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Prospects for the Integration of the Kazakhstan Economy Into the Global Value Chain

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ABSTRACT

The study of the integration of the Kazakhstan economy into the global value chain remains extremely relevant and important in the modern world context. In the context of world globalization, economic and trade ties between countries are becoming increasingly close and complex. Kazakhstan, as a country with a geostrategically important location, must actively participate in global production and trade networks to ensure sustainable economic growth, as participation in global value chains helps the country increase its competitiveness and provide higher quality and innovative products. The purpose of studying the integration of the Kazakhstan economy into the global value chain is to identify industries, in particular industrial production and attracting investment in this industry, that have the greatest potential for integration into global chains and contribute to the greatest added value. Conclusions drawn from the constructed trend model for assessing investment activity for 2023-2024 highlight the importance of investment and its connection with the long-term strategic activity of the enterprise and integration into the global value chain

INTRODUCTION

Integration of the Kazakhstan economy into the global value chain represents an important strategic development direction that ensures sustainable and accelerated economic growth for this Central Asian country. In today's world, where the global economy is highly interconnected and interdependent, countries are actively seeking to participate in global production networks and create added value for their products and services. In this context, integration into the global value chain opens up broad opportunities for Kazakhstan to expand its economic potential and increase its competitiveness on the world stage. In this study, the author will consider the key aspects of this strategy and its impact on the development of the Kazakh economy:

- expansion of sales markets - integration allows Kazakhstan to diversify its exports and expand access to world markets, which helps to increase sales and income;
- technological exchange - participation in global value chains provides access to advanced technologies and best practices, which can improve productivity and product quality;
- attracting foreign investors becomes more likely when Kazakhstan actively participates in global chains, which contributes to the growth of production capacity and infrastructure;
- integration can lead to the creation of new jobs and the development of local competencies, which is a key factor for improving the lives of the population;
- risk tolerance - diversity of suppliers and markets can reduce dependence on individual economic factors and risks.

However, implementing this strategy also presents challenges and requires careful planning. For example, it is important to ensure compliance with quality standards and requirements of global markets, and to ensure balanced participation of all stakeholders in order to maximize benefits to the Kazakhstan economy. Technological progress and digitalization are facilitating integration into global value chains, which creates opportunities for Kazakhstan to participate in high-tech industries and apply advanced solutions.

Integration into the global value chain can be a powerful engine for economic growth, improving competitiveness and ensuring Kazakhstan's stability in the face of global change. This strategy requires constant monitoring and adaptation, but if successfully implemented, it could make Kazakhstan a more influential player in the global economy. Given these factors, research on Kazakhstan's integration into the global value chain is of great importance for the development of effective development strategies, ensuring sustainability and increasing the economic potential of this country on a global scale.

1. LITERATURE REVIEW

Achieving high competitiveness of the national economy and its integration into the global value chain, which implies a high level of professional training and motivation of employees, with a priority on the quality of human capital, is a new model of economic growth in Kazakhstan (Country strategy). This model of economic growth is focused on sustainable development and country's competitiveness in the global economy. It is also important to consider that the successful implementation of this model requires concerted efforts on the part of the government, the business sector and educational institutions, as well as transparent and stable rules of the game in the market.

The introduction of this model of economic growth is aimed at achieving development in different directions, which puts the quality of human capital at the forefront and involves the effective use of new technologies and digitalization to achieve high results and competitiveness at the global level (Rymarczyk, 2020):

- through technological industries;
- through export;
- through new industries and services.

High investment attractiveness is the main factor influencing the achievement of high and sustainable rates of socio-economic growth and contributing to the acquisition of competitive positions by companies. The problem of choosing from possible alternative solutions is not easy for decision makers and requires qualified justification (Kosova, 2020; Křenková et al., 2021).

Integrating the Kazakh economy into the global value chain through the provision of educational services may be a key factor for successful integration. Educational services can serve as a bridge between local society and global markets, helping a country participate in global value chains. Therefore, the development of education and the training of qualified personnel play an important role in this process. Recently, policies aimed at increasing academic achievement have been emphasized in many European countries, which is considered by such authors as Sorensen, Bloch, and Young, (2016), Menter, Lehmann, and Klarl (2018), initiative (Daraio et al, 2019), and performance-based financing mechanisms (Meoli et al., 2018; Lehmann et al., 2019; Ismayilov et al., 2022). The overall goal of these policy initiatives is directly or indirectly aimed at various levels of Lehmann and Stockinger (2019), innovation and entrepreneurship or university outcomes and productivity (Froehlich, 2016), as well as the higher education system and its socio-economic impact - improve.

Global value chains (GVCs) are shaping new realities in organizing production. Multi-component products are designed in one country, their components are manufactured in another, and they are assembled at the final destination. Today, two-thirds of global trade is in GVCs. In this regard, the World Trade Organization has proposed producing international trade statistics on a value-added basis to divide the value added to a product at each stage of the value chain among all participants (Akhtanova et al., 2019; Kot, 2023).

