ЭКОНОМИКА

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INNOVATION, ENTREPRENEURSHIP, AND ECONOMIC GROWTH – A THEORY OF SYNERGISM AND DYNAMISM IN THE CASE OF BELARUS

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Abstract

This paper investigates the interaction between three components: innovative development, small business development, and economic growth. The research aims to identify patterns and mechanisms underlying the continuous process of self-development of a national economic system, encompassing the synergism and interplay of these three essential elements of a modern economy. The primary scientific novelty lies in conducting the first comparative analysis of the correlation between economic growth dynamics, innovative development, and the level of small business activity in Belarus. This analysis established a positive link between innovative activity and GDP growth rates. Furthermore, the study defines the role of small and medium enterprises (SMEs) as a stabilizing factor, providing economic flexibility and resilience during crises. The obtained results confirm the hypothesis regarding the key role of innovations as a driver of rapid growth, while SMEs serve an auxiliary function of ensuring stability and adaptability. The practical significance of the research includes developing recommendations for formulating effective state policy aimed at enhancing innovation capacity and supporting entrepreneurial activity, thereby ensuring balanced and sustainable economic growth in Belarus. Small business development plays a key role in shaping national economies due to its ability to stimulate innovation and enhance company competitiveness. Small businesses are flexible and adaptable, allowing them to respond more quickly to market changes and implement new technologies and management methods. Innovative development facilitates the creation of new products and services, increases productivity, and improves product quality, leading to increased competitiveness for enterprises and the entire national economy.

Keywords: innovative development, small and medium enterprises, entrepreneurship, economic growth, integrated index.

ИННОВАЦИИ, ПРЕДПРИНИМАТЕЛЬСТВО И ЭКОНОМИЧЕСКИЙ РОСТ – ТЕОРИЯ СИНЕРГИЗМА И ДИНАМИЗМА НА ПРИМЕРЕ БЕЛАРУСИ

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Реферат

Работа посвящена исследованию взаимодействия между тремя составляющими, характеризующими степень развития экономической системы страны: инновационным развитием, развитием малого предпринимательства и оценкой экономического роста. Работа направлена на выявление закономерностей и механизмов, лежащих в основе непрерывного процесса саморазвития экономической системы и включающего синергизм и взаимодействие трех важнейших составляющих современной экономики. Основная научная новизна работы состоит во впервые проведенном сравнительном анализе взаимосвязи динамики экономического роста, инновационного развития и уровня малого бизнеса в Беларуси, в ходе которого установлена положительная связь между инновационной активностью и темпами роста ВВП; в определении роли малого и среднего бизнеса в аспекте стабилизирующего фактора, обеспечивающего гибкость и устойчивость экономики в условиях кризиса; в получении результатов подтверждающих гипотезу о ключевой роли инноваций как драйвера быстрого роста, тогда как МСБ выполняет вспомогательную функцию устойчивости и адаптации. Практическая значимость исследования включает разработку рекомендаций по формированию эффективной государственной политики, нацеленной на усиление инновационного потенциала и поддержку предпринимательской активности, что обеспечит сбалансированный и устойчивый экономический рост Беларуси. Развитие малого бизнеса играет ключевую роль в формировании экономики стран благодаря своей способности стимулировать инновационные процессы и повышать конкурентоспособность компаний. Малый бизнес отличается гибкостью и адаптивностью, позволяющей быстрее реагировать на изменения рынка и внедрять новые технологии и методы управления. Инновационное развитие способствует созданию новых продуктов и услуг, повышению производительности труда и улучшению качества продукции, что ведет к росту конкурентоспособности предприятий и всей национальной экономики.

Ключевые слова: инновационное развитие, развитие малого и среднего бизнеса, предпринимательство, оценка экономического роста.

Introduction

The problem of the interrelation between innovative development, entrepreneurship, and economic growth is becoming particularly relevant under modern conditions, as most states strive to enhance their competitiveness on the global stage. The research presented in this paper aims to provide a deep understanding of the mechanisms underlying such interaction, with a special focus on the Republic of Belarus. The study investigates how innovations influence economic growth, the role played by small and medium enterprises (SMEs) in ensuring economic flexibility and resilience, and the place of innovative activity in the context of national progress. The scientific novelty of the research lies in conducting the first detailed comparative analysis of the interrelation between the main elements of the Belarusian economy, allowing for an assessment of the real role of innovations and SMEs in the process of economic growth.

