with high interest rates, which hurts their current and future development dynamics. Small businesses need help attracting investments necessary for their activities and further development. Access to finance is seen as one of the most critical constraints to firm growth. Access to external finance is positively related to the growth of small businesses and the dynamics of their development. Entrepreneurs need knowledge, skills, and experience to help them obtain finance from formal and informal sources.

When entrepreneurs are unsatisfied with bank credit, they are deprived of opportunities for business development, expansion, and digitization because innovative technologies, acquiring new markets, and raising quality standards in production require financial resources. Although there are ways to raise funds related to the state, they need more knowledge or often the resources to raise grants. That is why the starting point is informing entrepreneurs about the proper communication methods. Deciding on financing in a small business is a crucial step, during which entrepreneurs must evaluate different sources of financing and be able to select the most relevant source of financing for their business.

The paper aims to study, analyze, and evaluate the challenges and prospects of access to finance to ensure the sustainable development of small businesses in Georgia, which includes loans and grants issued by institutions responsible for mobilizing finance: banks, microfinance organizations, and state and donor organizations. They are responsible for creating an effective financing system as the promotion of the SME sector develops small businesses.

The research questions are as follows:

1. What are the reasons why entrepreneurs cannot get financial support?
2. What is the role of banks in small business development?
3. How easy can entrepreneurs find information about financing projects in their region?

The Crucial Role of Access to Finance in Sustaining Small Businesses Amidst Economic Challenges

Access to finance is vital for small businesses, playing a crucial role in their startup, operation, expansion, and development. In an international context, small and medium-sized enterprises (SMEs)

significantly contribute to economies, employing millions of people and generating a substantial portion of the GDP. Small businesses often need help accessing finance, and this constraint can hinder their growth potential. In particular, regions like Latin America, the Middle East, and North Africa face a significant financing gap, with nearly half of small businesses in need of assistance in securing loans (OECD, 2022).

Access to capital for small businesses can take various forms, including debt financing and equity financing, and the availability of such financing options varies across countries. Small businesses resort to debt financing in countries where equity financing is limited. However, even debt financing options can be limited, pushing small entrepreneurs to seek informal sources of financing from friends, family, or community savings and loan associations, known as ROSCAs (Durst, 2021).

Overcoming information asymmetry is critical in increasing access to financial resources for small businesses. Timely, accurate, and complete information empowers entrepreneurs to explore different avenues for business development, ensuring they are independent of bank credit.

The COVID-19 pandemic had a profound impact on small businesses worldwide. Lockdowns, social distancing, and business closures led to a sharp contraction in global economic growth, affecting small businesses that lacked financial resources the most (Maglakelidze, 2021). Governments and banks were crucial in supporting these businesses through low-interest loans and other financial relief measures. Many countries, including Georgia, implemented payment deferrals, income tax deferrals, and debt restructuring measures to alleviate the financial burden on small businesses.

Collaborations with international organizations like the World Bank and the European Union provided additional support to small businesses, helping them weather the economic challenges posed by the pandemic. Proactive support allowed many small businesses to survive and adapt creatively and innovatively to overcome the crisis. While the pandemic created challenges, it spurred resilience, adaptability, and innovation among small businesses worldwide. Governments, international organizations, and financial institutions have played a crucial role in supporting these enterprises, highlighting the importance of facilitating access to finance and providing assistance during economic hardship (Guenther, 2021).

In conclusion, small businesses are essential components of economies globally, and access to finance is pivotal to their growth and survival. Policymakers, international organizations, and financial institutions must work together to eliminate barriers to accessing finance, ultimately strengthening small businesses' resilience and growth potential.

Government Support for Small Businesses in Georgia: A Comprehensive Overview

Small businesses in Georgia encounter multifaceted challenges, but government-sponsored programs play a pivotal role in supporting their growth. These initiatives aim to stimulate local entrepreneurship, enhance competitiveness, and foster innovation across various sectors, focusing on access to finance, real estate provisioning, and consultancy services.

"Enterprise Georgia," initiated in 2014, serves as a cornerstone agency in the country, offering substantial support to small businesses. It includes facilitating access to credit, leasing options, and utilizing international brand names, helping entrepreneurs surmount financial obstacles. Moreover, the program extends grants for technology adoption, product development, research, and the

promotion of exports. " Enterprise Georgia" has been crucial in cultivating a dynamic business environment, spurring growth, and attracting investments (Enterprise Georgia, 2023).

The Rural Development Agency, founded in 2012, directs its efforts toward providing resources and assistance to rural entrepreneurs, particularly in the agricultural sector. Initiatives like the "preferential agro-credit program" subsidize loan interest, enhancing entrepreneurs' access to financial resources (Rural Development Agency, 2023).

Georgia's Innovation and Technology Agency (GITA) supports startups and businesses by providing grants and educational programs. GITA's involvement has been instrumental in fostering the growth of innovative businesses in Georgia, with over 600 startups benefitting from their initiatives (Innovation and Technology Agency, 2023).

To facilitate the integration of Georgian small businesses into the European market, the EU4Business - EBRD credit line assists in technology investment, aiding local companies in meeting European standards (EU4Business, 2023). The United States Agency for International Development (USAID) has long advocated for business development in Georgia. Their "Business Development Program," in collaboration with Gazelle Finance, extends interest-free loans and grants to small businesses. Additionally, USAID, along with the Kristal Foundation, supports women's entrepreneurship through programs such as "Supporting Youth and Women's Entrepreneurship in Georgia" (YES-Georgia) (USAID, 2023). These government-backed programs play a pivotal role in supporting small businesses in Georgia, enabling them to access financial resources, foster innovation, and contribute to economic growth (OECD, 2022).

Banking Sector Support and Financial Awareness Initiatives for Small Businesses in Georgia

A well-functioning banking system catalyzes small business development and overall economic growth by providing liquidity and credit. Banks play a vital role in lending to small enterprises, but they often need more information, leading to limited lending, high-interest rates, and collateral requirements. To bridge this gap, fostering strong relationships between small entrepreneurs and banks is essential (National et al. of Georgia, 2023).

One critical measure is the state-developed credit guarantee scheme, which enables entrepreneurs with insufficient collateral to access loans from commercial banks, agencies, or microfinance organizations with state guarantees. This scheme addresses the financing deficit small and medium-sized enterprises (SMEs) face. It mitigates market failures, a particularly pressing issue in developing countries like Georgia (National et al. of Georgia, 2023). Interest rates on loans significantly affect small businesses' access to finance. Georgia faces higher interest rates than some other countries, affecting the growth of small businesses. High bankruptcy rates further deter banks from lending to this sector (Rakhmonovna, 2022).

Commercial banks dominate Georgia's financial sector, and while alternative financing sources exist, their market share remains limited. Access to bank credit is crucial for SMEs, and ongoing efforts to increase their financial capabilities and knowledge are essential. Several banks in Georgia offer free business courses covering topics like entrepreneurship, management, finance, and digital marketing. These courses aim to enhance financial awareness and strengthen the relationship between entrepreneurs and financial institutions (Rakhmonovna, 2022). Innovative services like TBC Bank's "Business Guide" and Liberty Bank's "Business Dialogue" provide small entrepreneurs

valuable information on financial and non-financial products, training, and business opportunities. These initiatives foster strong relationships between banks and small business owners (Rakhmonovna, 2022). Collaborative efforts between banks and international organizations have also played a significant role in alleviating challenges faced by SMEs. These partnerships have helped banks secure funding to support small and medium-sized businesses and encourage the adoption of modern technologies and EU standards (FIF - Basisbank DCFTA loan, 2020; Credo Bank, 2023).

The proactive stance of Georgian banks and their dedication to increasing financial awareness and education reflects their commitment to eliminating financing barriers for small entrepreneurs and promoting business growth in the country (Netekoveni, 2019).

Green Banking and Capital Market Development for Sustainable Economic Growth in Georgia

Green banking, encompassing environmental and social protection elements, has become a growing priority in financing programs. While only a few Georgian commercial banks have embraced green goals and strategies, the importance of green financing is recognized in international markets. In 2022, seven out of 13 commercial banks provided information on green loans, with "The Bank of Georgia" and "TBS Bank" leading the way by presenting Environmental, Social, and Governance (ESG) strategies to align with British requirements (Aslanishvili & Omadze, 2019).

Procredit Bank has demonstrated a solid commitment to the green economy by establishing an eco-department and obtaining the ISO 14001 certificate. This bank funds small enterprises investing in energy-efficient, renewable energy, and environmentally friendly projects. Their initiative fosters awareness and training on the significance of entrepreneurship in the green economy, offering valuable support to environmentally conscious entrepreneurs.

The collaboration between the Base Bank and the Fund for Green Growth in Georgia is noteworthy. This partnership focuses on financing initiatives to enhance energy efficiency and reduce carbon emissions. The joint projects have already yielded substantial energy savings and emission reductions, contributing to sustainable development (Jishkariani, 2021). Developed countries, like the European Union, actively support climate-related programs through various financial instruments such as grants, guarantees, and loans. Sustainability initiatives, including creating the High-Level Expert Group (HLEG) and developing a sustainable development taxonomy, foster the transition to a resource-efficient economy. EU4Business, in collaboration with the EBRD, prioritizes green business financing, aiming to reduce energy consumption and increase production efficiency (EU4Business, 2023). However, Georgia's capital market development strategy for 2023-2028 has some things that could be improved. It does not adequately address external market factors or risks, such as geopolitical events, economic trends, and regulatory changes, which can impact market development. Furthermore, more emphasis on market infrastructure and regulatory framework improvement is needed. A robust regulatory framework is vital for investor protection and overall market growth. While the strategy recognizes the importance of the non-government bond and stock market, it needs comprehensive plans to diversify the range of financial instruments available. Diversification can attract a broader range of investors and stimulate market growth, reducing the reliance on the banking sector.

Overall, capital market development in Georgia is essential for creating a diversified source of financing, attracting investment, and reducing the dominance of the banking sector. Initiatives that support small businesses, like venture capital funds and the development of green financing, can

contribute to economic growth and business sustainability (Strategy for the Development of Small and Medium Enterprises of Georgia, 2021-2025).

RESEARCH METHODOLOGY

Qualitative research: Qualitative research is an important part, within the framework of which information was collected through interviews with representatives of banks operating in Georgia that provide business loans to small entrepreneurs. Five bank representatives were interviewed. The existing research results are valid because, in Georgia, eight commercial banks are operating in this segment, and the bank with the most extensive small business portfolio has been selected.

RESULTS

A qualitative study assessed access to finance for small businesses operating in Georgia. According to the Tax Code of Georgia, a business is called a small business if its annual combined income does not exceed 500,000 GEL (Parliament of Georgia, 2010). Qualitative research included interviews with representatives of five Georgian banks that provide loans to small entrepreneurs, which provides valuable information. The objective of the qualitative research was to explore the opinion of bank representatives about the challenges and opportunities faced by small businesses in Georgia in accessing finance. They assessed the barriers that prevent entrepreneurs from getting a loan and their level of awareness of various business opportunities.

One respondent cited a need for more information and effort in collecting documents as a barrier to accessing finance. Small businesses may need help to collect the necessary information banks require. The respondent perceives proper communication and cooperation between the bank and small entrepreneurs as critical. The second and fourth respondents highlighted insufficient solvency, sloppy accounting, unsound plans, and poor credit history as barriers to accessing finance (Surmanidze, 2018). The mentioned respondent states that the most common reason among the barriers to access to finance is the insufficient financial situation of the entrepreneur, which leads to the inability to repay the loan on time. A third respondent highlighted several challenges: insufficient revenue, limited collateral, negative environmental impacts, and unfavorable business structures. The respondent noted that entrepreneurs are most often refused a loan due to insufficient collateral. The factor in which small business operates is also essential; whether business activities hurt the environment or human health, such areas are considered risky, and banks avoid financing. "Business activity, for example, if it hurts the environment, human health (production of chemicals, bitumen, petroleum products, processing-extraction of high-risk inert material, etc.)

A fifth respondent cited "excessive loan demand, expectations, and risk-taking." Small businesses that request loan volumes beyond their revenue-generating capacity may need help obtaining financing. In addition, the lack of adequate risk assessment and analysis can prevent loan approval. Entrepreneurs need to match the loan request with their financial capabilities and assess the risks associated with the loan (Financing SMEs and Entrepreneurs,2022).

The respondents' responses reveal that banks significantly emphasize the borrower's financial ability to fulfill loan obligations. Although banks are trying to promote financial literacy by providing various programs and training and helping small businesses strengthen their financial management capabilities, the study revealed that this factor still exists as a barrier to access to finance. These

factors determine small businesses' financial stability and viability, which is crucial for banks. Common factors that hinder the ability to secure financing for small businesses have been identified. Among them are lack of information, insufficient solvency, unorganized accounting, unsound business plans, insufficient income, collateral limitations, lousy credit history, excessive liquidity, and inattention to risks. In almost all of the reasons listed, respondents' answers highlight the multifaceted nature of small businesses' challenges.