Kazakhstan uses its economic and strategic resources through a multi-vector approach to foreign policy. This framework is intended to view international relations in a "pragmatic and non-ideological" way. The globalization of markets, as well as increasingly unstable economic conditions and changes, imposes on companies the need to adopt strategies that not only provide them with a competitive advantage over other companies, but also, in addition to competitive advantages, contribute to increasing their sustainable development (Khediri, 2021; Kot et al., 2018; Zhidebekkyzy et al., 2023).

V. Zhuravlyov V. et al. (2019). an improved model has been proposed that determines the interdependence between the strategic management of investment policy and the sustainable economic development of a company, which represents an algorithm for managing the process of developing investment strategies in industry. Attention to the problem of sustainable development is constantly supported in the publications of foreign researchers (Karman, 2019). V. Strezov et al. (2012) and others outline the problems and propose solutions to justify the concept of sustainable development as an alternative to the concept of economic growth.

Due to the high rate of change in external factors that have a strong impact on subjects of production and economic activity, especially in the context of integration and globalization changes, enterprises are faced with the task of ensuring competitiveness in the international market (Halaskova et al., 2023; Lacko et al., 2023). The mechanism for coordinating the execution of tactical and strategic tasks of divisions of industrial enterprises in the context of diversification is built on the conditions of a flexible combination of modernized principles of managing the formation of personnel personnel and the transition to strategic and tactical plans that take into account the characteristics of industrial enterprises using the principles of diversification of production organization (Krasnikova et al., 2019). Thus, in modern conditions of economic integration and globalization, increased competition, and instability of consumer demand, enterprises need to use modern development strategies and models of interaction with other market participants to ensure financial and economic stability and reduce commercial risks, which, in turn, requires improved management.

2. RESEARCH METHODOLOGY

Integrating the Kazakh economy into the global value chain is of great strategic importance and can open up a number of prospects for the country (Figure 1).

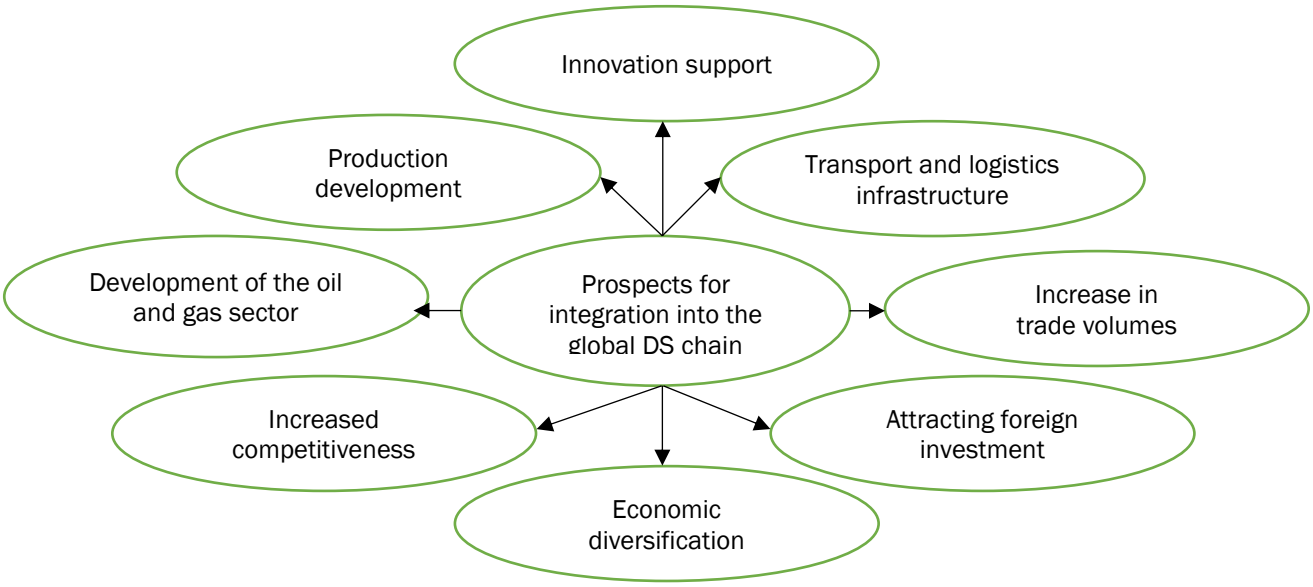

Figure 1. Prospects for the integration of the economy of Kazakhstan into the global value chain

Source: Compiled by the authors

Kazakhstan has vast reserves of oil and natural gas, and integration into global chains can help increase exports of energy resources and their products, which can generate significant revenues. Kazakhstan can develop the production and processing of raw materials and semi-finished products on its territory for further integration into global production chains. Integration into global chains can stimulate innovation and technological progress in the country, as it must meet international standards and requirements.

Successful integration requires modern transport infrastructure and logistics solutions, which contributes to the development of these sectors. Integration allows for increased exports and imports, which can contribute to the growth of national income. Participation in global chains can be attractive to foreign investors, which can stimulate economic growth.

