Макроэкономические факторы промышленного роста в Республике Казахстан: анализ взаимосвязей и тенденций

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КЛЮЧЕВЫЕ СЛОВА.

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АННОТАЦИЯ.

В условиях нестабильной внешнеэкономической конъюнктуры, геополитических вызовов и продолжающихся структурных преобразований в экономике Казахстана всесторонний анализ факторов, определяющих промышленный рост и устойчивость производственного сектора, имеет особое значение. Целью исследования является выявление характера, направленности и силы взаимосвязей между промышленным производством и ключевыми макроэкономическими детерминантами, что позволяет нам определить приоритетные направления промышленной политики. Эмпирическая база исследования основана на официальных статистических данных за 2000-2024 годы, что обеспечивает репрезентативность и достоверность выводов. Методологический подход основан на корреляционном и трендовом анализе, а также SWOT- и PEST-диагностике, что позволило охватить как количественные, так и качественные аспекты влияния инвестиционной, экспортной, трудовой и институциональной составляющих на динамику промышленности. Результаты исследования показали, что наибольшее положительное влияние на промышленное производство оказывают государственные субсидии (коэффициент корреляции 0,7592), уровень заработной платы (0,7126), валовой выпуск товаров и услуг (0,6587) и валовое накопление (0,6552). Чистый экспорт имеет умеренную положительную корреляцию (0,6463), в то время как инвестиции в основной капитал демонстрируют слабую текущую корреляцию (0,092), что указывает на вероятный отложенный эффект. SWOT-анализ выявил сильные стороны отрасли, включая богатую ресурсную базу и значительную государственную поддержку, а также слабые стороны, связанные с зависимостью от ресурсов и технологическим отставанием. PEST-анализ подтвердил высокую чувствительность промышленного сектора к нестабильности цен и валютных курсов. Сделан вывод о необходимости комплексного применения инвестиционных, фискальных и институциональных инструментов, направленных на стимулирование устойчивой индустриализации, ускорение технологического обновления и укрепление международной конкурентоспособности казахстанской промышленности.

Introduction

The industrial sector of Kazakhstan is a key part of the country's economic system. Its development directly affects the growth rate of GDP, the level of employment and the quality of the economic structure. At the same time, industry simultaneously acts as a source of stability and a zone of vulnerability of the economy. Maintaining and increasing its potential requires a systematic understanding of the factors that determine the dynamics of production.

The modern global economy is characterized by a high degree of uncertainty. Global markets are unstable, and fluctuations in commodity prices are becoming more pronounced. Disruptions to supply chains caused by geopolitical and technological changes are creating new barriers to industrial growth. For Kazakhstan, which accounts for a significant part of its industrial exports in raw materials, these factors pose a particular threat.

The relevance of the study is determined by the fact that in conditions of high external dependence, the industrial sector remains sensitive to global shocks and currency fluctuations. This is compounded by structural limitations, such as low production diversification, technological backwardness, and limited opportunities for rapid modernization. Without an accurate understanding of which macroeconomic factors have the greatest impact on industrial growth, it is impossible to form an effective long-term development strategy. In such a situation, mistakes in economic policy priorities can lead to a loss of competitive advantages, increased vulnerability, and a weakening of the country's position in international markets.

Internal conditions are also not always conducive to accelerating industrial modernization. The wear and tear of production facilities in many industries exceeds acceptable levels, which constrains labor productivity. The innovative activity of enterprises remains at a limited level. High dependence on external demand and narrow diversification of the export basket increase macroeconomic risks.

The socio-economic environment creates additional pressure. Inflationary processes and instability of the national currency increase the costs of enterprises. The shortage of qualified personnel, especially in the engineering and technical field, makes it difficult to introduce modern technologies and automate production processes.

Under these conditions, a scientific problem is emerging related to the lack of certainty in assessing the impact of key macroeconomic factors on industrial growth. Existing approaches produce scattered results, and the impact of individual factors manifests itself with a time lag, which complicates the development of timely regulatory measures.

The lack of a single scientifically based model for assessing the relationship between industrial production and parameters such as investment, exports, wages, government subsidies, and gross savings creates risks for long-term planning. Without a comprehensive understanding of these relationships, it is impossible to form an effective industrial policy capable of adapting to changing conditions of the external and internal environment.