All five respondents indicated that their bank loan helps small entrepreneurs expand their business and emphasized that this is one of the ways to use the received funds for improvements, such as upgrading the infrastructure, introducing new technologies, or improving the product/service offering. Also, by investing in the business, entrepreneurs can increase efficiency, competitiveness, and customer satisfaction, ultimately leading to improved business profitability. In "business expansion," "business development, access to money." The fourth respondent called the loan a cheap resource for development. It indicates that the bank representatives believe that the availability of loans at low-interest rates allows small entrepreneurs to obtain the necessary funds for the growth of their business at an affordable price. This availability can facilitate investments in new equipment, expansion of production capacity, and other development initiatives. Thus, respondents believe bank loans are crucial in providing cash to entrepreneurs.

The study reveals the green financing policies of five banks operating in Georgia and examines whether small businesses have an advantage in seeking green financing. Four respondents indicated that there are special green financing programs in their banks. It shows that these banks recognize the importance of financing environmentally sustainable projects and have specific initiatives to support such enterprises. Another respondent pointed out that green financing offers lower fixed and effective interest rates than standard financing. Moreover, low-interest rates lower the cost of borrowing and increase the financial viability of green projects, making them more attractive to small businesses looking for financing. "For the most part, the benefit for the entrepreneur is expressed in lower fixed and effective interest rates compared to the standard."

The fifth respondent said that banks encourage businesses to use green loans. Accordingly, the bank actively supports small entrepreneurs to implement environmentally friendly practices by encouraging green loans. One respondent emphasized that the bank prioritizes financing energy-efficient and environmentally friendly projects, as they positively impact the environment. In the answers of the bank representatives, several opinions were highlighted regarding the advantages of loan approval, which are available to small entrepreneurs who have grants from the state or donor organizations. However, some respondents emphasized that grant holders do not have an advantage. One respondent noted that small entrepreneurs who received government grants benefit from co-financing benefits, especially regarding interest and collateral requirements. The existence of a grant allows entrepreneurs to obtain financing with a reduced financial burden, potentially improving their financial situation. Reduced interest expenses can improve cash flow and profitability, which creates favorable conditions for the financial stability of the entrepreneur. On the contrary, one of the respondents mentioned that small businesses are not in an advantageous position if they own state grants because there are not enough conditions to meet the bank's requirements when taking a loan. "No, because it is not enough," one of the bank's representatives said that small entrepreneurs who received state grants enjoy relatively high trust in the bank. The grant acts as a form of guarantee, reducing the perceived risks of financing such entrepreneurs. This confidence can foster a more

favorable credit environment, allowing entrepreneurs to access finance more efficiently and with better loan terms. Also, small businesses that have received grants from donor organizations are at an advantage, as having an organization that oversees the funds can enhance transparency and accountability, ensuring the bank's confidence in the proper use of the funds. Such monitoring can further reduce the risks for the bank, potentially leading to more favorable credit terms for the entrepreneur. "Yes, they are. As the project financing involves an organization that monitors the goals of spending funds", the existence of a grant-supported project can provide an additional guarantee of the bank, which will contribute to the entrepreneur's favorable position in seeking financing.

The study also included examining the loan application behavior of grant entrepreneurs. Analysis of their answers provides essential information about the practical frequency of loan requests by small entrepreneurs with grants. The answers of the bank representatives indicate that requests for loans with grants from small entrepreneurs are relatively rare. Several respondents expressed that these entrepreneurs often do not seek additional funds through bank loans. "I have had contact with only one organization. Therefore, organizations with grants have less frequent loan requests than other entrepreneurs." Once entrepreneurs receive a grant, they can rely on the funds provided and do not need other resources to support their business activities.

The responses of bank representatives about the ways and level of awareness of small entrepreneurs emphasize that banks use different methods to provide information about projects and loan opportunities to small entrepreneurs. Bank representatives named such methods as posting information on the bank's website, personal communication with entrepreneurs, advertising campaigns, telephone offers, promos, use of Internet banking platforms, and involvement in marketing activities. Direct communication through channels such as social media and conferences/meetings are also mentioned as ways to provide information to entrepreneurs. The responses indicate that banks use multiple communication channels to connect with small businesses. This multi-channel approach ensures that information reaches the entrepreneur through various means, allowing for greater awareness and access. The combination of online platforms, direct communication, and marketing activities reflects the banks' efforts to ensure the dissemination of comprehensive and diverse information. Bank representatives gave different assessments about the level of information among small entrepreneurs regarding how to obtain financing. Some respondents rated it around 6-7 on the scale. "Compared to previous years, the population is more aware of grant projects. which naturally increases the number of project beneficiaries". Accordingly, according to the bank's representatives, the level of information among small entrepreneurs is moderately satisfactory, and some improvement has been observed over the years. However, banks should raise the level of information among entrepreneurs. Continued efforts to educate and inform small business owners about financing opportunities can support their ability to make informed decisions and access the resources they need to grow and develop their businesses.

The study will also examine the view of bank representatives regarding how business can be developed in Georgia. The answers highlight several key factors contributing to the development of small businesses in Georgia. According to one of the respondents, diversification of the economy is an essential factor. The development of various sectors and branches of the economy is considered a decisive factor for the growth of small businesses. A diversified economy gives entrepreneurs more opportunities to identify niches, explore new markets, and expand their businesses. "With the

development of various branches of the economy, with the development of diverse sectors." According to the third respondent, practical business and development-oriented management practices are essential for small business success. Emphasis is placed on acquiring the right skills, transferring new technologies, and applying global best practices. Small businesses should adopt effective management strategies to improve their operations, productivity, and competitiveness. The fifth respondent was "competition, seeking more information about the business." Competition plays a vital role in the development of small businesses. By actively seeking more information about their business sector, market dynamics, and customer preferences, entrepreneurs can identify areas for improvement and implement strategies to remain competitive.

Accordingly, taking into account these factors, small businesses in Georgia can strengthen their competitiveness, expand their activities, and contribute to the country's overall economic growth. It is important for stakeholders, including government agencies, financial institutions, and business support organizations, to collaborate and create an enabling environment that supports small business development and success.

CONCLUSIONS

Small business development has played a crucial role in the socio-economic progress of Georgia since its independence. The growth of small businesses led to the creation of jobs and a significant increase in the number of employees, and the growth helped to improve the overall level of wages, which reflects the positive impact of small businesses on the livelihood of the population in Georgia. Access to capital continues to be a significant barrier for small businesses, as Georgia's Capital Market Development Strategy (2023-2028) must explicitly address market infrastructure development, such as stock exchanges. There needs to be more focus on the regulatory framework and more detailed information on improving it. The COVID-19 pandemic has highlighted the vulnerability of small businesses and the importance of accessing finance in times of crisis. Governments, financial institutions, and international organizations have implemented various measures to support small businesses during these difficult times. These initiatives, such as low-interest rates, loan programs, payment deferrals, and tax relief, were intended to ease the financial burden and ensure the continuity of small businesses. In Georgia, specific programs and initiatives have been implemented to meet the needs of small businesses, resulting in positive results such as reduced liquidation procedures and increased demand for loans. Various agencies in Georgia create an entrepreneurial environment that promotes business development. Commercial banks mainly dominate the financial sector in Georgia. Therefore, banks are the main financiers of small businesses when receiving financing.

According to the banks, the barriers that make it difficult for entrepreneurs to secure financing are lack of information, insufficient solvency, unorganized accounting, unsound operating systems, insufficient income, collateral limitations, lousy credit history, excessive liquidity, and risk inattention. The research revealed that banks have specific green financing policies and programs that enable small businesses to benefit from low-interest rates and favorable terms. Small entrepreneurs who have received grants from donor organizations or state grants have an advantage in accessing bank loans; that is why it is essential to have a project supported by a grant, which represents an additional guarantee for the bank. Based on the findings, the paper can give some recommendations to improve access to finance for small businesses in Georgia.

They are strengthening financial education: developing and implementing comprehensive financial literacy programs for small entrepreneurs by the state and banks. Banks should support credit improvement initiatives and provide financial education and advisory services. These programs should focus on increasing the business education of entrepreneurs, which includes learning about finance, marketing, management, and the loan application process. Small businesses, on the other hand, should focus on improving their financial management practices. Promotion of sustainable practices: Banks should encourage businesses that engage in sustainable activities to minimize adverse environmental impacts. Accordingly, it is essential to develop the supply of green loans further. They should conduct informational training because entrepreneurs will understand how much priority green business is today. The initial ETPA banks need to give loans at interest-free rates because, in this respect, the environmental impact will be eliminated, as well as to promote the development of entrepreneurial activities in this regard.

Raising awareness: Banks need to raise awareness in the regions, giving small entrepreneurs a voice about their opportunities because as their awareness increases, so does their involvement in programs and entrepreneurial activities. Banks should create activities through which they can reach small entrepreneurs directly and provide comprehensive information about projects, as well as lending requirements and procedures, and small businesses should make a concerted effort to collect and submit the necessary documents. Development of the capital market: The state should develop the capital market and consider factors such as geopolitical events, economic trends, and regulatory changes. Significant attention should also be paid to developing market infrastructure, such as stock exchanges. Diversifying the financial instruments available in the capital market is also essential, which can attract a broader range of investors and stimulate market growth.

In conclusion, solving the challenges of access to finance for small businesses in Georgia requires a multifaceted approach involving various stakeholders. By implementing the above recommendations, policymakers, banks, and small entrepreneurs can work together to create an enabling environment to support small businesses' growth and development. It, in turn, will contribute to the overall economic prosperity of Georgia and create relevant business opportunities.

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MAIN DIRECTIONS OF ACCELERATING REGIONAL SOCIO-ECONOMIC DEVELOPMENT IN THE DIGITAL ERA

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Abstract: *International experiences show that one of the most important indicators for the sustainable and balanced development of each country is the socio-economic development level of the country's regions. The digital information presented by the digital economy is widely used in the direction of solving the socio-economic problems of the regions and opens great opportunities for increasing the effectiveness of the economic policy of the regions. Ensuring sustainable economic and social development of regions is part of the regional economic policy implemented by the state. Currently, in the international practice, the regional policy of the state is evaluated as an activity of managing economic and social development in the country through the creation of economic relations between the state and the regions of the country. Despite the implementation of a number of state programs in the field of socio-economic development of regions in the country, as well as the attention paid to regional development issues in a some program documents of the government and the achievement of certain progress in this direction, sharp differences and inequality between the levels of socio-economic development of the country's regions continue. does. This difference is particularly sharp between the Baku-Absheron zone and all other regions of the country. In the article, the current state of inequality in regional socio-economic development is analyzed based on official statistical data and its causes are investigated. Then, the policy steps implemented by the government so far in order to eliminate this problem are examined.The article examines the impact of measures resulting from the analysis of state programs and strategic road maps on the socio-economic development of regions. In the end, the economic benefits of digitization in economic regions were specified and presented in the form of recommendations.*

Keywords: *region, socio-economic development, economy, international experience, digital technologies.*

INTRODUCTION

In the digital era, equal development of regions remains the main way of economic development. It has become the main source of sustainable economic development in developed countries by creating conditions for attracting the natural, labor and financial resources of underdeveloped regions to the economic cycle in order to ensure interregional equal development. The cheap labor reserves of underdeveloped regions, rich natural resources, and favorable geographical location require investors to invest in these regions.

Even today, the issue of ensuring the balanced development of the country's regions has become one of the very important factors that ensure the fairness and usefulness of the state's regional policy in our country. This, in turn, ensured that the solution of a number of issues related to economic development was brought to the fore both theoretically and practically.

The main goal of the article is to develop economically sound scientific and methodological approaches to identifying the socio-economic aspects of sustainable development of regions in the digital economy.

RESEARCH METHODOLOGY

The methodological basis of the study was research by domestic and foreign scientists on various aspects of assessing the socio-economic development of regions, and articles from specialized journals. The article used research methods: comparative and SWOT analysis, systems approach. The regions are diverse according to their potential, according to the structure of their natural resources, according to the level of employment. The main factors that distinguish economic regions from the economic, geographical and historical point of view can be shown as follows: natural conditions and resources; economic-geographic location; territorial and field structure of regions; population settlement level; historical development features. (Ağayev, Mehtiyev, 2021)

One of the stimulating forces of the economic development of any country is the organization of state regulation in the economic sphere. Today, at a time when economic subjects are given maximum freedom in the conditions of market economic relations, state intervention in the economy can only be done with certain regulatory instruments. We can note that for the realization of optimal public administration, it is necessary to ensure the full and careful use of the existing potential in this sphere, as well as to ensure the sustainable development of this field.