Integration can reduce dependence on one or more industries and diversify the economy. Participation in global value chains requires increased competitiveness, which in turn contributes to the development of business and entrepreneurship.

However, for successful integration, Kazakhstan should take into account a number of challenges and risks, such as global competition, changes in the global economy, geopolitical factors and environmental problems. A clear strategy and government support are needed, as well as investment in human capital and education to prepare the workforce for new challenges and opportunities.

The integration of the Kazakhstan economy into the global value chain depends on many factors that can have both positive and negative impacts. Here are some of the main factors influencing this process (Table 1).

Table 1. Main factors influencing the process of integration of the economy of Kazakhstan into the global value chain

№	*Factor*	*Integration process*	*Prospects*
1	Energetic resources	Kazakhstan has vast reserves of oil and natural gas	integration into global chains for the production and export of energy resources and their processing
2	Trade policy	trade policy, including the conclusion of international agreements and customs barriers	may have a significant impact on global market access and integration opportunities
3	Infrastructure and logistics	developed transport and logistics infrastructure is a key factor for successful integration	The presence of modern ports, roads, railways and logistics centers improves access to global markets
4	Investments and financing	attracting foreign investment and having access to financial resources	contribute to the development of production and export of goods and services
5	Technology and Innovation	introduction of modern technologies and innovations	helps improve product competitiveness and increase participation in global chains
6	Quality of institutions	strong and effective institutions, including law enforcement and intellectual property protection	contribute to improving the investment climate and integration
7	Education and qualifications of the workforce	availability of qualified personnel capable of working in modern production	plays an important role in successful integration
8	Geopolitical factors	geopolitical situation and relations with neighboring countries	may affect access to global markets and trading opportunities
9	Environmental requirements	compliance with world standards for ecology and sustainability	may be an important condition for integration into some global chains
10	Competition	competition with other countries and regions for access to global markets	may influence the success of integration

Source: Compiled by the authors

The successful integration of Kazakhstan into the global value chain depends on a competent strategy, effective management and taking into account all of the above factors. Such integration can contribute to economic growth, economic diversity and increased competitiveness of the country. Considering the versatility of this study, the author focused on investing in the green economy, which is one of the development trends in the global community, and many countries are already taking measures to transition to the use of renewable energy sources (Figure 2).

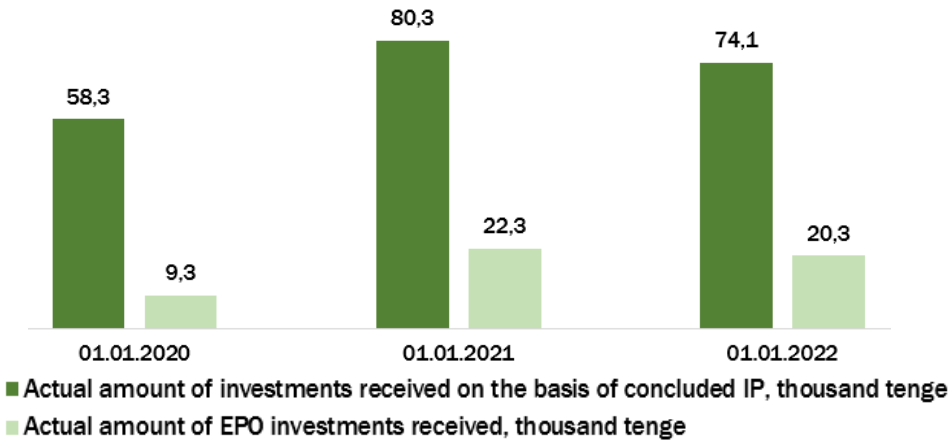

Figure 2. EPO investments received for 2019-2021.

Source: Compiled by the authors according to https://view.officeapps.live.com/

In Kazakhstan, investments are being made in the field of renewable energy sources, energy-saving technologies and energy efficiency, as well as investments aimed at environmental protection activities (Figure 3).