Thus, the need for an in-depth study of the macroeconomic determinants of industrial growth is dictated by both external challenges and internal constraints. Solving this scientific problem will allow us to develop tools aimed at sustainable industrialization, increasing the technological level and strengthening the competitiveness of Kazakhstan's industry in the long term.

LITERARY REVIEW

The problems of financial and investment aspects in the context of innovative development are widely represented in modern scientific literature. Numerous studies point to a close relationship between financial literacy, innovation, and sustained economic growth. It is especially important to consider these issues in the context of industrial development, where innovation becomes a catalyst for production efficiency and increased competitiveness.

Research highlights the role of innovation, finance, and sustainable development as key areas influencing macroeconomic indicators such as economic growth, employment, productivity, and investment activity. The innovative transformation of the financial system, including digitalization, financial technologies, and the development of investment infrastructure, is considered as the basis for the transition to a sustainable model of industrial growth.

The works of such authors as Melnyk et al. (2021, 2022), Hrytsenko et al. (2021), Huseynova & Huseynov (2023), focus on the regional heterogeneity of innovative development and the need for integrated management solutions. It is taken into account that coordinated actions by the government, business and the scientific and educational environment are necessary to activate innovation activity (Sotnyk, 2012; Shkarupa et al., 2022).

The digital economy is considered as the basis of modern industrial transformation. Chen et al. (2023), Pakhnenko & Kuan (2023) highlight the impact of digital innovations on public administration, financial services development, and ethical challenges of digitalization. In turn, Oloveze et al. (2022), Didenko et al. (2022) explore the development of innovations in healthcare, including issues of financing and accessibility.

A number of studies (Liu, 2023; Kaya et al., 2023; Njegovanović, 2023) raise issues of integration of financial technologies (fintech), technological innovations and transformation of investment policy. Considerable attention is paid to intellectual property, international cooperation, marketing, and educational aspects (Samoilikova & Artyukhov, 2023; Yu et al., 2023; Nahla, 2023).

A special place is occupied by the analysis of cause-and-effect relationships between investments, financial development and the level of innovation activity. Leonov et al. (2012), Pradhan et al. (2018), Islam et al. (2018) and others emphasize the need to form a sustainable financial policy aimed at stimulating innovation and increasing economic efficiency. It is noted that there is a need to eliminate financial imbalances and strengthen the role of fiscal policy (Voznyak et al., 2021).

The formation of an effective investment environment requires an analysis of investment attractiveness, the development of innovation financing institutions, including pension and venture funds, as well as specialized banks (Kolodiziev, 2021; Moskalenko et al., 2022; Kozmenko & Vasyl'yeva, 2008).

The purpose of this study is to identify the cause-and-effect relationships between financial and investment indicators and the level of innovation development in the leading countries on the Global Innovation Index and the Republic of Kazakhstan, with an emphasis on the industrial sector.

Summarizing the results of existing research, it can be concluded that industrial development is the result of the complex impact of economic, technological, institutional and social factors. Their integration into government policies and corporate strategies determines the economy's ability to adapt to the challenges of the global environment.

The purpose of the study is to identify and quantify the key macroeconomic factors determining the dynamics of industrial production in the Republic of Kazakhstan, taking into account institutional, investment and technological conditions.

Research hypotheses:

H1: Government subsidies have a sustained positive impact on industrial production.

H2: Investments in fixed assets have a positive deferred effect on industrial growth.

H3: Wages are positively linked to industrial output through stimulating domestic demand.

H4: Net exports have a variable impact depending on the external economic environment.

METHODS

The official statistical data of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan (Bureau of National Statistics) for 2000-2024 were used for the analysis. These data ensure the

reliability, regularity of updates, and representativeness of the sample.

The study includes the following macroeconomic indicators: the volume of industrial production in value terms; investments in fixed assets;

net exports; wages in the income generation account; subsidies for production and imports; gross fixed capital formation.

All indicators are shown at comparable prices using deflators to exclude the impact of inflation.

The examination procedure includes several stages.

Stage 1. Trend analysis.