As a result of the implemented economic policy, our country has progressed on the international level and the per capita national income has increased significantly. According to the classification based on the World Bank's atlas methodology, our country is included in the group of poor countries according to the level of national income per capita. According to that classification, Azerbaijan was then included in the group of low-middle-income countries, and then in the group of upper-middle-income countries.

One of the important conditions for sustainable and balanced development in the country is ensuring that the general social and economic development of the country affects all its population and all regions at the same level. (Qasımov, İsrafilov, Hacızadə & Ağayev, 2006)

The territory of Azerbaijan seems to be divided into 2 parts, which differ from each other according to the level of socio-economic development and economic potential:

1) approximately 75-80% of the country's economic potential is concentrated in the city of Baku and the Absheron-Khizi peninsula, which is only 6.8% of the country's territory and where up to 32% of its population lives;

2) only 20-25% of the country's economy is formed in other areas covering 93.2% of the country's geography and 68% of its population. (Azərbaycanın regionları,2023)

At the same time, serious differences are observed between the mentioned individual regions according to the level of socio-economic development and economic potential. To better see and understand these differences, first, let's look at the regional territory and population structure of Azerbaijan by economic regions.

Table 1. Regional territory and population structure of Azerbaijan by economic regions in 2022 (data as of January 1, 2023)

	Territory		Territory	
	100 0 m^2	Share in the total, %	Number, thousand people	Share of total,%
Baku city	2,14	2,5	2336,6	23,1
Nakhchivan Autonomous Republic	5,50	6,3	465,7	4,6
Absheron-Khizi economic region	3,73	4,3	874,1	8,6
Nagorno-Karabakh Shirvan economic district	6,13	7,1	317,8	3,1
Ganja-Dashkasan economic region	5,27	6,1	596,0	5,9
Karabakh economic region	8,99	10,3	736,4	7,3
Gazakh-Tovuz economic region	7,03	8,2	674,4	6,6
Guba-Khachmaz economic region	6,96	8,0	543,8	5,3
Lankaran-Astara economic region	6,07	7,0	930,6	9,2
Central Aran economic region	6,69	7,8	716,2	7,1
Mil-Mugan economic region	5,67	6,5	520,2	5,1
Sheki-Zagatala economic region	8,84	10,2	623,6	6,2
East Zangezur economic region	7.47	8,6	300,4	3,0
Shirvan Salyan economic region	6,08	7,1	491,3	4,9
Republic of Azerbaijan, total	86,6	100	10127,1	100

Source: Azərbaycanın reqionları ,2023

The main differences in regional development in Azerbaijan are primarily reflected more prominently between the city of Baku and other economic regions. The differences between the regions in terms of the level of economic well-being of the population in the republic arose primarily as a result of the development of relevant production and service areas concentrated in Baku and the Baku suburbs. The development of regions requires large investments. However, the majority of foreign companies and enterprises are concentrated in the Absheron-Khizi economic region, especially in the capital city of Baku, therefore, the creation of a system for promoting the attraction of foreign investments to the regions remains relevant.

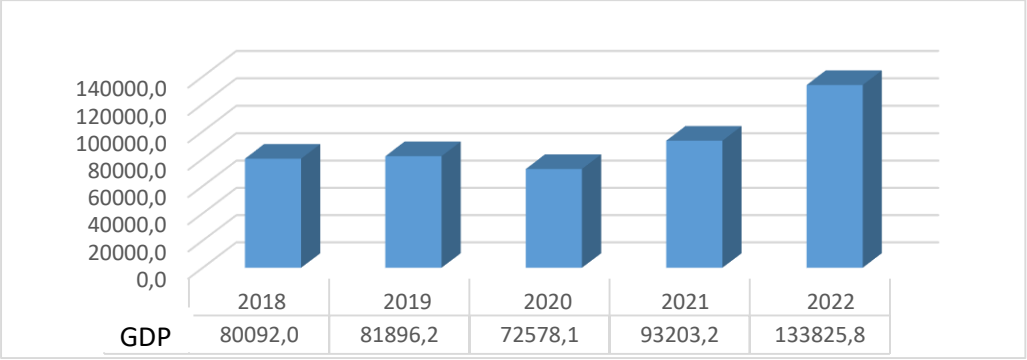
The observed situation in the development of the regions in the country requires raising the level of socio-economic development of the regions and minimizing the difference between them by using the existing potential effectively. The fact that the problems of the development of the regions are closely related to each other implies their systematic solution, which acts as an important condition for the development of the regions. In this regard, at the current stage of development, the need for fuller use of the potential of the regions and their effective coordination requires the implementation of complex measures aimed at the socio-economic development of the regions. This could be achieved through the development and implementation of a new effective regional policy system.

The existence of differences in socio-economic development between the regions of the country depends on many factors. The disproportionate distribution of productive forces between regions has created a sharp difference in the level of their socio-economic development. Thus, the concentration of the main part of the economy, especially the industry, infrastructure areas in Baku city, along with its faster development than in the regions, led to the worsening of the socio-economic situation in the regions and the flow of the population from the regions to Baku. (Azərbaycan Respublikasının iqtisadiyyat Nazirliyi, 2023).

The economic policy implemented in the country in recent years has contributed to the comprehensive development of the country as a whole and the regions, to the rise of the special quality of the regions in macroeconomic indicators across the country, to the improvement of the provision of infrastructure in the regions, to the improvement of the level of communal services, to the creation of new production and processing facilities, socio-cultural facilities, investments, employment. has led to the increase, the further acceleration of the development of local entrepreneurship, the opening of new jobs, as a result, the reduction of poverty and the further improvement of the population's standard of living. (Əliyev,2016)

It should be noted that during the period covering the last 5 years, the real GDP increased by an average of 6.4 percent (Fig. 1). We can note that the nominal GDP has increased by 65 percent. A 62 percent increase in the volume of GDP per person was observed during this period of time, with which our country rose from the 134th to the 85th place among the countries of the world. The social status of the population has changed significantly, and the poverty level has decreased from 40.2 percent to 4.9 percent in 10 years. (Azərbaycanın statistik göstəriciləri, 2023)

Figure 1. Gross domestic product growth dynamics (in million manats)



Source: AR State Statistical Committee,2023

The economic growth model implemented during the period of increasing oil revenues has created conditions and opportunities for the creation and increase of strategic currency reserves on a large scale, and as a result, it will be able to ensure the elimination of possible threats that the republic's economy may face. In addition, it should not be forgotten that it can be an important tool for the process of financing future economic growth. According to the information provided by the State Statistics Committee, the growth rate of economic development in the period covering the years 2018-2022 was 7.9 percent on average. The level of investment decreased by 6 percent compared to previous years. The fact that the economic growth model successfully implemented during 2018-2022 has reached the limit of "saturation"

has revealed the importance of switching to a qualitatively new economic growth approach. (Dövlət Statistika Komitəsi,2023)

Historically, the oil sector has been the main factor of economic development in Azerbaijan for many years. From 2018-2022, the contributions of non-oil sectors to economic development began to increase. According to statistical data, in 2022, an increase of 6.2 percent in the non-oil sector, 8.8 percent in the construction sector, and 7.6 percent in the service sector were observed. In addition, 11.5 percent economic growth was recorded as a result of the reforms carried out in the non-oil sector. (Dövlət Statistika Komitəsi, 2023)

SWOT analysis is widely used in the analysis of the current state of economic development in the strategic road map. (Azərbaycan Respublikasında kiçik və orta sahibkarlığın inkişafına dair Strateji Yol Xəritəsi,2016)

The SWOT analysis of the regions of the Republic of Azerbaijan is given in the table below (table 2).

Table 2. SWOT analysis of the current economic situation in the regions of the Republic of Azerbaijan

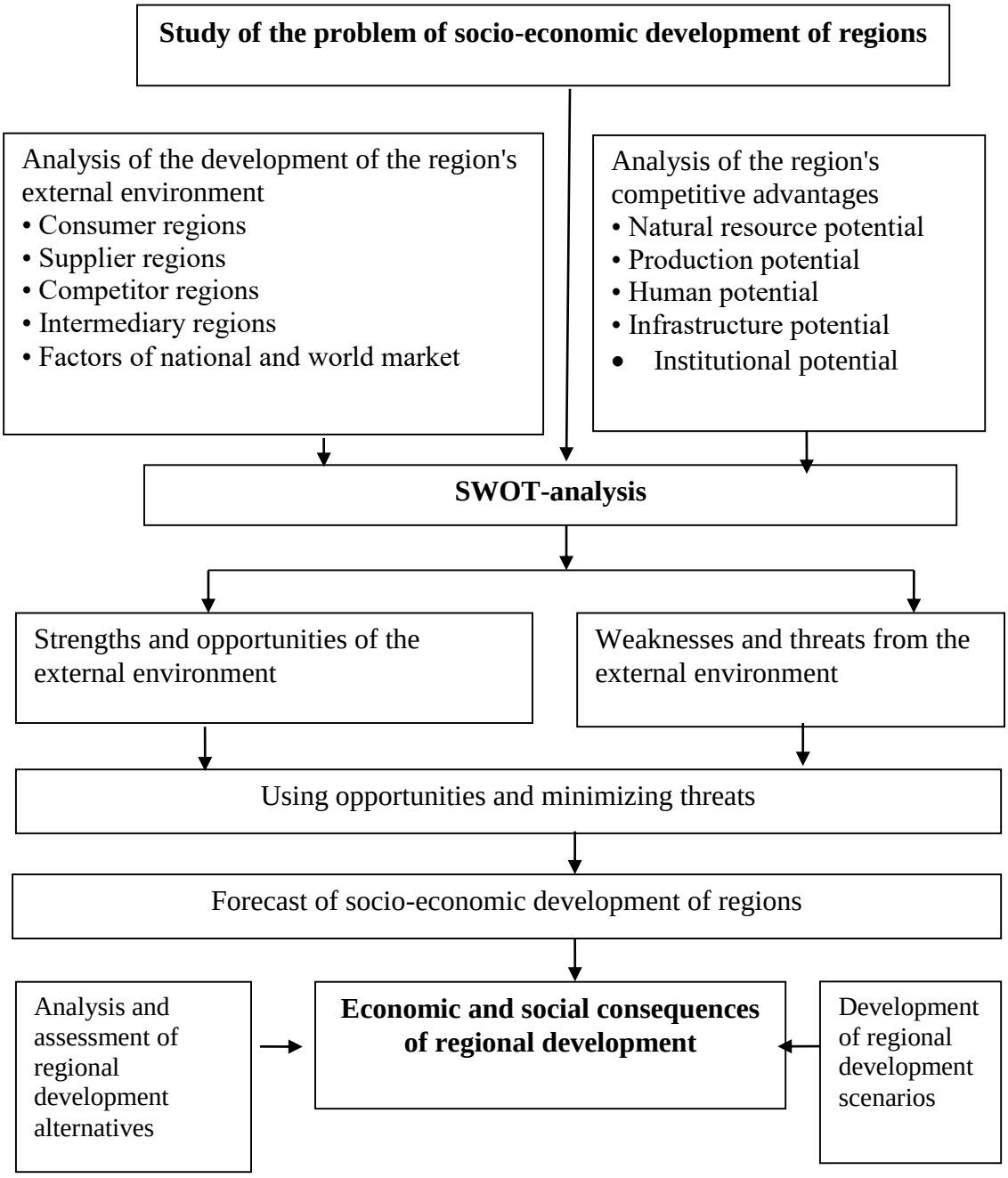
Strengths	**Weaknesses**
-Ensuring the stabilization of the macroeconomic environment in the regions - High labor force -Development of telecommunications infrastructure - Availability of wide opportunities for lifelong learning - Low labor costs - Satisfactory level of food self-sufficiency in the regions	-It is difficult to get initial capital for entrepreneurship - Lack of interregional transport facilities at any level - Inability to develop the regional infrastructure at the desired level - Low state support for research and development - Inadequate coordination between the educational institution and the labor market - High military costs
Opportunities	**Threats**
- Access to the European market - International cooperation and research opportunities in the field of science -Opportunities for new investors to enter - Development of local branches of foreign companies - Being able to stimulate regional economic growth with low taxes and low costs	- The possibility of running out of natural resources - Low profitability of non-oil sector areas - Release of skilled workers to another country - Directing investments to infrastructure projects rather than to production areas

As it is known from the analysis, there are wide opportunities and conditions for the regions of the Republic of Azerbaijan to reach a high level of economic development. So, today, the main strengths in the economic development of the country's regions are the stability of the macroeconomic environment, the abundance of the workforce, the development of the telecommunication infrastructure at a certain level, the availability of wide opportunities for lifelong education, low labor costs, and the satisfactory level of food self-sufficiency of the regions. which is one of the factors that create opportunities and conditions to overcome a number of obstacles in front of economic development. However, currently, the biggest potential opportunity of the country's regions is that the non-oil products produced in these

regions are competitive in the European markets due to their quality and ecological purity. On the other hand, the creation of research and development centers by the state in the regions can be one of the main factors that stimulate development.