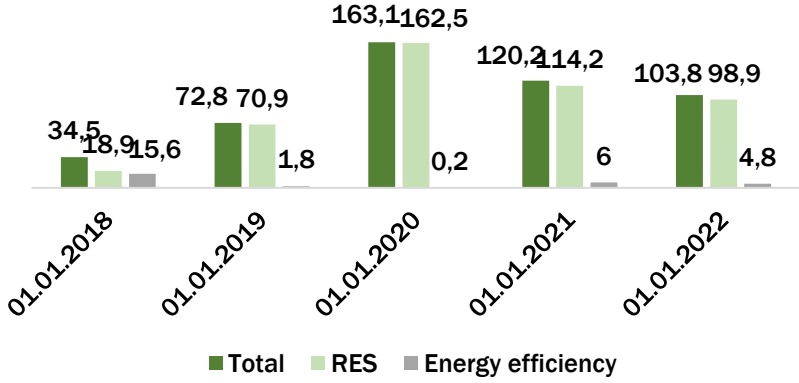

Figure 3. Investments in the "green" economy of Kazakhstan, billion tenge

Source: Compiled by the authors according to https://www.pwc.com/

The need to achieve green growth requires not only effective coordination between government authorities, national and international investors, but also broad participation of society and the integration of the economy of Kazakhstan. Currently, energy indicators are actively integrated into environmental and economic assessments, while for energy efficiency analysis it is important to take into account the impact on the economic, social and environmental spheres of activity (Matraeva et al., 2017; Sansyzbayeva et al. 2020; Gasimov et al., 2023). Taking into account modern trends and the current macroeconomic conditions for the functioning of industries, it is necessary to improve the processes and management mechanisms to integrate the economy into the global value chain, as well as create competitive products. Assessing the competitiveness of an economy involves many aspects, and new theoretical approaches seek to take into account the wide range of factors that influence a country's ability to compete successfully on the world stage. According to the results of the 2023 study, the Republic of Kazakhstan took 37th place with a score of 66.11 points, rising six points compared to the 2022 ranking. Kazakhstan is ahead of countries such as Kuwait (38th place), Portugal (39th place) and India (40th place). In terms of the "Economic Activity" factor, Kazakhstan took 57th place, moving up one position (Figure 4).

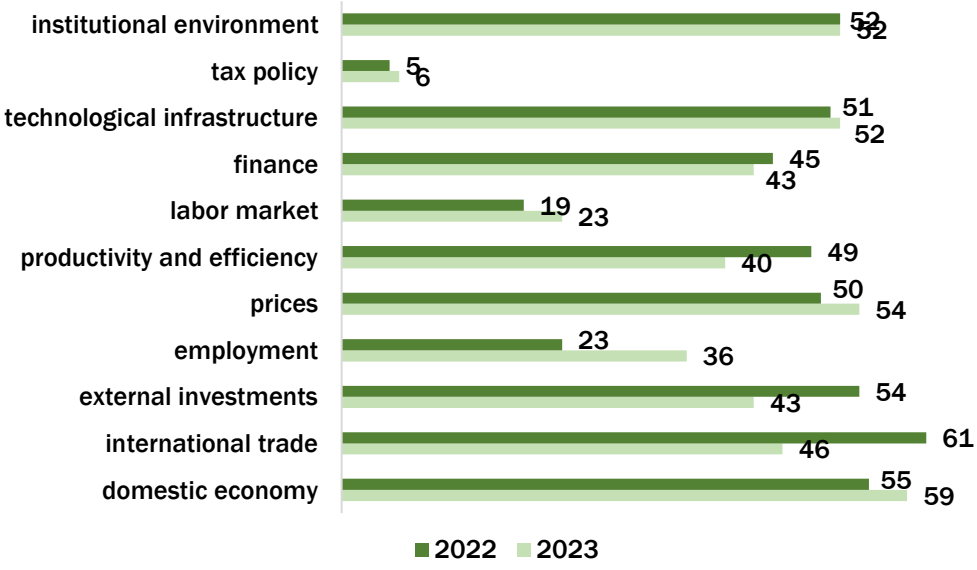

Figure 4. Kazakhstan's position in the world competitiveness ranking for 2022-2023

Source: Compiled by the authors according to https://www.zakon.kz/

3. ANALYSIS AND RESULTS

Investment support from the state and other interested structures is an important factor for stimulating the growth and development of large enterprises. Providing financial and tax benefits, supporting innovative projects and initiatives, as well as creating a favorable investment climate help attract investment and strengthen the position of large companies in the market and, accordingly, the competitiveness of the economy. The concept of strategic entrepreneurship indicates that the integration of capabilities and profit-seeking behavior will lead to innovation. Countries that implement effective innovation policies and appropriate support measures demonstrate a high level of economic development, achieving a level of competitiveness in various sectors of the economy.

The task of integrating scientific activity and the educational process at all levels of higher and postgraduate education is of great importance. At the same time, the common link in which integration processes in the field of science, education and production are intertwined is the university. Being a subsystem of the global social system, education is influenced by innovative and integration changes in the structure, content and implementation of its main functions. The education system reflects the socio-economic relations of society and, on the one hand, is influenced by the processes of social reforms, and on the other, is a stimulus for the innovation process itself.

The project of the Ministry of Education and Science of the Republic of Kazakhstan "Productive Employment" includes systemic measures to organize personnel training, taking into account the new structure of employment, which involves improving the quality of education in universities and technical and vocational training through the modernization of programs, personnel composition and MTB (Figure 5).