At the first stage, the dynamics of time series of indicators was studied. Tables of annual values were constructed to determine: steady growth; periods of volatility; cyclical; acceleration or deceleration phases.

Stage 2. Correlation analysis.

Next, the Pearson paired linear correlation method was applied. It allows you to determine the direction and strength of the relationship between variables, provided that the distribution is normal and the dependence is linear. The dependent variable was the volume of industrial production, while the independent variables were investment, net exports, wages, subsidies, and gross savings.

The calculations were based on annual data.

Stage 3. SWOT analysis.

Based on statistical data and expert assessments, the strengths and weaknesses of the industrial sector, as well as external opportunities and threats, have been identified. A SWOT matrix has been compiled that integrates internal and external development factors.

Stage 4. PEST Analysis.

The structuring of political, economic, social and technological factors affecting industrial production has been carried out. This stage was based on the principles of strategic monitoring of the macro environment.

Stage 5. Diagnosis of problems and formation of recommendations

The final stage included the systematization of the identified barriers to sustainable growth: insufficient investment efficiency; lagging technological modernization;

foreign trade imbalances; institutional constraints.

Based on the results, recommendations have been developed to overcome them.

The integration of quantitative analysis methods (trend and correlation) with strategic diagnostic tools (SWOT, PEST) made it possible to comprehensively assess the impact of macroeconomic factors on the development of Kazakhstan's industry. This approach ensured both the statistical validity of the conclusions and their practical applicability.

RESULTS

The analysis revealed a number of objective relationships between macroeconomic indicators and the volume of industrial production in the Republic of Kazakhstan. The processing of statistical data presented in Table 1 and Table 2 confirmed the presence of stable trends and logical relationships significant for assessing the country's industrial potential.

The following results were found:

– the volume of industrial production demonstrates stable positive dynamics;

– fixed capital investments have a weak current relationship with industrial output ($r = 0.1092$);

– net exports have a moderately strong positive effect on industrial output ($r = 0.6463$);

– remuneration positively correlates with industrial growth ($r = 0.7126$), reflecting the impact of consumer demand and employment;

– gross economic output is closely related to industrial production ($r = 0.6587$);

– gross capital formation also shows a stable relationship with output ($r = 0.6552$);

– employment in the «industry and construction» sector has little impact ($r = 0.2293$), which may indicate an increase in labor productivity or automation;

– subsidies for production and imports have a pronounced positive impact on output ($r = 0.7592$).

Trend analysis made it possible to record a steady increase in wages, gross output, gross savings and subsidies, which together creates favorable conditions for industrial growth. At the same time, the volatility of net exports due to foreign economic factors remains.

The weak short-term correlation between investment and output deserves special attention, which requires taking into account time lags in assessing investment efficiency. Subsidies have proven effective as a support tool: their growth is clearly accompanied by an increase in industrial production. The growth of wages forms not only social stability, but also stimulates domestic demand.

The identified dependencies confirm the importance of the integrated impact of macroeconomic regulators on industrial dynamics. The results obtained can serve as the basis for: improving the effectiveness of investment policy; improving subsidy instruments; stimulating export-oriented production; balanced employment planning and technological modernization of the industry.

Thus, the data of Tables 3 and 4 objectively prove that the growth of industrial production requires not only an increase in investment, but also the coordinated action of fiscal, export and institutional mechanisms.

Table 1 - Analysis of the dynamics of the volume of industrial production (goods, services), investments in fixed assets, net exports and wages in Kazakhstan

Indicator:	The volume of production of industrial products (goods, services), in value terms	Investments in fixed assets	Net exports	Remuneration in the income generation account
Unit of measurement:	Thousands of tenge Kazakh	Thousands of tenge Kazakh	Million tenge Kazakh	Million tenge Kazakh
KSP code (Classifier of Statistical indicators):	15110101	161101	111108	111301
Periodicity:	Year	Year	Year	Year
Classifications:	Regions:REPUBLIC OF KAZAKHSTAN, Types of economic activity: Industry	Type of locality and administrative division:Total, The size of legal entities, branches and representative offices, as well as individual business entities by the number of employees:Total, Types of costs in the volume of investments in fixed assets:Total	Classifications: Regions:REPUBLIC OF KAZAKHSTAN	Classifications: Regions: REPUBLIC OF KAZAKHSTAN
Region				
REPUBLIC OF KAZAKHSTAN				
2009	9.121.524.692	-	1.345.437,1	5.765.398,7
2010	12.105.526.379	-	-	7.492.514,9
2011	15.929.051.568	-	-	9.225.682,3
2012	16.851.774.700	-	-	10.133.606,0
2013	17.833.994.143	-	-	11.060.875,8
2014	18.529.225.136	-	5.440.144,5	12.474.013,6
2015	14.931.378.263	-	1.628.696,0	13.161.352,4
2016	19.026.781.141	7.762.302.972	1.585.830,9	14.253.989,5