In the country, the social development of the regions is as important as the economic development. One of the main factors of social development is the income level of the population. As a result of the economic development of the regions, the attraction of investments, especially in the non-oil sector, creates conditions for the creation of new jobs in this field and the employment of more people.

Figure 2. Model for developing a forecast of socio-economic development of regions



The following laws, decrees, orders and instructions were adopted by the President of the Republic of Azerbaijan, the Milli Majlis of the Republic of Azerbaijan and the government of the Republic in accordance with their authority to implement the regional policy and regulate the internal economic development of the republic.

1. Law of the Republic of Azerbaijan on environmental safety.
2. Law of the Republic of Azerbaijan on environmental protection.
3. Law of the Republic of Azerbaijan on specially protected natural areas and objects.
4. Law of the Republic of Azerbaijan on municipalities.
5. State program of socio-economic development of the regions of the Republic of Azerbaijan (2004-2008)
6. The State Program for the Socio-Economic Development of the Regions of the Republic of Azerbaijan (2009-2013)
7. State program for socio-economic development of the regions of the Republic of Azerbaijan (2014-2018 years)
8. State Program on Poverty Reduction and Economic Development (2005-2015)
9. State Property Privatization Program
10. State Program of Small and Medium Business Development
11. We can give an example of laws as the main directions of the strategic roadmap for the national economy and the main sector of the economy.

Despite the extensive development of the large-scale areas of the republic, there are still many unsolved problems in the field of state regulation and management of regions. Such problems are related to the new establishment of a single central authority for the management and regulation of regional development in many countries, including the Republic of Azerbaijan. Various functions of the state are performed by local and regional administrative bodies, that is, committees, ministries, national councils, and local self-government bodies. The state's regional management bodies are considered the main management bodies created in democratic societies. (Azərbaycan Respublikası regionlarının 2019–2023-cü illərdə sosial-iqtisadi inkişafı Dövlət Proqramı,2019)

Four State programs on socio-economic development of regions were adopted and implemented: the first state program (2004-2008); the second state program (2009-2013); the third state program (2014-2018); the fourth state program (2019-2023).

The main goals set in the framework of this program are to support the development of business entities, especially to support the activities of small, medium, and micro entrepreneurial entities, to continue infrastructure projects, to increase the income level of the population, to develop the non-oil sector, to increase the activity of young people in the regions, to increase personnel training, to support the development of tourism services, to ensure the availability of financial services, to further strengthen social protection, to improve the environmental situation, to improve road infrastructure, and to carry out protection measures. (Babayev,2022)

In recent years, digitalization has become one of the key areas of socio-economic development of regions. Access to digital technologies in the regions changes: the quality of life of people, makes the activities of industrial enterprises and agriculture more efficient,

simplifies access to information, and simplifies access to clients for small and medium-sized businesses. (Sadıqov, Balayev,2020)

The economic benefits of digitalization in the regions are: an open and accessible market; rapid receipt and processing of data, significant contribution to economic growth; creation of new jobs in industries; increase in labor productivity; accelerating the pace of small and medium-sized businesses; simplifying financial transactions for businesses; the emergence of new organizations interested in qualitatively new technological solutions. (Samara, Andronikidis, Komninos,Bakouros&Katsoras,2022)

Social benefits from digitalization in the regions are: creation of digital public services; overcoming social inequality; the emergence of new opportunities to ensure people's lives; automation and robotic of treatment processes, thereby improving the quality and accessibility of medical care; poverty reduction; reducing negative impact on the environment; increasing the availability of financial services. [Батракова,2019]

It should be noted that the digital economy is a new type of economic relations in the regions. For its development, it is necessary to create digital infrastructure, new business models, build trust in the reliability and security of digital infrastructure, assess risks, train specialists, and increase the level of proficiency in information technology.

In recent years, Azerbaijan has focused on such large projects as the creation of "smart" regions, cities, streets, and houses. With the deoccupation of Karabakh, the relevance of these ideas has increased. President Ilham Aliyev has repeatedly stated that such "smart" cities and villages will be created in the liberated territories. "Cities and villages in the liberated territories must be created based on the concept of "smart-city", "smart-village", that is, "smart city", "smart village". Work is already being carried out to ensure that the most advanced technologies in the world are used when carrying out urban planning and implementing projects there. (Azərbaycan 2030: sosial-iqtisadi inkişafın Milli prioritetləri, 2021)

It is planned that the Karabakh region will become a center of interest for technological investments, and will also play the role of an experiment in the application of smart urban and rural technologies in other regions of the country.

Currently, 54% of the world's people live in cities, and the global population is projected to reach up to 9.7 billion people in 2050. Along with overall population growth, urbanization will add another 2.5 billion people to cities over the next three decades.

As migration from regions to cities continues, urban overcrowding is becoming a real threat to the quality of life of the people living in them. If optimal solutions are not implemented, cities will face many challenges in the near future. Among them are growing economic crises, poverty, environmental pollution, disease and others. (Corchado &Trabelsi, 2022)

The concentration of large numbers of people in cities has become one of the main causes of climate change. Cities account for more than 70 percent of global greenhouse gas emissions, according to a United Nations Development Program report. Urban residents themselves are more susceptible to many of the impacts of climate change caused by urbanization, especially heat stress, floods and health emergencies.

The creation of smart cities and regions in the modern world can also eliminate many of the problems caused by globalization and the 4th industrial revolution. In addition, making

cities and regions more resilient, inclusive and safe is identified as one of the United Nations Sustainable Development Goals.

It should be noted that for the concept of a "smart city" to become a reality in territories liberated from occupation, it is necessary to first study sustainable international practices, apply and promote them at the next stage, and make extensive use of information and communication technologies. [Quliyeva,2021]By implementing «smart city» solutions, it is possible to influence various quality of life indicators such as safety, time and convenience, health, environmental quality, social connections and civic participation, jobs and cost of living. [Corchado &Trabelsi, 2022] As an analysis of scientific literature has shown, it is possible to distinguish 5 areas in which the implementation of the "Smart Region" is taking place:

1. Mobility of the population (road infrastructure, means of transport).

2. Economics (support for innovative entrepreneurship, local initiatives, creative industries, providing citizens with opportunities for personal growth).

3. Environment (rational use of natural resources, their efficient consumption, waste management and prevention of negative impacts on the environment).

4. Human potential (special education opportunities, social awareness, collaboration opportunities).

5. Living conditions (safety, health, cultural opportunities, housing, leisure activities, availability of general education).

Analysis of each area allowed us to identify certain problems. Increasing the level of digitalization of the region requires the identification of measures to ensure the necessary conditions for sustainable development.

However, there are certain problems in the development of digitalization of regions. Among the main ones, we highlight the following: insufficient funding for IT projects in the regions, personnel shortages, inconsistency of actions between different levels of government. In addition, in remote and sparsely populated regions there is a problem associated with the absence or poor development of regional information and telecommunications infrastructure.

RESULTS

As a result of the study, the most significant factors influencing the socio-economic development of the regions were identified and classified. The dependence of these factors on the development of regions in the digital economy has been established. A forecast model for the socio-economic development of regions has been developed. The conducted analysis leads to the conclusion that despite the implementation of 3 state programs aimed at the socio-economic development of regions in Azerbaijan since 2004, as well as the completion of the implementation period of the "Azerbaijan 2020: Vision of the Future" Development Concept, the socio-economic development of the regions in the country there are still serious problems in the field of elimination of sharp differences. Summarizing the analysis, it can be said that there are still sharp differences between the country's regions on all socio-economic development parameters of the country.

Therefore, in order to ensure a more efficient and balanced development of the socio-economic development of regions in the country, we consider it appropriate to implement measures in the following directions, both in the field of regional development management

and regulation, and in the field of mechanisms for stimulating the economic development of digital technologies in the regions:

1. It is important to use digital technologies in the regions. With this aim, it was possible to provide resource saving and control system in the regions by computerization and skillful use of information technologies.

2. In order to speed up social and economic development in the regions, a separate "economic analysis and information center" should be established in each region in order to regulate financial problems and detect its activity based on deep economic analysis. Such centers should be created in the regional centers first of all.

3. Special programs should be prepared in economically problematic regions. Proper distribution of key manpower between regions should be ensured and also sustainable development of this manpower should be ensured. Using digital technologies will save people time, money and energy.

4. Production or processing facilities in each economic region should be located close to the sources of raw materials. With this, we will be able to use the resources efficiently and economically.

5. Competitiveness of regions should be assessed. Naturally by using the resources properly, additional income will be obtained. We must ensure that this income is invested in other sectors. However, at this time, it is also necessary to ensure the protection of ecology.

6. Plans should be prepared for optimal use of labor resources.

In order to ensure the sustainable development of regions in the digital era, we need to approach each region separately, analyze it, and draw up development plans based on this.

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THE IMPACT OF DIGITAL PAYMENTS ON THE GROWTH OF CASHLESS PAYMENTS AND THE FACTORS LIMITING ACCESS TO FINANCIAL SERVICES

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Abstract. *Most countries worldwide are undergoing digitalization, with the adoption of non-cash payment methods accelerating. In recent years, the population and economic entities in our country have readily embraced the use of digital technologies. Organizing new methods of innovation is a key priority in the pursuit of strengthening the financial stability of the banking system. The introduction of new technologies serves as an effective tool for improving production potential, providing financial support, and stimulating entrepreneurship. Ensuring the reliability and security of the payment system, enhancing the efficiency and speed of payment operations, expanding financial inclusion by providing the population with access to payment services, minimizing the volume of cash circulation, and organizing and promoting new methods of innovation in the payment market. The application of financial technologies, especially in payment services, enables market participants to conduct their payments conveniently, safely, and at low cost. It allows for a broader involvement of economic cycles in the banking sector, limits the informal economy, and increases banks' credit resources and financial intermediation.*

Keywords: *banking sector, digital payment, financial services, financial intermediation, payment cards.*

INTRODUCTION

In recent years, a number of serious steps have been taken in Azerbaijan in the direction of maintaining macroeconomic stability, forming a favorable business environment and developing non-oil sectors, and reforms have been continued. Strategic roadmaps for the national economy and the main sectors of the economy, many state programs have been adopted, economic development goals for the near, medium and long-term perspective have been defined. Building a digital economy takes an important place among these goals. The development of the digital economy will lead to wider involvement of economic cycles in the banking sector and will multiply the investment and lending opportunities of the sector, and provide access to sources of financing. Renewal of production capacity, increase of fixed capital, finding new forms and mechanisms of investment attraction for modernization of production, will stimulate growth of economic activity and investment opportunities. The deep reforms initiated in the economy have created a favorable opportunity for the formation of a new development model and the achievement of sustainable economic growth. In such circumstances, ensuring the transition from the “capital accumulation” based model to the “effective” based growth model (Azerbaijani Government, 2016) is considered the most important strategic challenge of the new era.

The historical services of the Great Leader Heydar Aliyev, who has independent organization, management skills and phenomenal analytical thinking, are invaluable. The

National Economic Development Strategy, which was founded by Heydar Aliyev, is successfully continued by Ilham Aliyev. The follower of H. Aliyev's policy, political heir, courageous and heroic statesman, President of the Republic of Azerbaijan Commander-in-Chief Ilham Aliyev played an unparalleled role in the formation and establishment of the Oil Strategy. In the last 20 years, the strategic goals set by the President of the country, Ilham Aliyev, have been achieved. During this period, the economy of Azerbaijan increased by 4 times, the non-oil sector by 2.8 times, and the non-oil export by 4.1 times. Strategic currency reserves exceeded 65 billion dollars as of 01.06.2023. The main purpose of the Digital Payment System is to ensure continuity of the payment service. Most countries of the world are moving towards digitalization, the use of non-cash payment methods is spreading faster. The changes in the digital payment system, the availability of non-cash payments in the payment system to the financial services of the population and enterprises, increase the relevance in the financial sector. The COVID-19 pandemic has spurred the adoption of digital payments internationally. In recent years, the population and economic entities in our country have readily embraced the use of digital technologies. Electronic money is considered safer and more convenient than physical currency, facilitating quick and efficient financial transactions. This approach aims to minimize the risks associated with banking transactions, ensuring the reliability of the payment system and the security of non-cash payment instruments. Additionally, it seeks to enhance the efficiency and speed of payment transactions by reducing associated costs, promoting financial inclusion by ensuring widespread access to payment services, and fostering innovation in the payment market within the digital economy.