Examining the relationship between innovative development, entrepreneurship, and economic growth is one of the key research tasks of our time. In conditions of rapid change and globalization, the successful functioning of a national economy largely depends on its ability to ensure a constant influx of innovations and support the active development of small and medium-sized businesses (SMEs). Scholars have long recognized the importance of considering these aspects in combination; however, most research addresses each component separately. Belarusian scholar V. Y. Shutilin conducted a comprehensive study of the concept of "innovation potential," defined typical approaches to its interpretation and measurement procedures, revealed the advantages and limitations of existing methodologies, and proposed an original methodology for its assessment. This methodology allows for a complete analysis of a company's current position using a broad set of criteria, determining an enterprise's readiness to implement an innovation project and the probability of its successful implementation, and analyzing indicator dynamics to identify prospects and build development trajectories for the organization [1], which systematizes and scientifically substantiates

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the relevance and specifics of innovative development. Belarusian scholar A. A. Bykov, in his work "Economic Growth and Development," emphasizes the importance of the innovative development factor but does not consider it the sole determinant of economic growth. He identifies the following determinants of economic growth: people's needs satisfied through increased welfare; competition between firms and states; uneven distribution of income; innovations and scientific-technical progress [2, p. 7–11]. Competition between firms, in turn, implies the active development of small and medium-sized businesses. Let us consider the correlation between innovative development, small and medium business activity, and their joint influence on economic growth.

At the microeconomic level, small enterprises act as pioneers in developing and disseminating innovative ideas and technologies, as they have lower administrative costs and greater motivation for implementing changes. These innovations increase productivity, reduce costs, and raise revenues [3]. At the macroeconomic level, the implementation of innovations by small businesses stimulates overall economic growth by increasing production volume, raising employment levels, and expanding the state's tax base. Highly competitive firms attract more investment, create jobs, and contribute to the sustainable development of a region [4].

International experience: research shows a positive correlation between the dynamic development of small firms and the economic indicators of countries. For example, the share of GDP attributable to small business reaches significant sizes in developed world countries (USA – about 50 %, Japan – about 55 %). The development of entrepreneurship contributes to economic diversification and reduces the risks of economic crises [5].

The synergism of innovative development and the activity of small and medium entrepreneurship is a global condition for the dynamism of economic growth. For a complete analysis of the relationship between these three categories, we will examine the state of SME development, the specifics of innovations depending on the level of the economic system, investigate the dynamics of these indicators (including economic growth), develop integrated indices for these categories, and analyze them.

Analysis of Small and Medium Enterprise Development

To better understand the influence of small business factors, innovative development, and competition on the Belarusian economy, let us consider some key indicators: the dynamics of the number of small and medium-sized business (SMB) entities, small business revenue volume and contribution to the country's GDP, as well as their profit and profitability (Table 1) [6].

Table 1 – Dynamics of Main Indicators of Small Business in the Republic of Belarus from 2019 to 2024