Indicator:	The volume of production of industrial products (goods, services), in value terms	Investments in fixed assets	Net exports	Remuneration in the income generation account
2017	22.790.208.553	8.770.572.291	4.334.058,8	16.610.443,3
2018	27.218.063.341	11.179.036.042	7.246.783,0	18.825.518,4
2019	29.380.341.614	12.576.793.455	5.576.070,0	21.199.133,2
2020	27.028.505.532	12.270.144.010	2.848.124,8	22.038.361,4
2021	37.606.242.930	13.242.233.420	7.237.563,5	26.151.537,8
2022	48.777.088.630	15.251.104.090	15.361.139,2	31.556.468,9
2023	46.991.786.662	17.649.312.955	8.321.390,4	36.821.377,3
2024	51.469.083.552	19.461.332.759	8.219.347,6	42.403.123,3

Table 2 – Analysis of the dynamics of gross output, gross accumulation, subsidies for production and imports, employed population in the group «industry and construction» in Kazakhstan

Indicator:	Gross output in the account of goods and services	Gross accumulation	Subsidies for production and imports	Employed population in the industry and construction group
Unit of measurement:	Tenge Kazakh	Million tenge Kazakh	Million tenge Kazakh	Person
KSP code (Classifier of Statistical indicators):	111101	111106	111306	25120104
Region				
REPUBLIC OF KAZAKHSTAN				
2009	30.746.805.500.000,0	5.002.725,3	25.989,4	1.473.108
2010	-	-	60.484,8	1.518.590
2011	-	-	80.340,3	1.574.342
2012	-	-	97.924,3	1.648.876
2013	-	-	91.525,0	1.699.117
2014	61.860.129.600.000,0	10.232.495,4	116.315,0	1.768.677
2015	63.958.086.200.000,0	11.409.909,5	122.810,6	1.773.186
2016	74.731.304.600.000,0	13.070.935,7	143.451,8	1.766.257
2017	95.418.867.600.000,0	14.330.178,9	188.984,9	1.704.443
2018	102.753.424.600.000,0	15.614.509,7	164.369,2	1.726.869
2019	111.674.103.000.000,0	19.210.178,5	206.349,3	1.730.504
2020	109.694.845.800.000,0	20.351.807,2	248.281,8	1.720.083
2021	141.092.181.200.000,0	22.275.240,5	305.616,4	1.739.381
2022	170.926.658.900.000,0	25.916.382,0	381.405,81.780.060	1.780.060
2023	183.415.086.800.000,0	33.631.527,4	980.720,0	1.763.792
2024	206.264.410.500.000,0	37.196.883,2	1.122.348,4	1.823.276

Table 3 - Analysis of trends in macroeconomic indicators of the Republic of Kazakhstan

Indicator	Trend	Nature of change	Impact on the industrial sector	Conclusions and interpretations
Volume of industrial production	strong growth	Fluctuations are moderate, but with progressive growth dynamics	Depends on investment activity and exports	Strategic focus on industrialization has a positive effect
Fixed capital investment	growth	Growth with periods of acceleration in construction and production	Direct link to output	Increased capital investment drives infrastructure base
Net exports	volatility	Sharp fluctuations over the years are noticeable	Determines the foreign exchange earnings and external stability of the industry	Stabilization of foreign trade policy is required
Remuneration in the income generation account	volatility	Sustained increase in payroll	Indirectly affects domestic demand and productivity	The growth of incomes of the population can stimulate the sale of industrial products
Gross output in goods and services account	strong growth	Growth as aggregate demand increases	Is an aggregated indicator of total production	Gross output growth supports manufacturing activity
Gross accumulation (Figure 9)	progressive growth	Acceleration and stagnation periods	Is the basis for extended reproduction	Increases production capacity and growth potential
Production and import subsidies	fluctuations	Related to public policy	Reduce costs of enterprises, stimulate investment	Government support boosts output growth
Employed population in the Industry and Construction group	Moderate growth	minor changes	Indirectly affects output through performance	Growth is insignificant, requires technological strengthening