The establishment of a digital economy holds a significant role in fortifying the financial stability of the banking system. The application of digital technologies in payment services enables market participants to conduct their payments securely and conveniently. This, in turn, contributes to broader involvement in economic cycles within the banking sector, restricts informal economic activities, and augments banks' credit resources and financial intermediation. In Azerbaijan, several legislative acts have been enacted in recent years to expand non-cash payments and enhance transparency in the economy. The implementation of new laws in this direction creates fresh opportunities. Key objectives include expanding the non-cash payment environment among the population and business entities, as well as state structures, while simultaneously minimizing the volume of cash circulation.

Overall, these initiatives underscore the commitment to embracing digital advancements, fostering financial stability, and driving economic growth through a more efficient and transparent payment ecosystem. The application and expansion of digital payment technology will lead to a reduction in cash-related costs, a systematic provision of the tax base, as well as access to financial services for market subjects, an increase in investment and credit opportunities for the banking sector in general, and ultimately economic growth.

Within the framework of the State Program, the range and volume of electronic banking operations will expand, the proportion of the population using electronic banking will increase, and the growth of the volume of electronic commerce will accelerate the de-cashing of the economy. This will significantly contribute to the increase of budget revenues and the standard of living of the population. It should be noted that banking services are the central link in the financial system and reflect the processes taking place in the economy as a whole, including in

individual areas, in providing the material and technical base of reproduction. The limitation of banking services restricts the participation of legal and natural persons in the reproduction process, as a result of which the chain of transmission of the product produced in the real sector to the final consumer loses its effectiveness.

RESEARCH METHODOLOGY

Creating a stable system in the banking services market and strengthening its integration into the real sector are considered among the main challenges facing the economy of Azerbaijan. One of the critical factors for ensuring the development of the non-oil sector in Azerbaijan is the availability of investment sources. This, in turn, necessitates efficient operations in the banking sector. A key indicator of the successful functioning of the banking sector is the level of access to financial sources among the population. Thus, increasing financial inclusiveness among the population and lending substantial amounts of funds circulating in the economy to the real sector are directly possible as a result of the effective functioning of the banking sector.

The rapid adoption of modern technologies in financial payment services creates conditions for market participants to make their payments comfortably and safely, enabling a broader involvement of economic cycles in the banking sector and an increase in banks' credit facilities. Limited access to financial resources – on one hand, causes the banking sector to be deprived of sufficient funds circulating in the economy, and on the other hand, does not allow the revitalization of the non-oil sector. The size of the amount of cash in circulation limits not only the country's economy but also the financial intermediation of the banking sector to a large extent. In the last 15 years, special importance has been given to the intensive use of the possibilities of the National Payment System (NPS) among businesses and the population. In 2022, the total volume of payments made through the Real-time Interbank Settlement System (AZIPS) and the Small Payments Settlement Clearing System (XOXKC), which are the main components of the system, reached 341.9 billion Manat (2.6 times of GDP). The number of payments in 2022 was 97.2 million, representing an increase of 37% in the number and 57% in the volume of bank transfers compared to 2021.

In AZIPS, the total volume in 2022 was 300.1 billion Manat, with 1358.6 thousand payment documents processed, amounting to AZN. Compared to the previous year, the volume of operations increased by 63.3% (116.3 billion manats), and the number increased by 22% (245.6 thousand units). The average amount of each payment document processed by the system was 220.9 thousand manats. In XOHKS, an important component of the payment system, 95,896 thousand payment documents with a total volume of 41.9 billion manats were processed. Compared to the previous year, the number of transactions increased by 37.7% (26,257.6 thousand pieces), and the volume of transactions was 8.0 billion manats. There was an increase, and the average amount of each processed payment document was 437.3 manats.

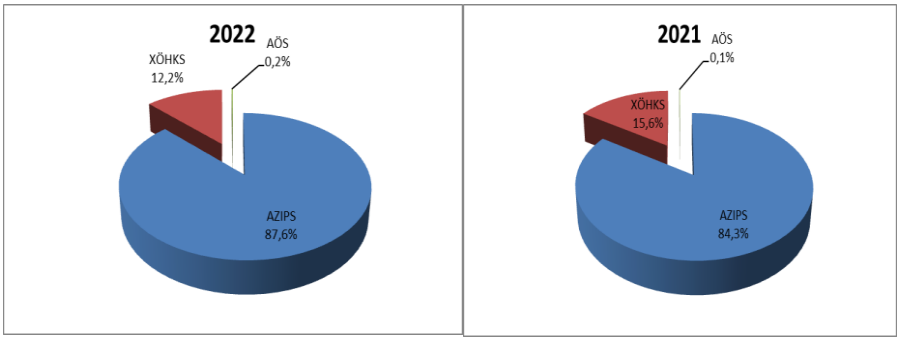
DISCUSSION

In recent years, one of the modern payment trends, the Instant Payment System (IOS) and the blockchain-based Digital Identification System have been created, the card infrastructure has been improved, and the possibilities of non-cash payments have been increased. For the first time in the country, "smart student cards" with payment functionality

have been issued to students in the education system. The implementation of this mechanism allows to expand of infrastructure capabilities and offers innovative payments to customers. As a result of the convenience and safety of non-cash payments, the radical change in the financial behavior of the population, the emergence and application of modern innovative payment channels, realizes the possibility of rapid growth in the dynamics of digital payments.

337.3 thousand payment documents with a total volume of 549.6 million manats were processed in the Instant Payment System (ISP) launched on 01.01.2023. Compared to 2021, the number of operations has increased by 2.9 times (220.3 thousand units). In the total volume of payment documents processed in the payment system for 2022, AZIPS had a special weight of 87.6%, XÖHKS 12.2%, and AÖS 0.2%

Figure 1. Components of the National Payment System in %



Source: Prepared by the author based on Central Bank Statistics

As a result of the work done in the direction of the development of cashless payments, the pace of development during 2022 was higher than in previous years. As of 01.01.2023, the number of payment cards in circulation is 13.6 million. Units, the number of ATMs was 3 thousand, and the number of POS-terminals was 79.8 thousand. During the reporting period, the volume of non-cash transactions with payment cards within the country increased by 2.1 times to 24.4 billion. Formed manat. The number of e-commerce transactions in the country has increased by 2.4 times and its volume by 2.5 times compared to 2021. The specific weight of non-cash payments made with payment cards in the country increased by 11.4 percentage points compared to last year and was equal to 43.2%. During the reporting period, the volume of transactions carried out through internet banking services increased by 50% compared to 2021, and the volume of mobile banking transactions increased by 3 times. (CBAR, 2022)

One of the main problems of the banking sector is the lack of alternative financial institutions in order to eliminate the limitation of financial inclusion among the population. In the world experience, the creation of alternative financial institutions to traditional banks is encouraged to involve the population in the financial-banking system and, in parallel, to diversify the banking sector and the economy. Although such organizations differ according to the characteristics of the countries, they are essentially the same and aim to include large amounts of money flows outside the banking sector into the general financial system of the country and provide cheaper loans to the real sector by providing access to financial services for the population (Zeynalov, 2021). The intensity of access to financial services has a positive effect on the demand for banking services and economic activity along with the improvement of the population's well-being.

Figure 2. Cash flow (M0/M2)

Source: Central Bank Monetary Policy Review 2023 January – June

The specific weight of cash money (M0) in manat broad money (M2) was 46.3% by the end of the period (CBAR, 2023). Due to the convenience and speed of non-cash payments, radical changes have taken place in the socio-economic landscape of cash in several countries.

With the advent of mobile phones and innovative payment channels, the dynamics of digital payments are rapidly increasing. According to the 2020 edition of the World Payments Report (World Payments Report 2020), "over the last year, the volume of non-cash payments made via the Internet increased by 14.1%, and the volume of payments made by mobile phone increased by 8.1%. At the same time, in 2020, although the size of the world economy shrank due to the COVID-19 pandemic, the volume of cashless payments made through electronic commerce increased significantly. Thus, a 62.4% increase in the volume of credit card transactions and a 52.7% increase in debit card transactions were observed in electronic commerce" (CBAR, 2023).

The low level of financial literacy among the population and lack of knowledge about the advantages of digital payments have a negative impact on the use of these services. A study conducted by the World Bank shows that "interest in opening bank accounts in Azerbaijan is significantly less. Financial literacy is lower in regions and rural areas, especially among housewives and elderly population groups" (CBAR, 2023). The weak competitive environment and low level of financial literacy in the digital payment system, high cash circulation outside banks (M0/M2=46.3%), and the rapid expansion trend of the monetary base (2 times in the last 5 years) are factors limiting the development of cashless payments and access to financial services. (Zeynalov, 2021).

At the same time, the weak development of financial markets, the high cost of digital payments, poor use of payment facilities by business entities and population groups, and a number of other factors significantly impact the volume of digital payments. Cyberattacks and money laundering also pose serious risks when using electronic money. It is crucial to continuously implement various projects aimed at increasing access to cheap and convenient financial services for the population and businesses in the country and increasing the volume of non-cash payments. For the diversification of the banking sector and the economy, the creation of alternative financial institutions to traditional banks will create the possibility of attracting large amounts of financial flows outside the banking sector to the banking circulation and providing cheaper loans to the real sector by ensuring the population’s access to financial services.

CONCLUSIONS

In conclusion, the application of new technologies emerges as a powerful tool for enhancing the qualitative aspects and increasing the production potential of a nation. By extending innovative payment services to customers, there is a positive impact on mobilizing internal financial resources and reducing the high cost of credit resources within the banking sector. Furthermore, the improvement of economic management mechanisms, with a heightened focus on formulating sectoral development strategies grounded in the economic and labor potential of distinct regions, stands out as a priority issue. The overarching goal is to foster economic growth and entrepreneurship stimulation. Addressing the pressing matter of financial accessibility for both businesses and households is paramount. Establishing a robust connection between the real and banking sectors requires concerted efforts, including collaboration with international financial institutions such as the International Monetary Fund and the World Bank.

Urgent monetary reforms are essential in this context. To expand financial inclusion in the banking services market and deepen financial intermediation, building trust in the financial sector and ensuring transparency are foundational. Measures to develop the capital market play a crucial role in this endeavor. The organization and promotion of innovative methods in the payment market, especially those facilitating access to non-cash payments, represent a key priority. This involves fostering confidence, transparency, and regulatory frameworks covering the legal and security aspects of digital payments to ensure the stability and security of the payment system. Creating a stable system in the banking services market and reinforcing its integration into the real sector are imperative. Diversifying investment sources becomes a strategic approach for the banking sector to minimize risks effectively. Lastly, the rapid, efficient, and secure adoption of innovative innovations in digital payments and electronic banking services necessitates ongoing efforts to educate the population and enhance financial literacy periodically. This holistic approach ensures the sustainable growth of the economy, supported by a well-functioning and resilient financial ecosystem.

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INNOVATION MANAGEMENT ON THE WAY TO BUSINESS EXCELLENCE

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Abstract. *The current conditions of the global economy have caused innovative changes to be the main condition for a good, sustainable, competitive business of the organization. The solution to the problem can be seen in innovation management, of course with information technology. The goal of this work is the development of innovation with practical software solutions through the innovation management process, i.e. increasing business excellence in the organization. Researchers in organizations use original experience in the implementation of developed software solutions in the field of document management and business innovation. In recent times with globalization and the technological revolution, knowledge has become a key resource for the economic growth and development of nations. Accordingly, the improvement of innovation has become a key condition for the sustainable development and competitiveness of organizations on the local and international market. The results of the conducted research are presented through author-developed programs for statistical data processing and for assessing economic sustainability and achieved business excellence (based on the EFQM 2013 methodology).*

Keywords: *Management system, quality, innovation, document management*

1. Introduction

In order for the economy to progress, strategic investments for the development of technology that lead us to innovation must be increased. Knowledge and innovation have the greatest importance in the development of society, since the very beginnings of human civilization. The assessment of economic sustainability is a special form that expresses the overall performance of the business. Only with a fundamental concept can the company achieve good results and show business excellence with the maximum involvement of all interested parties, with knowledge management.

Globalization and the technological revolution with knowledge represent a key resource for the economic growth and development of nations. Accordingly, the improvement of innovation has become a key condition for the sustainability and competitiveness of organizations on the local and international market. In the modern economy, small and medium-sized organizations play a significant role in creating the gross domestic product of individual countries. Changes in the business environment have reduced the structural disadvantages of small and medium-sized enterprises, due to the small business volume.

The end of the last century and the beginning of this century are marked by general globalization around the world. The increase in industrial production and the devastation of the human environment created an obligation for numerous national and international institutions to

introduce new approaches for restructuring economic flows. The need to organize sustainable development with intergenerational solidarity, which implies the responsible use of natural resource potential, is increasingly emerging.

Skilled managers transform their knowledge through ideas into a new product and service with added value as part of research activities. The innovation process must be well planned and clearly oriented towards obtaining a positive final result. Large investments in research and development as well as other elements of the innovation process do not necessarily result in successful innovations. Innovation efforts and activities can be misdirected. There is a possibility that good ideas will not be implemented due to the creation of a bottleneck in some part of the innovation process.