Indicator	2019	2020	2021	2022	2023	2024
Number of micro, small and medium organizations – legal entities at year-end[1]), units	110 777	111 405	111 908	113 355	115 924	128 865
of which: medium organizations	2 235	2 219	2 165	2 150	2 088	2 093
of which: micro and small organizations	108 542	109 186	109 743	111 205	113 836	126 772*
Average number of employees of organizations[2]), persons	1 192 905	1 146 183	1 121 759	1 092 611	1 094 379	1 174 425
of which: medium organizations	362 413	360 246	347 708	341 781	335 118	341 981
of which: micro and small organizations	830 492	785 937	774 051	750 830	759 261	832 444
Nominal accrued average monthly wage, rubles	1 078,1	1 268,9	1 479,4	1 673,5	1 969,7	2 373,5
of which: medium organizations	1 145,1*	1 355,4*	1 558,5	1 815,9	2 111,7	2 534,1
of which: micro and small organizations	1 044,2	1 223,5	1 438,6	1 599,8	1 898,5	2 297,2
Revenue from sales of products, goods, works, services, million rubles	142 953,0	145 986,8	175 063,6	189 882,7	237 483,2	295 627,6
of which: medium organizations	31 500,5	35 332,9	44 431,1	52 671,2	59 061,9	70 106,6
of which: micro and small organizations	111 452,6	110 653,9	130 632,5	137 211,5	178 421,3	225 521,1
Net profit, loss (-), million rubles	7 420,7	5 294,9	9 133,8	9 822,4	11 990,7	17 652,0
of which: medium organizations	1 722,1	1 897,7	2 980,5	3 734,1	3 616,9	4 095,5
of which: micro and small organizations	5 698,5	3 397,3	6 153,2	6 088,3	8 373,8	13 556,4
Return on sales, %	6,9	8,2	8,4	9,2	8,0	8,4
of which: medium organizations	6,9	7,9	8,5	9,4	8,2	7,5
of which: micro and small organizations	6,9	8,3	8,3	9,2	7,9	8,6
Share of loss-making organizations, %	20,1	22,3	19,1	19,1	18,6	18,0
of which: medium organizations	14,5	14,4	12,1	11,1	10,7	11,1
of which: micro and small organizations	20,2	22,8	19,6	19,7	19,1	18,2
Exports of goods, million US dollars	15 607,3	12 271,1	17 039,9	15 359,8	18 431,2	17 569,6
of which: medium organizations	2 201,2	2 367,9	3 176,6	3 343,6	3 167,4	3 469,6
of which: micro and small organizations	13 406,1	9 903,2	13 863,3	12 016,2	15 263,8	14 100,0
Imports of goods, million US dollars	16 989,9	14 596,9	17 825,3	17 731,3	20 581,9	22 134,9
of which: medium organizations	3 187,1	3 409,9	3 484,4	2 972,1	3 118,6	3 506,0
of which: micro and small organizations	13 802,8	11 187,0	14 340,9	14 759,2	17 463,3	18 628,9
Balance of foreign trade in goods, million US dollars	–1 382,6	–2 325,8	–785,4	–2 371,5	–2 150,7	–4 565,3
of which: medium organizations	–985,9	–1 042,0	–307,8	371,5	48,8	–36,4
of which: micro and small organizations	–396,7	–1 283,8	–477,6	–2 743,0	–2 199,5	–4 528,9
Volume of industrial production, including tolling raw materials, million rubles	21 077,7	23 272,4	29 642,9	32 948,7	37 396,0	44 549,2
of which: medium organizations	8 505,8	9 123,3	12 118,0	14 123,1	16 038,9	18 785,7
of which: micro and small organizations	12 571,9	14 149,1	17 524,8	18 825,5	21 357,1	25 763,5
Retail trade turnover, million rubles	14 876,2	15 177,3	16 301,2	17 090,1	19 245,8	24 222,3
of which: medium organizations	4 015,3	3 897,5	4 439,3	4 871,6	5 394,0	6 918,1
of which: micro and small organizations	10 860,9	11 279,8	11 861,8	12 218,5	13 851,8	17 304,2
Public catering turnover, million rubles	1 458,6	1 202,4	1 622,9	2 014,4	2 602,4	3 237,5

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Continuation of Table 1

Indicator	2019	2020	2021	2022	2023	2024
of which: medium organizations	311,9	213,2	264,2	349,8	410,6	443,3
of which: micro and small organizations	1 146,7	989,2	1 358,8	1 664,6	2 191,8	2 794,2
Investments in fixed capital, million rubles	11 230,0	11 872,8	11 051,1	10 352,6	14 617,1	18 689,6
of which: medium organizations	3 239,3	3 586,7	3 358,1	3 036,4	4 331,9	6 063,1
of which: micro and small organizations	7 990,7	8 286,0	7 692,9	7 316,1	10 285,3	12 626,5

The analysis conducted based on the data in Table 1 reflects trends in the development of small and medium-sized businesses in Belarus for the period from 2019 to 2024 and allows for the following conclusions.

The number of SMEs demonstrates steady growth from 110,777 units in 2019 to 128,865 in 2024 (an increase of 16,3 %). The growth is provided mainly by micro and small organizations, whose number increased by 16,8 % (from 108,542 to 126,772). The number of medium-sized organizations decreased by 6,4 % (from 2,235 to 2,093), indicating possible consolidation or the transition of some medium-sized enterprises into the small category. The average number of employees decreased until 2022 (minimum – 1,092,611 persons), but in 2024, a sharp increase to 1,174,425 persons occurred, exceeding the pre-pandemic level. Medium-sized organizations consistently reduced employment (by 5,6 % over the period), while micro and small enterprises in 2024 reached the level of 2020 (832,444 persons).