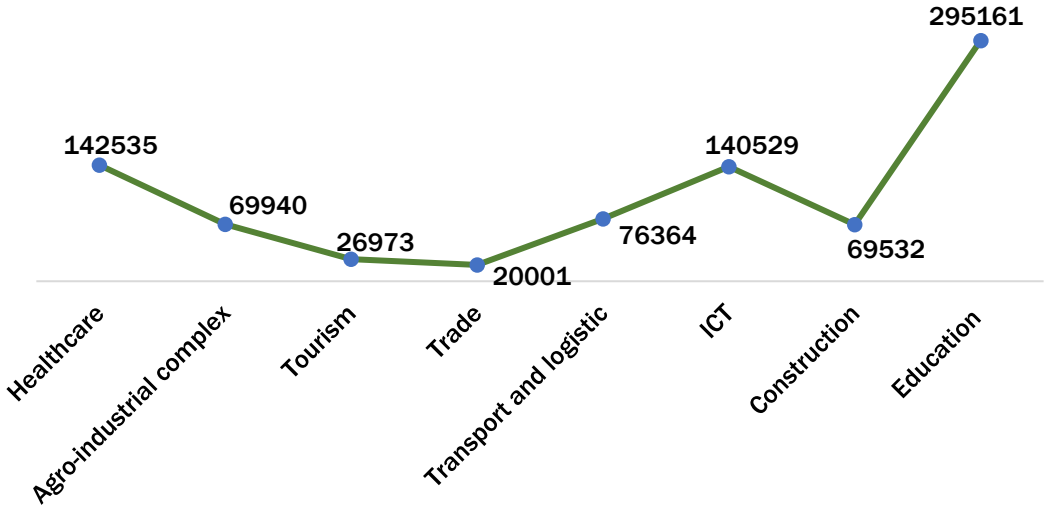

Figure 5. Forecast indicators of the number of graduates of universities and colleges by 2021-2025

Source: Compiled by the authors according to Project of the Ministry of Education and Science of the Republic of Kazakhstan "Productive Employment" for 2021-2025

Assessing the sectoral competitiveness of the economy of Kazakhstan is an important tool for determining the current state and development potential of industries and regions of the country, allowing one to determine the extent to which industries are able to compete in the international market and attract investment. The assessment of regional competitiveness, in turn, focuses on the characteristics of each region and its potential for attracting investment and development and includes an analysis of such factors as the availability of infrastructure, the availability of a qualified workforce, entrepreneurship development, and the availability of resources:

– firstly, in the context of global economic integration and competition, countries are faced with the need to develop competitive industries that can compete in the international market and attract investment;

– secondly, competitiveness is important for balancing economic development and attracting investment in various regions of the country, allowing for the development of targeted development strategies and attracting resources to achieve competitive advantages;
– thirdly, assessing industry competitiveness helps to determine the factors influencing the success of the economy of Kazakhstan as a whole.

Competitive sectors, including industry, play a key role in the integration of the Kazakhstan economy into the global value chain, and influence this process:

– Attracting investments. Competitive industries attract more foreign and domestic investment. Investors are looking to invest in sectors that have high potential for growth and profit.
– Development of trade. The production of competitive goods and services can help increase exports, which is a key element for integration into global markets and value chains.
– Technological progress. Competitive industries are required to innovate and implement modern technologies and production methods, which contribute to increased efficiency and competitiveness.
– Development of local suppliers. Developed industries can become demand areas for local suppliers and contractors, facilitating their integration into global chains.
– Job creation. Competitive industries create new jobs, which can reduce unemployment and promote economic growth
– Development of human capital. Competitive industries require skilled workers, which facilitates training and development.
– Improving the quality of products and services. Competitive industries are required to maintain high quality products and services, which strengthens their position in global markets.
– Attracting new partners and clients. Competitive companies can attract new international partners and clients, which helps expand their business and network of contacts.

Industry is a key source of export earnings for many countries, which helps strengthen their economic position in the global market. Especially in the context of globalization and competition, countries that actively develop their industry and provide it with investment support can strengthen their position on the world stage. Analysis of industrial production in the Republic of Kazakhstan allows us to obtain information about the state and development trends of this sector of the economy. It is an essential tool for making economic policy decisions, developing development strategies and improving the competitiveness of the industrial sector (Figure 6).