The innovation process first requires an idea, with a focus on the conceptual solution, innovation modeling (invention), evaluation of alternatives, decision-making and innovation implementation. Rapid changes, great competitive advantages, increasing expenditures for research work, influence the small economy to search for new, more open types of innovation, as well as to cooperate with external partners and develop new products or services on the market before its competitors. The main concern of this economy is to make the best use of the internal possibilities of research and development in order to maximize the advantage through the model of open innovation.

A successful open innovation strategy for small and medium-sized enterprises must use the internal innovation potential for good development innovation solutions. On the other hand, there are also problems that limit the use of the open investment model in small and medium-sized enterprises. This often does not allow an aggressive market presence at the right time and with the right product.

1.2 Methodological approach

Research objective. One of the possible approaches to solving the problem of determining and activating the innovative potential of small and medium-sized enterprises assumes the development of a model for the management of quality system documentation. However, this model requires expansion to a level that will represent a prototype platform for initiating, modeling and testing business process innovations. Therefore, the model must provide data on the success of the tested processes, as well as a methodology for their transition from a successful prototype to an operational version.

The work shows, through the author's conceptual model and a practical software solution in the food industry, the process of modeling, making and implementing a possible solution to this problem. Also, the conceived model provides a solution for efficient, effective and sustainable implementation in a real business environment:

- tools for training staff and management to get involved as bearers of business system redesign according to the new Service Oriented Architecture (SOA)/Business Activity Monitoring (BAM)/Complenx Event Processing (CEP) paradigm, with the help of benefits obtained from the implementation of ISO 9000 + Business Excellence (BE);
- the logic of the new paradigm into existing business solutions and its prototype testing by staff and management, with the support of Information Technology (IT) staff and consultants;
- new and changed IT solutions that are designed according to the new paradigm, but also logically tested through prototype application.

This would test the potential of a synergistic innovative effect for the creation of benefits obtained by the complementary application of Quality Management System (QMS) and Information Technology (IT) to the business system (enterprise). and with the help of Documentation of Quality Management System (DQMS) as a catalyst for innovating business processes.

Theoretical foundations of research. Innovations, knowledge and entrepreneurship represent a key determinant of economic growth and improving the competitiveness of companies and countries [1]. Enterprise innovation means the ability to produce and commercially valorize goods and services based on the use of new knowledge and skills [2]. Improving innovation is a key condition for the economic progress of countries, while innovation policy is the most important instrument of long-term economic development strategies and improving the competitiveness of countries in the knowledge-driven global economy [3]. In today's conditions, it is possible to ensure a satisfactory development performance of the company, as well as the respectable competitive position of the country on the world market, only under the assumption of satisfactory innovativeness of its economy.

A good example of BAM/CEP implementation for HACCP purposes is the AliFarm dairy farm management software solution of the Israeli company AfiMilk [4]. Although it is not structured as SOA architecture, the program creates in real time a cloud of events, compares it with historical data and, based on predefined scenarios, predicts complex events (such as the occurrence of mastitis in the throat) and automatically initiates corrective action to treat the throat and informs the farm manager.

Business excellence is a creative framework that naturally follows the implementation of the ISO 9000 series quality standards [5]. Business excellence is a term that implies the systematic use of the basic principles and tools of quality management with the aim of improving organizational performance. The concretization of this concept in practice is the European Foundation For Quality Management (EFQM) model of business excellence as the most popular quality tool in Europe. The model is based on nine basic elements, which at the first level are divided into two groups: a) criteria that enable the realization of results and b) results.

a) The criteria that enable the realization of results are:
   K1. Leadership,
   K2. Strategy
   K3. People (directly or indirectly involved in the functioning of the organization) K4. Partnership and resources
   K5. processes, products and services
b) The group of results includes results related to:
   R1. Customers
   R2. People (directly or indirectly involved in the functioning of the organization)
   R3. Social community
   R4. Business

The model is dynamic in nature and is based on learning, creativity and innovation that improve the first five criteria, which automatically affects the improvement of results. By implementing this model in practice, companies achieve the following goals:

- Permanent creation of added value for their customers and clients by understanding, predicting and satisfying their needs and expectations.
- Constantly improving their own performance, thereby positively influencing their

environment, creating a sustainable future for the environment by improving its economic, ecological and social conditions.

- Improvement of organizational potential and timely response to changes within or outside the boundaries of the business system.
- Market growth using the creativity and innovation of all employees.
- Creating leadership with a vision that shapes the future of the organization and guides it towards the realization of that vision.
- Ability to identify and respond efficiently and effectively to both opportunities and threats.
- Valuing employees and aligning individual progress with organizational growth.
- Effectiveness in achieving long-term and short-term plans with maximum efficiency in the use of own resources.

From the above, it can be concluded that innovation is one of the key assumptions for the realization of the model of business excellence [6]. This is the reason that the central topic addressed in this paper belongs to the innovation management process. In this paper, an original methodology, a new model and a software solution for expanding the Quality Document Management System (QDMS) domain are proposed in order to increase the innovative capacity of SMEs with the aim of reaching a higher level of business excellence.

Basic hypotheses. The development of the approach to designing a permanent model integrated into the process with the support of the innovation management process proposed in this paper is based on theoretical assumptions and practical achievements of modern cybernetics, decision theory, production management, industrial, information and software engineering. Based on that, the following hypotheses are defined in the paper based on modern paradigms in the field of management and information technologies:

- H1: By applying the proposed model, it is possible to reduce the time that passes from the idea to the implementation of the innovation (incubation period).
- H2: By applying the proposed model, it is possible to increase the number of initiated, and therefore implemented, innovations and thus increase the efficiency of the innovation process.
- H3: By applying the proposed model, it is possible to raise the level of business excellence (measured according to the EFQM methodology), which shows the growth of the effectiveness of the innovation process.

Methods, models, techniques, approaches and tools applied in research. In the research, which precedes the implementation of the proposed approach to designing an original model for dynamic evaluation and support for the innovation management process, the theories of system-oriented scientific disciplines of knowledge management will be used. The scientific basis should be provided by the methods on which the model will be developed. In addition to the general scientific methods that will be applied, including: the method of analysis and synthesis, the method of abstraction and concretization, the method of generalization and specialization, the method of description, etc., certain models, techniques, approaches, concepts and tools will be applied within the framework of individual methodology.

Expected results. In accordance with the objectives of the research and the basic scientific hypotheses set in this work, relevant theoretical, methodological and, above all, practical results are expected.

2. The Function of the Quality Concept Leads To Business Excellence

Quality is the result of a carefully constructed environmental culture. It must be the fabric from which the organization is sewn, not a button sewn onto the fabric. Philip B. Crosby [7]. In modern business conditions, quality is considered a factor in the survival and development of every company, which significantly determines competitive ability, success and vitality of the economy as a whole. The vision of the future consists in the implementation of quality. But there are certain changes taking place that arise from the shift from the concept of product quality to quality management. Innovation is a key assumption for the functioning of organizations in the 21st century. But in order to know how to build an innovative organization, companies must first "climb on the shoulders of the great" [8]. The ISO 9000 series of standards defines the requirements of quality management as fundamental conditions for achieving the best practices of successful companies while continuously approaching the goals of business excellence [5].

Evolution of the quality management system. Quality management includes measures for organization, planning, control and monitoring of numerous aspects relevant to quality. The evolution of the quality management system is continuously controlled by stages: controlling and determining quality control, quality assurance, quality management (ISO 9000), Total Quality Management (TQM) and, in modern conditions, the Business Excellence (BE) phase, which at the highest level strives for the concept of quality-of-life management (QoL) [9]. The QoL phase is the most comprehensive and consistent approach to quality management and represents the last instance in the evolution of quality management.

The first phase, the phase of control and testing, has its roots already at the end of the 19th century thanks primarily to the affirmation of mass production. The first forms of industrial quality control appear in the sense of articulated, primarily production activity.

Phase II – Quality Control. The result was an orientation towards meeting the required quantities of goods on the market. At this stage, the primary activity within quality management was product control.

Phase III - Quality Assurance. The increase in production capacity and produced quantities due to technological progress has led to a balance between supply and demand in terms of quantities. At the moment of equilibrium, the customer gets the opportunity to choose the goods, that is, to choose the producer. The customer's ability to choose also initiates the possibility to set certain requirements to the manufacturer. The requirements are defined in the form of statistical indicators of the quality of deliveries Acceptable Quality Level (AQL). The practical application of this new approach to quality comes to full expression with the introduction of the ISO 9000 series standard in the next phase.

Phase IV - Quality Management. The tightening of competition among suppliers positions the customer to be able to demand the product without error. The customer determines what the quality of the product is, and requires that it be ensured by statistical methods (testing batches, etc.). Furthermore, the customer insists on the supplier's quality system, so that there are no errors in production and delivery. Large users (automotive industry, manufacturers of electronic parts, etc.) in this period began to introduce predefined quality assurance systems of suppliers, which ensured their verification in a certain way [10].

Phase V - Total Quality Management (TQM) phase. As product quality becomes the default condition of competitiveness, the market differentiation of companies shifts towards services [11]. Almost every production activity is accompanied by services. In the perception of product quality by users, service has a very important place.

Phase VI - Phase of QoL and Business Excellence. The phase of QoL (quality of life) and business excellence as a creative framework represents the social aspect of quality. That is, that the process activities of each company produce products that are healthy for people, as well as the environment, suitable for customers and saving natural resources. Business excellence is based on the concept of sustainable competitiveness that combines the economic, environmental and social sustainability of the system in a global context [12].

Also, the globalization of the market leads to an increasing role of achieved business excellence and its verification by comparing business processes and performance indicators with the best business practices at the global level (Benchmarking).

3. Development of a Quality Model for the Evaluation of Innovations

This part explains the methodological and practical application of the idea of possible synergistic effect through the interaction of Quality Assurance (QA) and Information Technology (IT) systems in small and medium-sized enterprises that do not have significant, first of all, human resources such as large organizations. The backbone is the potential role of QMS documentation as a catalyst for the interaction of QA and IT systems in the process of modeling and applying new information paradigms.

The ultimate goal is to increase the innovative capacity of the business system as a determinant of business excellence. The methodology is accompanied by the analysis of a case study based on practical application in the food industry, in the concrete process of collecting, analyzing and receiving raw milk in the dairy.

3.1 Service Oriented Architecture (SOA)

Event Driven (ED), which already has a great influence in the business environment, but the problem of continuous recognition and analysis of important data, and that in real time, prevents sufficient agility and ability of companies to make timely and correct business decisions. Therefore, it is vital that Business Process Management (BPM)/Enterprise Resource Planning (ERP)/Customer Relationship Management (CRM) solutions based on SOA architecture continuously and in real time monitor the flow of events in the process [13], perform their processing (transformation , filtering and, according to pre-defined patterns of events, noticing the occurrence of scenarios of importance. Based on this, it provides: a) automatic reaction and/or notification of actors in the system, b) initiates adjustment of business activities/processes, and c) initiates timely preventive/corrective actions. In order to make this possible, it is necessary to implement BAM/CEP within the organization's IT system, which is based on the Event Driven Architecture (EDA) paradigm.

Service Oriented Architecture (SOA) represents an effective technology for the integration of distributed information systems in complex business environments. SOA is based on web service technology where, by adapting the request/response mechanism, the user's request is forwarded to one of the services provided by the distributed service provider, which after processing the request returns the response to the user. However, in business systems with a high level of distribution of functions, such pulling services based on request/response mechanisms do not provide a sufficiently efficient and flexible solution, because the business system (enterprise) changes at a high speed in order to adapt to the diverse requirements of the environment. Such a dynamic imposes an event-driven (ED) approach as an additional complement to the SOA paradigm, as it enables a more natural distributed application of services through the Publish/Subscribe mechanism.

The main advantage of the ED paradigm is that it formalizes a cloud of business events with different levels of semantic capacity, which represent a very important resource in the process of managing knowledge flows and developing the innovative character of the entire organization.

QDMS as a prototype platform and catalyst for the ED paradigm. Application services, available from providers, map business services in a process-modeled business environment, which is described in detail by the QMS documentation [14]. In order for the mapping to be effective, it is necessary for the documentation to faithfully reflect the business system and all its changes, as well as for it to have a mechanism for prototypical testing of changes through the records of the documentation system. This raises the quality of the documentation system to the level of a mechanism for iterative innovation of the system's business performance.

All this implies strong requirements for the implementation of a QDMS based on a process approach. QDMS traditionally has to provide QMS documentation management. The dominant paradigm of the culture of education and work is based on rewarding success and punishing mistakes (obedience is valued more than curiosity). This encourages the monitoring of routine algorithms during the execution of activities, which is the essence of standardization culture [15].