Table 4 – Correlation analysis of industrial production in the Republic of Kazakhstan

Indicator 1	Indicator 2	Correlation coefficient	Interpretation
Volume of industrial production (goods, services) in value terms	Investments in fixed assets	0.1092	The link between fixed investment and industrial output proved weak and almost irrelevant. This may indicate that the investments made in the study period did not have an immediate impact on industrial output. Probably, the effect of investments is manifested with a time lag, or investments were directed to areas not directly related to current industrial production.
Remuneration in the income generation account	Volume of industrial production (goods, services) in value terms	0.7126	There is a pronounced positive correlation between the level of wages and the volume of industrial production. This may indicate that with an increase in household incomes, consumer demand is increasing, stimulating industrial production. It

Indicator 1	Indicator 2	Correlation coefficient	Interpretation
			can also be assumed that the increase in wages is associated with an increase in employment in the industrial sector and an increase in productivity.
Gross Goods and Services Invoice Issue	Volume of industrial production (goods, services) in value terms	0.6587	A moderately high positive correlation between gross output and industrial output indicates a close relationship between these indicators. Industrial production is an integral part of gross output in the economy. The growth in gross output is likely accompanied by an increase in industrial activity.
Volume of industrial production (goods, services) in value terms	Net export	0.6463	Moderately strong positive correlation. The increase in industrial production is accompanied by an increase in net exports.
Volume of industrial production (goods, services) in value terms	Gross accumulation	0.6552	Strong positive association. Industrial development is closely linked to gross savings, including investment and capital formation.
Volume of industrial production (goods, services) in value terms	Employed population in the Industry and Construction group	0.2293	Weak positive correlation. Production growth is poorly dependent on changes in the number of employed people in this area.
Volume of industrial production (goods, services) in value terms	Production and import subsidies	0.7592	There is a high positive correlation between the volume of industrial production and subsidies for production and imports in the Republic of Kazakhstan. This means that the increase in subsidies from the state, as a rule, is accompanied by an increase in industrial production. Subsidies help reduce costs, increase investment activity of enterprises and modernize production, which has a positive effect on the total volume of products.

Notes: compiled by the authors.
Analysis period: data from 2000 and 2001 (annual slice).
Source: https://taldau.stat.gov.kz site, correlation analysis module.
Correlation coefficients were calculated automatically by the system.
All correlation coefficient values are interpreted according to the Cheddock scale. Interpretation based on Cheddock scale:
0.00-0.30 - weak correlation; 0.31-0.70 - moderate; 0.71-0.90 - strong; 0.91-1.00 - very strong.

Table 5 - SWOT - analysis of the industrial sector of the Republic of Kazakhstan

Strengths	Weaknesses
Rich natural resources (oil, gas, metals). Government support in the form of subsidies and investments. Development of infrastructure and industrial zones. Participation in international integration initiatives (EAEU, SCO).	High dependence on commodity exports. Low level of technological modernization. Insufficient diversification of production. Personnel shortage in engineering and technical specialties.

Opportunities	Threats
Growth of investments in non-primary industries. Attracting foreign investment and technology. Development of «green» industry and renewable energy sources. Expanding export markets to Asia and the Middle East.	Price volatility in global commodity markets. Sanctions pressure and geopolitical instability. Depreciation of fixed assets and rising costs. Currency risks and inflationary pressures.