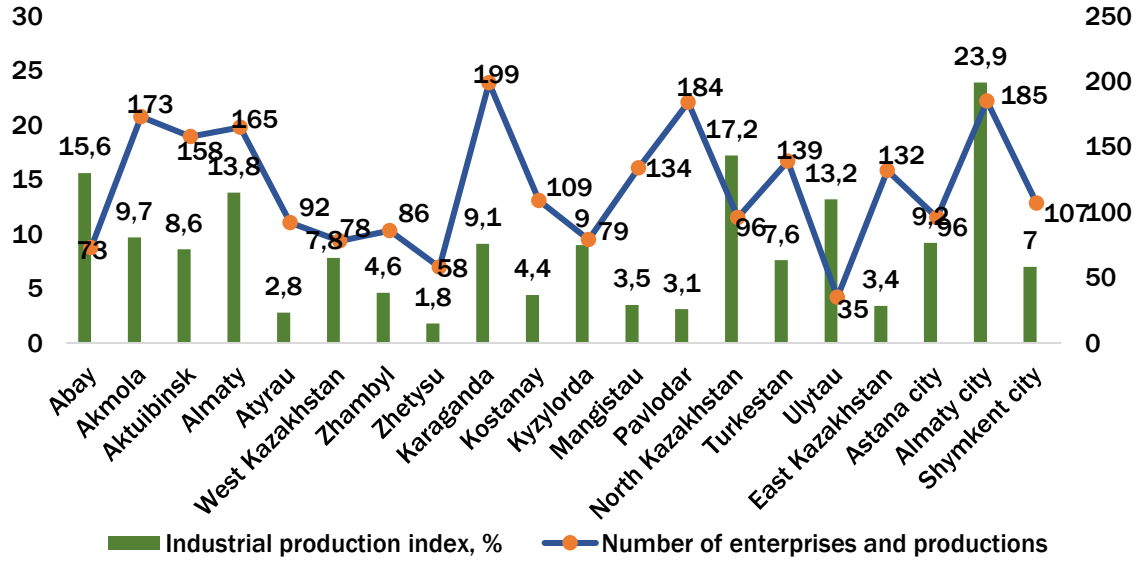

Figure 6. Indicators characterizing industrial production in the regional aspect for 2022

Source: Compiled by authors according to https://www.stat.gov.kz

To accelerate integration into the global value chain, Kazakhstan must continue to develop and maintain its competitive industries, closely monitor changes in the global economy, and strive to diversify its economy. It is also important to create a favorable investment environment and ensure stability in the legal and economic sphere. Industrial enterprises must develop clear tactical and long-term goals so that indicators of the volume of products (goods and services) tend to increase.

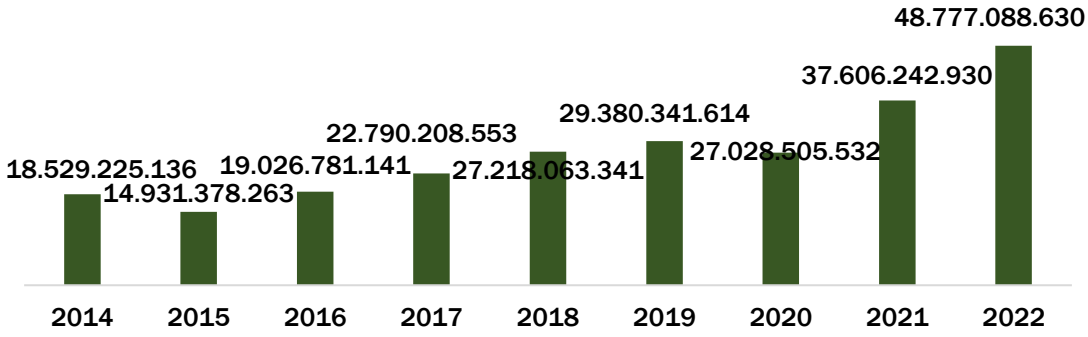

Figure 7. Volume of industrial production by regions of the Republic of Kazakhstan

Source: Compiled by authors according to https://www.stat.gov.kz

Industrial companies of the Republic of Kazakhstan, in the conditions of fierce competition and a rapidly changing situation, must not only focus on the internal state of affairs, but also develop a long-term strategy that would allow them to keep up with the changes occurring in their environment and promote the further development of industrial production in order to integrate into the global one value chain. High investment attractiveness is the main factor influencing the achievement of high and sustainable rates of socio-economic growth and contributing to the acquisition of competitive positions by companies (Table 3).

Table 3. Share of regions in investments in fixed capital, %

Region	*Share in investments 2020 %*	*Share in investments 2021 %*	*Changes, %*	*Increase in total investment in fixed capital in the regional aspect as of 2022*
Akmola	2,6	3,5	0,9	39
Aktuibinsk	4,8	5,2	0,4	15
Almaty	5,1	5,5	0,4	16
Atyrau city	34,6	26,9	-7,7	-1
West Kazakhstan	4,7	3,8	-0,9	10
Zhambyl	2,3	2,8	0,5	4
Karaganda	6,4	5,5	-0,9	-23
Kostanay	2,3	2,7	0,4	19
Kyzylorda	3,2	2,4	-0,8	23
Mangistau	4,4	4,7	0,3	5
Pavlodar	3,9	3,9	0	60
North Kazakhstan	1,9	2,3	0,4	-2
Turkestan	3,5	5,7	2,2	-35
East Kazakhstan	4,9	5,8	0,9	15
Astana city	7,3	9,1	1,8	9
Almaty city	6,5	7,9	1,4	31
Shymkent city	1,6	2,3	0,7	139

Source: Compiled by authors according to https://www.stat.gov.kz

4. APPLICATION FUNCTIONALITY

As of 01.01.2022 the total volume of investments amounted to 13.2 trillion tenge, which is 7.3% more than the volume as of 01.01.2021. The level of investment in fixed assets amounted to 16.5% of GDP. To assess the forecast values of the investment activity indicator (million tenge) for 2023-2024. A trend model was built, consisting of the following initial data:

A) Time series analysis to detect anomalous observations:

$$\lambda_t = \frac{|y_t - y_{t-1}|}{\sigma_y}, \quad t = \overline{2,11}$$

Observed value of Irwin standard

Irwin standard critical value $\lambda_{0,05} = 1{,}5$

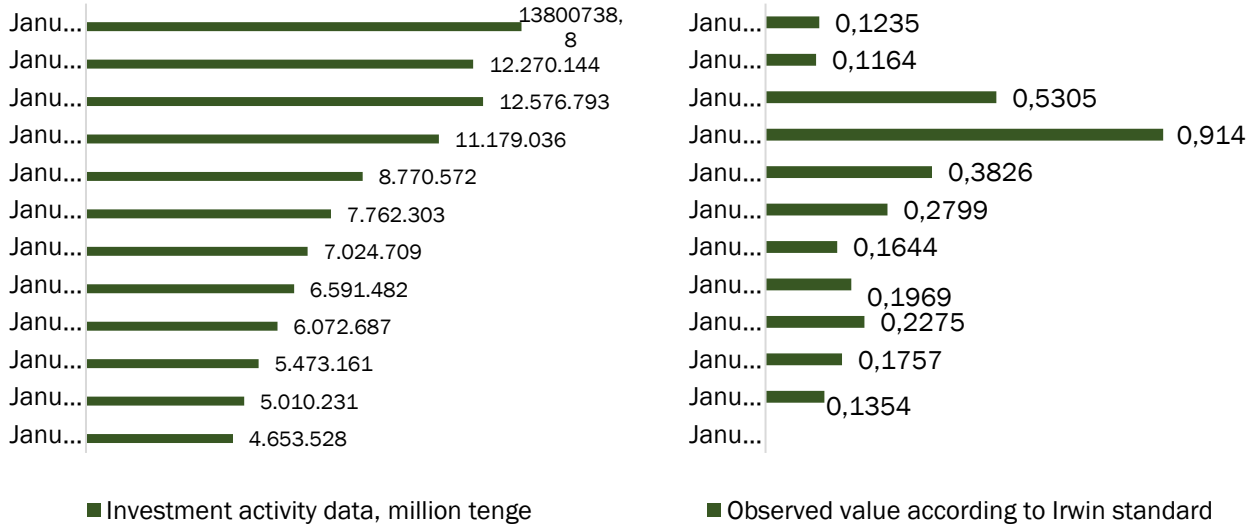

Figure 8. Time series analysis to detect anomalous observations

Source: Compiled by the authors

During the analysis, it was revealed that the probability that all values of the Irvine criterion are less than the critical level is 95%.

B) Checking for a trend:

$\nu(n) > \left[\frac{2n-1}{3} - 1{,}96\sqrt{\frac{16n-29}{90}}\right]$, results with probability of error - 2< 4

$K_{\max} < [K_0(n)]$, results with a possibility of error 9> 5

1) Substituting into the formula $y_t = a_0 + a_1 t + \varepsilon_t$ value, a trend model was obtained: $y_t = 2\,924\,047{,}236 + 836\,668{,}582t$

2) Results of the analysis of the suitability (adequacy) of the model:

- with the obtained value 4 > 3 the limit is 3, with the peak criterion being $p > \left[\frac{2}{3}(n-2) - 1{,}96\sqrt{\frac{16n-29}{90}}\right]$ which indicates the adequacy of the constructed model;

- with the obtained value 3,17 the border is from 2,80-3,91, wherein RS- criterion $RS = \frac{e_{\max} - e_{\min}}{S}$ which indicates the adequacy of the constructed model;

- with the resulting value 0, the limit is 2,23, wherein *t*-Statistic Student's $t_{observ.} = \frac{|\bar{e}|}{S}\sqrt{n}$ which indicates the adequacy of the constructed model.

The model is quite accurate and suitable for use in forecasting $E_{rel.} = \frac{1}{n}\sum_{i=1}^{n}\frac{|e_t|}{y_t}\cdot 100\% = 8{,}45\%$,

2) Variable values $t = n + k$, necessary for further calculations at the significance level $\alpha = 0{,}05$

.

$$U(k) = S_e t_\alpha \sqrt{1 + \frac{1}{n} + \frac{(n + k - \bar{t})^2}{\sum_{t=1}^{n}(t - \bar{t})^2}}$$

C) Obtained forecast result (Figure 9):