However, innovation requires imagination, curiosity, invention, learning through trial, error, failure and retry. There must be a space where new ideas can be tested through prototype application and people must be motivated to use that space and feel comfortable in it.

Hazard Analysis And Critical Control Points (HACCP) and ED/BAM/CEP principles. In a concrete practical example, the methodology focuses on a case study from the food industry (specifically the industry of production and processing of milk and dairy products) where the mandatory complement of the QA system is ISO 22000/HACCP (in addition to the generic ISO 9001 complement of the QA system which is basic and universal), but the methodology is fully applicable to organizations from any other field of business.

In that case, as a natural solution to the IT paradigm that would successfully map the QA paradigm in the food industry (eg ISO 9000 + HACCP) the application of event-driven architectures (BPM/SOA/ED/BAM/CEP). The basic principles of HACCP and ED systems are given and mapped in the following table 1.

The case study that will be presented in the next part deals with the situation when HACCP is the dominant component of the QA system, but the mapping of ED principles is also applicable with the QA system (ISO 9001:2008).

Table 1. Mapping of HACCP and ED principles

HACCP principles **Source:** Mortimore, S., & Wallace, C. (2013). HACCP: A practical approach. Springer	**ED/BAM/CEP principles** **Source:** Luckham, D. (2008). A Brief Overview of the Concepts of CEP1.
Hazard analysis (flow diagram for each step, recognize the hazard, make an inventory and determine control measures)	Event identification (an event is an object that represents or records an activity that occurs, or abstracted as an event)
Identifying critical control points – CPP (decision tree)	Observing event scenarios (an event scenario can be a time schedule or a causal relationship between patterns of events)
Determining critical limits (ensuring	**Event scenario constraints** (scenarios that are not

control of each critical control point)	realistically expected in the organization's operations)
Establishing a monitoring system - monitoring	**Activating measures by the occurrence of event scenarios** (using event scenarios to initiate reactive measures, then when these scenarios occur)
Establishing corrective measures that should be taken when monitoring indicates that an individual CCP is not under control	
Establishing verification procedures to confirm that the HACCP system is effective (critical audit and tests)	Event cloud formation (monitoring of historical event data and establishment of a hierarchical map of abstractions)
	Event scenario abstraction (an event is an event scenario abstraction if it summarizes, represents, or denotes an observed set of events)
	Hierarchy of events (the hierarchy of events defines a set of activity levels and a set of rules for calculating events at each level of abstraction of the event scenario from its subordinate levels)
Establishing documentation related to all procedures and records in accordance with these principles and their application (documentation management).	**Event cloud formation** (monitoring of historical event data and establishment of a hierarchical map of abstractions)

A good example of the application of BAM/CEP implementation for the needs of HACCP is the software solution for managing the dairy cow farm AfiFarm of the Israeli company AfiMilk [4]. Although it is not structured as a SOA architecture, the program creates all events in real time, compares them with historical data and, based on predefined scenarios, predicts complex events (such as the occurrence of mastitis in the throat) and automatically initiates corrective action to treat the throat and informs the farm manager.

The problems pointed to by previous research, implementation of BAM/CEP in environments with a HACCP system, refer to the technical side such as: the capacity of events that the CEP system can process, the number of lost events, the system's agility to changes in real time, the system's ability to quickly react to a problem and return to stable state (resilient), capacities for event processing and analysis, and optimization of the event processing process. This approach would activate the potential of the synergistic effect of the complementary application of QA and IT systems to the business system (enterprise), and with the help of QDMS as a catalyst for the interaction of these two systems.

Approach methodology. During the completion of the organization's business processes, it is necessary that there is a continuous cycle of adaptation and innovation of the business system, which is formally defined through policy and quality goals. The implementation of BAM/CEP/ED architecture should be seen as infrastructural innovation and not as the ultimate replacement of the existing IT system. The proposed methodological cycle of process adaptation and innovation is structurally divided into five phases that take place in parallel with the previously explained cycle of managing knowledge flows, as well as the cycle of managing documentation as the physical carrier of that knowledge. In order to apply the developed methodology for business process innovation, it is necessary for the organization to apply or during process innovation implement IT components (extended domain QDMS, ED/BAM/CEP components and business applications that support the process being innovated).

Defining the focus of process innovation. Before starting to implement process innovation into the existing IT system, it is necessary to define a procedure and provide tools

for scanning and analyzing existing event data as a valuable corporate resource from which, colloquially speaking, we read the history of the business system. This phase can be divided into three steps:

1. selection of key process parameters and sub-processes (separating the significant minority from the insignificant majority - overcoming IT blindness [16], and connecting them with the events that emit them and the events that consume them (events in processes and their interactions in the system);
2. iterative abstraction of low-semantic events into high-semantic events (data filtering, discovery of patterns of event scenarios - patterns of events, as well as data derivation represents iterative drill-down cycles in which the capacity of abstraction increases and thereby raises the semantic value of complex events that are detected after each cycle);
3. defining priorities for implementation and measurable parameters for determining the success of the process in accordance with the set business goals.

The abstraction process is iterative. Its mathematical description is given in Table 2.

Table 2. Display of event processing function from lower to higher semantic level

$I_n = f_n\left(\sum_{x_n}^{1} D_n\right)$	
$f_n = f_{nF} \cdot f_{nM} \cdot f_{nD}$	
$I_n = D_{n+1};$	
Where are:	
n	level of abstraction (levels of abstraction are not unambiguously determined but depend on the availability and level of accuracy of data on events at a given time and in a given environment, i.e. on the context in which the events are located)
$\mathbf{D_n}$	event data of the n-th level of abstraction (does not have semantics at that level)
$\mathbf{I_n}$	information about events of the n-th level of abstraction (have semantics at that level)
f_n	aggregate event data processing function
f_{nF}	function of filtering data about to events at the n-th level of abstraction,
f_{nM}	the function of detecting the scheme (pattern) of event data at the n-th level of abstraction
f_{nD}	the function of deriving a new event based on the event data at the n-th level of abstraction

Modeling of process innovation prototypes. As the QA system (in our example ISO9000+HACCP) implies complete documentation of the system, the modeling of acquisition, monitoring and event processing can be carried out through the processes of: 1) documentation management and 2) record management of this system, adhering to all the intended activities of these two processes. Table 3. shows the documentation layers of the management system and the ED-based system that indicate a certain degree of parallelism and give a recommendation for mapping the documentation and the ED-based application in a conceptual sense.

Additional problems in this stage of process innovation modeling are different languages of communication, i.e. vocabularies, syntax and semantics of IT and QA systems, as well as the absence of standard definitions and building blocks for Event Driven Based System (EDBS). Therefore, in the entire methodological process, it is recommended to adopt and apply the standard ISO 9000 dictionary as universal for all systems.

Table 3. Parallel view of EDB application layers and QMS documentation

Layer	**Business solution as an application based on event management** (EDB systems aplication)	**Documentation system supported by QDMS**
1	Language layer	Standard operating procedures layer
2	Execution layer	Specific work instructions layer
3	Communication layer	Forms layer (forms) with a defined time and functional schedule
4	Data download and creation layer	Records layer (filled forms, drawings, databases, etc.)

Source: Voisard, A., & Ziekow, H. (2011). Architect: A layered framework for classifying technologies of event-based systems. Information Systems, 36(6), 937-957.

Implementation and application of process innovation. As it is not realistic to expect a sudden transition of the company's IT system to BAM/CEP/SOA solutions, after prototype testing, Successfully validated scenarios would be implemented in existing IT solutions (applications, modules), coming as close as possible (as much as the adaptation of existing modules allows in terms of expediency) to the BAM/CEP paradigm, including the information push approach (solving the question: Where and when is information needed? ; How to get information at the place and time when it is needed?; How to prioritize information in accordance with its importance?); Users get the possibility of subscribing to available and desired data about events (the source of the event can be automatic, for example, laboratory software, business module, hardware sensor, but also a person) that happen according to interesting scenarios for them, and the system would send them data when the given scenario happens (here the scenario is actually a prediction of a complex event).

The implementation of the BAM/CEP paradigm should be seen as a way to expand the scope of existing applications in a flexible and non-invasive way. Instead of comprehensive interventions on existing applications, we should strive to add functionality that enables the broadcasting and consumption of events. In this way, the intermediate ED layer for event processing can be separated and thereby enable the rapid adaptation of existing solutions to the new business requirements of the system (the aspiration is that the application users themselves perform iterative adaptation during use).

Monitoring, analysis and optimization of process innovation. During the exploitation of the ED module, it is necessary to enable continuous monitoring and analysis of the set process parameters and thereby monitor the success and expediency of the implementation in practice. In accordance with the ED paradigm, process parameters are event data to which different business functions subscribe and, based on the analysis of that data, change, cancel or define new business scenarios.

This phase includes the intensive use of software tools for monitoring, statistical processing (pareto diagrams, histograms, control charts, correlation diagrams) as well as predefined and ad-hoc (custom) data analysis of events in the system. On the basis of these analyses, the semantic capacity is raised to the level required to start a new cycle of adaptation of business processes with the aim of their continuous improvement and innovation.

3.2 An example of the application of process innovation in practice - a case study

The authors applied process innovation using the previously described methodology in a company engaged in the production of dairy products, and its structure belongs to small and medium enterprises.

The practical application of the methodology is focused on the example of the innovation of the business process of collecting, analyzing and receiving raw milk as one of the key processes/sub-processes of processing and production of milk and dairy products. Dairy production belongs to the food industry sector where there is a trend of implementing integrated management systems (eg ISO 9000 + HACCP), which makes it a good candidate for ED remodeling of IT systems. The dairy that is the subject of the case study had already implemented:

1. Integrated quality management system - QMS.
2. IT system in the segment of composite applications with a low level of interoperability and a high level of data redundancy, which included:
    - ssQDMS for quality management system documentation management – QDoc, which was implemented in parallel with the QA system, but was subsequently partially extended to the domain of design management. During the project, an additional module was developed in QDoc for managing QMS records, which included: a) pseudo-application layer and b) ED layer.
    - data mining module for the analysis of existing data in the IT system – the QProMng application module adapted to the specific needs of a large number of dairies for which it was originally designed and developed,
    - an application for managing the collection business process, analysis and reception of raw milk - QLabMlek as a business application which, in the process of innovating the process, is functionally expanded by applying the ED/BAM/CEP paradigm (the ED layer of the application is implemented).

The software programs listed above are intended for general support to employees and consultants during QMS implementation, but are modified during process innovation based on the analysis of user requirements.

In the first phase of defining the focus of process innovation and key parameters, the QMS documentation for the selected process - Collection, analysis and reception of raw milk was used as a starting resource: 1) Procedure, 2) Quality plan, 3) HACCP process plan, 4) Process list and 5) Accompanying forms. As HACCP requirements are naturally mapped into the ED paradigm, from the documentation, we came to the initial model of the event processing network which shows. During the project, the model was corrected and optimized through an iterative drill-down process of historical data from the existing IT system.

After defining the framework in which the modeling of the BAM/CEP paradigm moves, the above-mentioned two author's application solutions (QDoc and QProMng) provided a system that enabled employees in the organization to implement process innovations and their dynamic evaluation according to the previously defined methodology.

1) The first step. In order to define the focus of process innovation, a tool for monitoring, scanning and analyzing data from the event cloud (drill down/data mining) was used, which iteratively abstracts low-semantic event data into high-semantic information. In this way, users get the opportunity to: a) choose databases, b) combine a number of heterogeneous databases through queries, and c) analyze focused data. Thus, they detect patterns of events of interest for

the performance of business processes and define the focus of innovation.

2) Second step. In the innovation modeling phase, it is possible to create and propose draft forms that employees recognize as occasionally recurring scenarios of events important for making business decisions. Users define these scenarios as suitable candidates for process innovation.

The implemented QDMS supports employee collaboration in focusing innovation in order to further optimize proposed design patterns through teamwork. This provides a channel that promotes the flow of exchange and codification of employees' knowledge and reviews the innovation. By applying the basic functionalities of the implemented QDMS, the draft form becomes a system document and is approved for use by the authorized function. Collaboration on the application of the form in practice finalizes the process innovation modeling phase.

3) The third step. The phase of the zero implementation of the innovation requires the definition of the chronology hodogram and the functions that participate in the application of the form with different roles in the scenario in which the application of the form takes place (launch, filling, approval, distribution, use, initiation of action, etc.). This defines the application rules of process innovation in the pseudo-application layer of QDMS.

Defining the functions but also specific persons who have certain roles in the application of records is (according to the author's experience) of key importance for zero implementation of process innovation. For this reason, it is possible to define the priorities of employees with the same functions. Priorities are determined by analyzing the files of employees in terms of their formal and informal competencies as well as the position of the evaluation of individual persons (according to the set criteria defined by the human resources management process) in relation to the average of the organization.