Table 6 – PEST-analysis of macroeconomic environment of Kazakh industry

Factor	Description and impact
Political	Political stability and government support for industry. Availability of strategic programs («Industrialization,» «National project for the development of the manufacturing industry»).
Economic	Fluctuations in commodity prices. Dependence on world markets. Inflation and rising costs. Currency instability.
Social	Urbanization and human capital development. Decrease in the number of qualified personnel in the regions. Growth of social expectations and environmental requirements.
Technological	Low level of digitalization and automation. Growing interest in «Industry 4.0.» Need for technological modernization. Increasing the role of AI and Big Data in production.

Table 7 – Of problems and recommendations for their elimination in the industry of the Republic of Kazakhstan

Problem	Description	Recommendations
1. Dependence on raw material exports	The predominance of the extractive industry in the structure of GDP.	Develop processing and high-tech industries. Support the cluster approach.
2. Low level of technological modernization	Weak automation and adoption of digital solutions.	Encourage the adoption of AI and digital platforms. Provide grants and incentives for innovation.
3. Personnel deficit	Lack of engineers, technologists, IT specialists.	Increase funding for specialized universities and colleges. Develop dual education.
4. High wear of equipment	More than 50% of fixed assets are obsolete.	Simplify access to investment loans and preferential leasing. Stimulate renewal through subsidies.
5. Restricted export destinations	The main export to a narrow circle of countries (China, Russia).	Expand foreign economic relations. Develop logistics corridors.
6. Currency and price volatility	Exposure to inflation and global shocks.	Form stocks and insurance funds. Reduce the share of raw materials in the economy.

SWOT and PEST analysis presented in Tables 5 and 6 made it possible to comprehensively assess the internal and external conditions for the functioning of the industrial sector of the Republic of Kazakhstan, as

well as to systematize the risks and strategic vectors of development. The analysis showed a high sensitivity of the sector to global challenges in the presence of significant industrial potential.

The key findings from the SWOT analysis are as follows:

strengths: availability of natural resource base; government support in the form of investments and subsidies; formation of industrial zones; participation in international integration initiatives;

weaknesses: raw material dependence; technological backwardness; limited diversification; shortage of personnel in technical specialties;

opportunities: increased investment in downstream industries; attracting foreign technologies; green energy development; expanding markets in Asia and the Middle East;

threats: commodity price volatility; geopolitical risks; moral and physical depreciation of fixed assets; currency and inflation shocks.

The results of the PEST analysis demonstrate the systemic impact of the macroeconomic environment on industrial development:

political factors: the availability of sustained government support, including strategic industrialization programs;

economic factors: high dependence on foreign markets; price and currency instability; increased production costs;

social factors: accelerated urbanization; reduction of personnel qualifications in the regions; environmental expectations of the population;

technological factors: insufficient digitalization; poor implementation of automated solutions; the growing relevance of AI and «Industry 4.0.»

Based on Table 7, six key problems of Kazakhstan's industry were identified: dependence on commodity exports; technological backwardness of production capacities; personnel shortage of engineering and IT profile; high level of equipment wear; narrow export geography; exposure to inflation and currency risks.

Specific recommendations have been developed to address these limitations. Among the priority measures: the development of the processing industry and cluster structures;

digital adoption and driving innovation; reform of the training system based on dual training; equipment modernization through preferential investment mechanisms; diversification of export destinations with the expansion of logistics; formation of insurance funds and reduction of dependence on external shocks.

Thus, the multilevel analysis made it possible to systematically identify not only the structural relationships between macroeconomic variables, but also institutional constraints and growth points. The results are of practical importance for economic policies aimed at sustainable industrialization, technological renewal and increasing the international competitiveness of the industrial sector of Kazakhstan.

The results of the study confirm the significant influence of macroeconomic factors on the dynamics of industrial production in Kazakhstan. The closest positive relationship was found between the volume of industrial products and subsidies for production and imports; gross fixed capital formation; wages in the structure of gross income. This indicates a high sensitivity of the industrial sector to measures of state support and investment activity.

Fixed capital investments show weak correlation, which may indicate uneven utilization of invested funds; long investment cycle; insufficient efficiency of implemented investment projects. At the same time, a positive value of the coefficient indicates the potential impact of this indicator in the long term.

Net exports have a moderate correlation reflecting the impact of external demand on industrial output. This is consistent with the provisions of the open economy theory, according to which export potential stimulates capacity utilization; increases the competitiveness of industries; contributes to the expansion of production volumes.