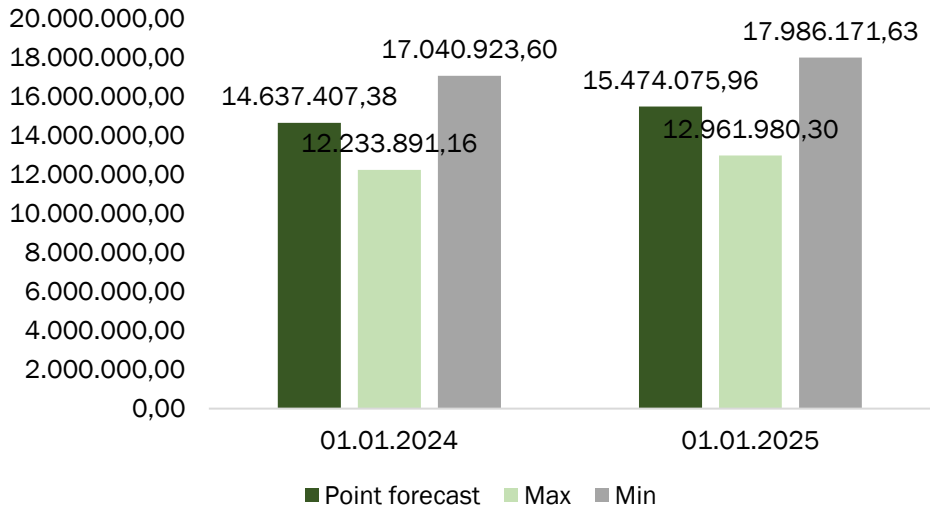

Figure 9. Forecast of investment activity for 2023-2024, million tenge

Source: Compiled by the authors

The investment process is part of the strategic activities of the business unit and is aimed at the long-term development of the enterprise, as well as the possibility of integration into the global value chain.

In terms of country, the largest volume of investments came from the Netherlands - $8.3 billion, followed by the USA - $5.1 billion, and Switzerland in third place - $2.8 billion (Figure 10).

The trend model indicates that the investment activity of the enterprise is aimed at long-term development. This demonstrates a strategic approach to investment and a focus on creating a sustainable and successful organization. The fact that investments are planned for the period 2023-2024 underlines the company's desire to integrate into the global value chain. This may include modernizing production processes, developing new products or services, and strengthening positions in global markets.

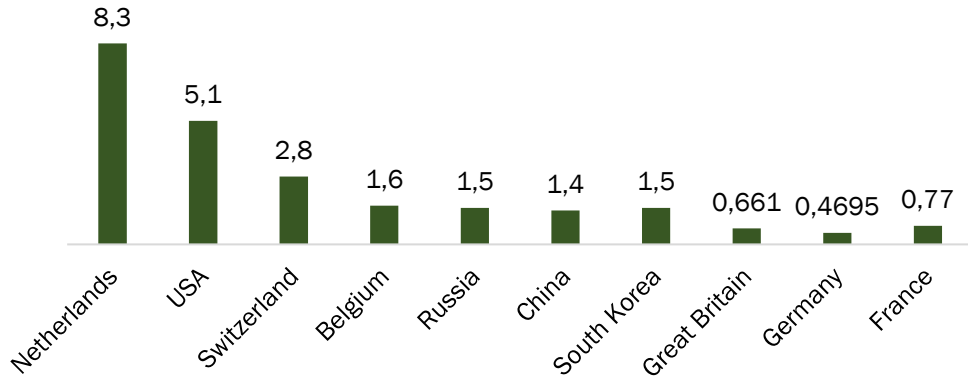

Figure 10. Top 10 investor countries in 2022, billion US dollars

Source: Compiled by the authors

It is important to note that the investment process is part of the strategic activities of the business unit. This indicates the need for systematic investment management, taking into account their contribution to the long-term goals of the enterprise. The trend model can serve as a starting point for monitoring and evaluating the implementation of investment projects. Regularly tracking and analyzing the results of investments will help ensure that they are aligned with strategic goals and adjust plans if necessary.

In general, the analysis of the trend model of investment activity for 2023-2024 indicates the importance of investment as a strategic tool for achieving the long-term goals of the enterprise and its integration into global economic processes.

CONCLUSION

Integrating Kazakhstan's economy into the global value chain represents a strategically important effort that has the potential to bring significant benefits to the country. Integrating the Kazakhstan economy into the global value chain is a strategic goal that can bring many benefits to the country:

- Competitive sectors, including oil and gas, industry and education, play a key role in integration. They attract investment, promote trade and technological progress.
- Educational institutions play an important role in preparing the qualified personnel needed to participate in global chains. Specialized programs and international partnerships contribute to the development of human capital.
- Attracting investment and developing transport and logistics infrastructure are integral elements of successful integration.
- The development of local suppliers and contractors in competitive industries facilitates the integration and participation of their products in global chains.
- Compliance with world standards in the quality of products, services and living standards of the population is an important condition for successful integration.
- To reduce dependence on individual industries and risks, it is necessary to diversify the economy and create new promising sectors.

Geopolitical stability and environmental compliance also play an important role in integration.

Given these factors, the integration of Kazakhstan's economy into the global value chain can contribute to economic growth, economic diversity and increased competitiveness of the country. This process requires careful management, strategic planning and consideration of many variables to achieve the desired results. However, to successfully implement this strategy, Kazakhstan needs to:

- continue to invest in the development of human capital;
- improve infrastructure;

- create a favorable business environment and support innovation;
- ensure socio-economic sustainability and equal distribution of benefits from integration for all segments of society.

Overall, integration into the global value chain represents a powerful mechanism for achieving sustainable economic growth and prosperity for Kazakhstan in the global economy.

Integration into the global value chain:

- will help Kazakhstan increase the competitiveness of its goods and services on the world market, promoting export growth and increasing income.
- will diversify the country's economic structure, which will make it less dependent on one market or industry, promoting sustainability in the face of global economic fluctuations.

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