The application of forms, records and accompanying documentation through the pseudo-application and ED layer enables the acquisition, monitoring and processing of generated events, which results in the initiation of previously defined triggers for initiating business decisions. In this way, records management through QDMS forms a prototype platform for zero realization, verification and validation of process innovation.

4) The fourth step. The implementation phase of the process innovation is done after its validation in QDMS. The implementation of the process innovation in the specific case study was carried out as an infrastructural superstructure (ED layer of the QlabMlek business application) which includes:

- event registration services (event service notifications) with parameters for publishing event data,
- a mechanism for subscribing business functions to selected event data according to the given scenario (pattern) for the problems of receiving raw milk in the dairy,
- defining the event trigger as a reaction to the occurrence of the given scenarios (pattern).

From a technological point of view, the solution was realized with VBA/JetDB/SMTP technologies and protocols, in the pilot phase of the implementation of process innovation, in the existing IT infrastructure. It is a non-scalable technology, but it proved to be very applicable in the specific case with 20 or less, competitive users (which is the case with most SMEs). Also, the solution is fully applicable to organizations with a very limited IT infrastructure. The implementation of process innovation is possible without a dedicated server or on a server with an open source operating system, which is a common characteristic of SMEs. G

5) Fifth step. The phase of monitoring, analysis and optimization of the process innovation was realized with author's software tools for: a) statistical processing and data analysis (QStat) and b) predefined data analysis. In the specific case study, tools for predefined data analysis are specially specialized for the innovative process of analysis, collection and reception of raw milk. These tools are implemented as a module within the business application QProMng, with sufficient flexibility to enable access and analysis of all existing databases, which are available as a resource to the specific dairy.

Therefore, the mentioned tools for analysis in cooperation with the applied ED paradigm, enable management and employees to, based on the data on the events to which they are subscribed:

- monitor the innovated process,
- react in a timely manner to potential problems in the process and
- undertake activities aimed at further optimization, improvement and process innovation.

3.3 Analysis of the impact of the implementation of QDMS

In this part of the paper, an overview of the results achieved by applying the author's developed methodology in concretely realized case studies of process innovation is given.

Bearing in mind that the target group of the research is manufacturing SMEs, in the analysis of the impact of QDMS implementation on process innovation and improving the level of business excellence, experience gained during the implementation of originally developed software solutions was used both in the area of document management and in the area of business process innovation.

More specifically, the analysis used data from 4 projects (4 case studies) of the introduction of specially developed software solutions to support process innovation in four production organizations that belong to small and medium-sized enterprises (SMEs). The aforementioned innovation projects engaged approximately the same resources during implementation. The observed companies have introduced the ISO 9001 system, and accordingly some form of documentation management. The companies were chosen so that the impact of the implementation and exploitation of the developed QDMS on the management of the innovation process can be seen.

The results of the conducted research are presented through originally developed programs for statistical data processing as well as for the assessment of achieved business excellence. In this way, the practical application of the developed methodology was shown, as well as its impact on the change in innovation potential and business excellence of SMEs.

Multi-criteria analysis using the SAW method. SAW (Simple Additive Weighting) is a relatively simple and the most used method of multi-criteria analysis [17]. The method is based on a weighted average. The advantage of this method is that it performs a proportional linear transformation of the raw data, which means that the relative order of magnitude of the total normalized result is equal and directly comparable even after the transformation.

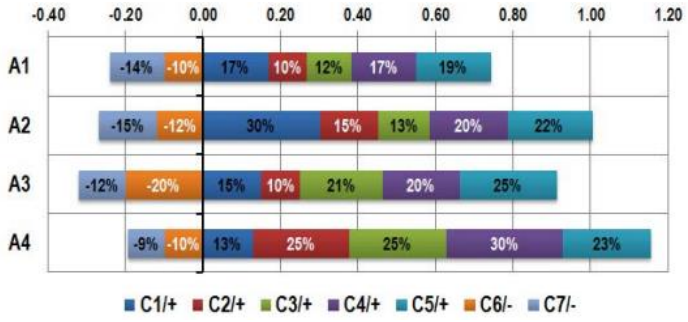
Using the SAW method, the analysis results are determined by adding weight values for each selected criterion. The method consists of three steps: a) rating normalization in order to achieve mutual comparability; b) application of criteria weight values to normalized ratings; and c) summing up the values of indicators for alternatives. The following formula gives the general form of the multi-criteria analysis model in a matrix display:

$$R = \begin{array}{c} \\ w \\ A_1 \\ A_2 \\ \vdots \\ A_n \end{array} \begin{array}{c} \begin{array}{cccc} C_1 & C_2 & \cdots & C_m \end{array} \\ \begin{array}{cccc} w_1 & w_2 & \cdots & w_m \end{array} \\ \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1m} \\ x_{21} & x_{22} & \cdots & x_{2m} \\ \vdots & \vdots & \vdots & \vdots \\ x_{n1} & x_{n2} & \cdots & x_{nm} \end{bmatrix} \end{array} \quad (4)$$

Where:

- R – the achieved result of an individual alternative,
- An – alternative, i.e. the observed aspects,
- Cm – criteria, indicators of the value of the dimensions of individual aspects,
- wm – weighting coefficients for each selected criterion,
- xij – values of the corresponding criterion, for each aspect of observation.

Figure 1. Graphic representation of the multi-criteria analysis of the impact of QDMS on process innovation



The obtained results (Figure 1) show that the implementation of some form of software-supported QDMS in the observed companies has positive effects on the implementation of process innovation. The most pronounced positive effects are experienced by companies that implement the most extensive extensions of the QDMS domain (in this case it is company P4, that is, in this analysis, alternative A4).

3.4 Analysis of self-assessment of excellence according to the EFQM 2013 methodology

Self-assessment is a systematic and regular review of the company's activities and the results achieved according to the model of excellence. Self-assessment is a positive way of recording the current situation and allocating constructive efforts for priority solutions with the aim of continuous improvement as well as innovation, their way of measurement to determine positive changes with long-term results.

The fact is that the self-assessment method requires a multidisciplinary approach with constant and systematic reviews of process activities, constant improvements and innovations:

- Determining the state of what we have done?
- Determining the current state that leads us to new changes with innovative activities
- Determining the relationship between what we do and what we want to do.

In order to carry out self-assessment according to the EFQM 2013 methodology, an analysis of current questionnaires (EFQM Model in Action, n.d.) was performed according to all nine criteria, and based on that, the author's database model and application solution for self-assessment were modified and developed. The application solution enables the installation of

the program on the company's computers and thus the continuous process of self-assessment according to this methodology. In this way, the conditions for assessing the current position of the company and identifying its key strengths and areas of improvement are created. The following formula gives the mathematical form of the model for self-assessment:

$$R = \sum_{9}^{K=1} \sum_{m}^{S_K=1} S_K \cdot G \cdot \frac{W_K}{m} \qquad (5)$$

Where are:

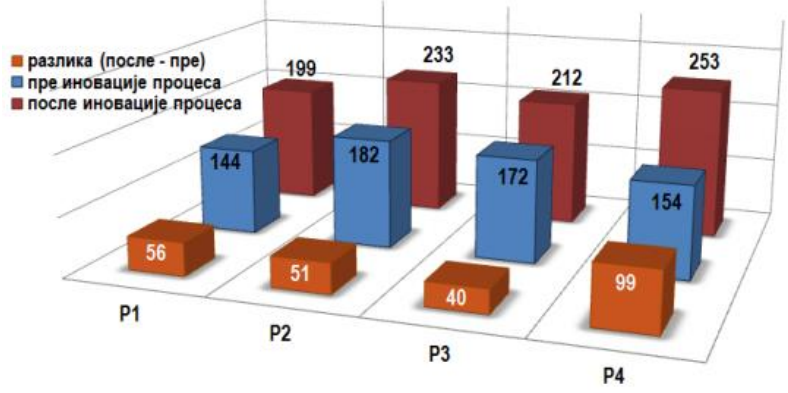
- K - main criteria of the method (from K1 to K9),
- SK - sub-criteria of each of the main criteria (from S1 to minimum S7 and maximum S9)
- WK - weighting coefficients for each of the main criteria (from W1 to W9 with values of 0.1 or 0.15),
- G - score of the subcriteria (from 0 to 4 where 0 brings 0%; 1 brings 25%; 2 brings 50%; 3 brings 75%; and 4 brings 100% of the points carried by the sub-criterion in accordance with the weight coefficient and the number of associated sub-criteria within the criteria).
- The database of the application solution was initially filled according to the requirements of EFQM 2013, but the users are left with the possibility of adapting and expanding the defined criteria, sub-criteria as well as the way of evaluation.

In addition to the numerical evaluation, each criterion also has descriptive comments related to a) existing advantages and b) areas of improvement of the company for the business segment to which the observed criterion refers. The program also supports the entry of these descriptive comments, but they were not taken into consideration during the analysis.

According to the defined EFQM 2013 model, evaluation is done according to each sub-criterion within each of the nine criteria. The review of results was realized with reports showing comparative results for two selected self-assessments. In this way, the progress of achieved business excellence is shown descriptively and numerically. For the purposes of analyzing the impact of QDMS on the process innovation process, the observed companies conducted a self-assessment before and after the implementation of innovative software solutions. The results are presented in graphic form a) individually by company and b) in summary.

In the case of individual radar diagrams, a comparative result before and after process innovation is given in percentage for each EFQM criterion. In the interpretation of the summary result, the value of points obtained according to the business excellence model EFQM 2013 is shown a) before the introduction of the process innovation, b) after the introduction of the process innovation and c) the achieved difference.

Figure 2. Summary results of self-evaluation according to EFQM



From the graphical interpretation of the obtained results, it is shown that the greatest relative progress of business excellence after the implementation of process innovation is shown by company P4, where QDMS was applied with the most extensive domain extension. The most even progress of business excellence was achieved at the company P2, which applies QDMS in its basic domain (QMS documentation management).

4. CONCLUSIONS

Innovations represent an important prerequisite for improving the competitiveness of small and medium-sized enterprises. It is difficult to imagine the growth and development of all, including SMEs in that context, without developed innovation activities, based on a firmly defined innovation process.

By presenting and considering the concept of TQM and business excellence, innovation was detected as the "fuel" of SME business excellence. In order for innovations to be realized, it is necessary that innovation, as a key attribute of SMEs, be woven into their business culture, vision, mission and strategies. This part of the work also initiated the creation of an original author's solution for the self-assessment of business excellence of SMEs according to the original EFQM 2013 methodology (the solution also allows the modification of metrics according to the specific needs of the organization that uses it).

In the continuation of the work, a) knowledge as a necessary resource for creating innovations, b) management of knowledge flows and c) the innovation process itself were discussed. The general conclusion is that SMEs must strive for an innovative approach to organizing, which assumes that the organization's innovative effort must encompass the entire process structure. Therefore, the organization's innovative culture and policy, as well as the ways in which they are implemented, represent the responsibility and obligation of all employees and assume their commitment to it. In order to realize this, IT infrastructure is needed as a carrier of codification, dispersion and concretization of knowledge and its focus on an efficient and effective innovation management process. QDMS (but now additionally extended to the domain of QMS draft management and functionally enriched with the paradigm of event-based management) is emerging as a sustainable and expedient solution for SMEs.

The proposed and developed model, methodology and specific proprietary software application solutions are presented in more detail in the paper through development steps, functional review and case studies of manufacturing companies.

The model was verified through analyzes conducted in four companies as four case studies of process innovation development. All the analyzed production organizations have introduced QMS according to the requirements of the ISO 9001 standard, which guarantees business according to the process approach and the existence of systematically organized business processes. One of the observed companies did not apply software-supported documentation management of QMS, while the other three companies used QDMS in basic or one of its extended forms.

At the beginning of the research of the problem, the basic hypotheses were defined and proved during the research.

Based on the defined methodology and metrics of EFQM 2013, a model for self-assessment of business excellence was developed. Based on the model, the application solution QSA (Quality Self Assessment) was developed. The solution enables the measurement of the achieved level of business excellence of the organization using the self-assessment method,

while also having flexibility; the originally applied EFQM 2013 metric can be adapted to the specific needs of an individual organization in order to apply it more effectively.

The obtained results of the analysis showed: The greatest relative progress of business excellence after the implementation of process innovation was achieved by the company where the proposed new QDMS solution was implemented with the most extensive domain extension. The company that implemented the proposed QDMS solution in its core domain (QMS documentation management) achieved the most consistent progress in business excellence after the implementation of process innovation.

The presented methodology, implementation and configuration of the proposed and developed new application solutions for managing the innovation process are flexible; practice shows that they can be successfully applied within the existing QMS and IT systems of manufacturing small and medium enterprises. In any case, the developed methodology, model and application solution, due to their topicality, provide a great opportunity for further improvements in a large number of different directions.

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