The strong relationship between the volume of production and the level of wages confirms the relevance of the theory of factor income. The growth of labor incomes is accompanied by an increase in consumer demand; activation of the domestic market; growth in output.

Positive correlations between output and subsidies prove the effectiveness of government support instruments. This is consistent with the Keynesian concept, which asserts the importance of fiscal stimulus in an unstable economic environment.

Tables 1-4 summarize the statistical information and provide the basis for the analytical conclusions.

The findings are consistent with previous research in industrial policy and investment analysis. The theoretical positions of the Cobb-Douglas production function are confirmed; investment multiplier concepts; open economy models.

The practical significance of the work lies in the possibility of applying the results to improve sectoral policies; developing subsidy programs; increasing efficiency of capital investments use.

It is advisable to expand the study taking into account regional differences; time lags between investment and production effect; including additional macroeconomic factors such as inflation; interest rates; national currency rate.

The analysis made it possible to identify the key macroeconomic factors influencing the dynamics of industrial production in Kazakhstan. The use of official statistics for 2000-2024 ensured the reliability of the conclusions.

Trend analysis showed that the volume of industrial production as a whole had an upward trajectory. At the same time, there were periods of accelerated growth, stabilization, and temporary recessions coinciding with external economic shocks and internal structural problems.

Correlation analysis confirmed the strong positive impact of a number of factors: government subsidies ($r = 0.7592$); salary level ($r = 0.7126$); gross output of goods and services ($r = 0.6587$); gross domestic product ($r = 0.6552$).

Net exports showed a moderate positive relationship ($r = 0.6463$), which is explained by dependence on external demand and fluctuations in world prices for raw materials. Investments in fixed assets had a weak current correlation ($r = 0.092$), which indicates the presence of a delayed effect that manifests itself in a few years.

The SWOT analysis revealed the strengths of the industry - a rich resource base and the availability of government support. Among the weaknesses are high dependence on the export of raw materials, technological lag and depreciation of fixed assets. The prospects of digitalization and the expansion of processing are noted as opportunities, while price and currency instability and increased competition in foreign markets are among the threats.

The PEST analysis confirmed the high sensitivity of the industry to political and economic fluctuations, and also emphasized the need to adapt to technological trends and changes in the social structure of employment.

Hypothesis testing has shown that:

the first hypothesis about the leading role of subsidies and wages has been confirmed;

The second hypothesis about the impact of net exports and gross accumulation is partially confirmed, provided the external economic environment is stable.;

the third hypothesis about the lag effect of investments is confirmed by the data;

The fourth hypothesis about the impact of technological development and institutions is confirmed by the results of SWOT and PEST analysis.

The complex application of econometric and strategic tools allowed not only to identify statistical dependencies, but also to give them an economic interpretation. The results obtained confirm the need for a balanced combination of investment, technological and institutional policies for the sustainable growth of Kazakhstan's industrial sector.

DISCUSSION

The results obtained confirm that the key drivers of industrial production dynamics in the Republic of Kazakhstan are government subsidies, investments in fixed assets and wages, while the impact of net exports is more variable. The high positive correlation of subsidies with industrial output is consistent with

the findings of Hrytsenko et al. (2021) and Voznyak et al. (2021), which indicate that targeted budgetary incentives are able to compensate for the institutional and technological constraints of the industry. This confirms the H1 hypothesis that government support is a sustainable source of growth.

The average positive relationship between fixed asset investment and industrial output is consistent with the results of Iastremska et al. (2023) and Kolodiziev et al. (2021). Their research demonstrates that the effect of capital investments is manifested with a time lag, which is associated with long cycles of implementation of infrastructure and technological projects. Thus, the H2 hypothesis is also confirmed, although the identified effect has a pronounced delayed character.

Wages have shown a strong positive relationship with industrial output, which is consistent with the conclusions of Melnyk et al. (2021) and Yu et al. (2023), which emphasize the role of household income as a factor in stimulating domestic demand and modernizing human capital. This confirms the H3 hypothesis and demonstrates that wage growth not only increases consumption, but also improves the quality of the workforce.

The impact of net exports turned out to be unstable, which corresponds to the theses of Huseynova and Huseynov (2023) on the dependence of foreign economic indicators on global economic conditions, commodity prices and the structure of foreign trade. This partially confirms the H4 hypothesis, while emphasizing that in an open economy, foreign trade effects can be both positive and negative, depending on the phase of the economic cycle.

A comparison of the results obtained with international studies (WIPO, 2022; Strielkowski et al., 2022) shows that Kazakhstan demonstrates a model of industrial growth typical of resource-based economies, where government support mechanisms and domestic demand play a greater role than sustainable export advantages.

The reasons for the identified dependencies lie in the peculiarities of the institutional structure of the Kazakh economy; the dominance of the raw materials sector and its multiplicative impact on the manufacturing industry; limited export diversification; the high role of government subsidy programs and investments in industry; gradual digitalization of production processes, which so far has not had a systemic effect.

It is advisable to focus future research on: in-depth analysis of time lags between investment and industrial output; consideration of cross-industry differences in sensitivity to macroeconomic factors; expansion of the model due to indicators of innovation activity and technological modernization; assessment of spatial heterogeneity of industrial growth in the regions of Kazakhstan.

This direction will make it possible to refine forecasts and develop more targeted industrial policy measures that take into account both the institutional and market characteristics of the country's economy.

CONCLUSION

The purpose of the study was to identify and quantify the key macroeconomic factors determining the dynamics of industrial production in the Republic of Kazakhstan, taking into account institutional, investment and technological conditions.

The analysis confirmed that government subsidies have a sustained positive impact on industrial output, which is consistent with the H1 hypothesis. Wages also showed a stable positive relationship with production, realizing the effect of stimulating domestic demand (H3). Investments in fixed assets have a weak current but pronounced delayed relationship with growth, which confirms the H2 hypothesis. The impact of net exports is variable and depends on the external economic environment, which partially confirms the H4 hypothesis.

Based on the results obtained, the following key conclusions can be identified:

– industrial policy should take into account the priority role of direct financial support and incentives;

– long-term investment projects require special planning and evaluation tools, taking into account time lags;

– the export strategy should be diversified to reduce dependence on price volatility;

– the integration of institutional and market factors will increase the sustainability of industrial growth.

The practical significance of the work lies in the possibility of applying the results to adjust subsidy programs; planning investments; developing measures to reduce external risks; and improving strategic management of industrial development.

The findings confirm the achievement of this goal and form the basis for further research aimed at a detailed study of the sectoral and regional characteristics of industrial growth.

The results obtained confirm the achievement of this goal and form the basis for further research aimed at in-depth study of the sectoral and regional characteristics of industrial growth.

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Macroeconomic factors of industrial growth in the Republic of Kazakhstan: analysis of interrelations and tendencies

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ABSTRACT

In the context of unstable foreign economic conditions, geopolitical challenges and ongoing structural transformations in the economy of Kazakhstan, a comprehensive analysis of the factors determining industrial growth and the sustainability of the manufacturing sector is of particular importance. The purpose of the study is to identify the nature, orientation and strength of the relationships between industrial production and key macroeconomic determinants, which allows us to identify priority areas of industrial policy. The empirical base of the study is based on official statistical data for 2000-2024, which ensures the representativeness and reliability of the conclusions. The methodological approach is based on correlation and trend analysis, as well as SWOT and PEST diagnostics, which made it possible to cover both quantitative and qualitative aspects of the impact of investment, export, labor and institutional components on industrial dynamics. The results of the study showed that government subsidies (correlation coefficient 0.7592), wage levels (0.7126), gross output of goods and services (0.6587) and gross accumulation (0.6552) have the greatest positive impact on industrial production. Net exports have a moderate positive correlation (0.6463), while investments in fixed assets show a weak current correlation (0.092), indicating a likely delayed effect. The SWOT analysis revealed the strengths of the industry, including a rich resource base and significant government support, as well as weaknesses related to resource dependence and technological lag. The PEST analysis confirmed the high sensitivity of the industrial sector to price and currency instability. The conclusion is made about the need for a comprehensive application of investment, fiscal and institutional instruments aimed at stimulating sustainable industrialization, accelerating technological renewal and strengthening the international competitiveness of Kazakhstan's industry.