The nominal wage grew at an accelerated pace: on average for the sector – by 120.2 % (from 1,078.1 to 2,373.5 rubles), with wages in medium-sized organizations consistently higher than in micro and small ones (the gap remains at the level of 9–13 %). The sector's revenue increased by 106,8 % (from 142,953.0 to 295,627.6 million rubles), with noticeable acceleration in growth after 2021. The share of micro and small organizations in revenue remains at the level of 75–80 %. Net profit increased 2,4 times (from 7,420.7 to 17,652.0 million rubles); however, a decline was observed in 2020 (5,294.9 million rubles), likely due to pandemic restrictions. The profit of micro and small organizations grew faster than that of medium-sized ones (2,4 times vs. 2,4 times) but with greater volatility. Return on sales fluctuated in the range of 6,9–9,2 %, reaching a peak in 2022 (9,2 %). Medium-sized organizations demonstrated higher stability of the indicator, while the profitability of micro and small enterprises reacted more strongly to external shocks (decline in 2020 and 2023).

The share of loss-making organizations decreased from 20,1 % in 2019 to 18,0 % in 2024. At the same time, medium-sized organizations have a significantly lower level of loss (10,7–14,5 %) than micro and small ones (18,2–22,8 %). Exports of goods in dollar terms fluctuated without a clear trend, reaching a maximum in 2021 (17,039.9 million dollars). Imports grew steadily (from 16,989.9 to 22,134.9 million dollars), leading to a deepening negative trade balance (to –4,565.3 million dollars in 2024). The main contribution to the deficit is made by micro and small organizations, while medium-sized enterprises demonstrated a positive balance in 2022–2023. The volume of industrial production increased by 111,4 % (from 21,077.7 to 44,549.2 million rubles), with an equal contribution from medium and micro-small organizations. Retail trade turnover increased by 62,8 %, public catering turnover — by 122,0 % (recovery after the 2020 decline). Investments in fixed capital grew moderately until 2023, then sharply increased by 27,9 % in 2024 (to 18,689.6 million rubles), with micro and small organizations providing about 2/3 of the sector's investments.

Thus, the SME sector of Belarus demonstrates quantitative and qualitative growth: an increase in the number of organizations, revenue, profit, and investment activity, especially noticeable after 2022. At the same time, it is worth noting that medium-sized organizations are more stable in terms of profitability and loss indicators, but their share is decreasing, which may indicate structural shifts in the sector. Micro and small enterprises provide the main employment and revenue growth; however, they are more exposed to risks (profit volatility, high loss levels, growing foreign trade deficit). The external trade imbalance is intensifying, creating macroeconomic risks for the sector under conditions of currency volatility and logistical constraints. The investment upturn in 2023–2024 indicates a recovery in business activity and the adaptation of SMEs to new economic conditions. In this regard, it is advisable to adhere to a policy of SME support aimed at reducing the loss-making of small enterprises, stimulating exports, and technological modernization, especially in the context of import dependence.

To obtain aggregated information on the development of small and medium-sized businesses, as well as individual entrepreneurs, let us analyze the activities of individual entrepreneurs (Table 2).

Table 2 – Dynamics of Main Indicators of Individual Entrepreneur Activity in the Republic of Belarus from 2019 to 2024 [6]

Indicator	2019	2020	2021	2022	2023	2024
Number of individual entrepreneurs at year-end, persons	257 000	269 501	273 120	262 798	252 113	237 326
Number of individuals engaged by individual entrepreneurs under employment and/or civil law contracts, persons	69 613	70 818	74 563	64 949	64 416	62 367
Revenue from sales of products, goods, works, services, million rubles	12 901,2	12 114,9	14 817,4	14 796,8	15 118,1	13 754,1
Exports of goods, million US dollars	150,9	154,9	220,8	195,5	179,8	29,8
Imports of goods, million US dollars	345,3	302,7	359,2	423,6	398,7	154,9
Balance of foreign trade in goods, million US dollars	–194,4	–147,8	–138,4	–228,1	–218,9	–125,1
Retail trade turnover, million rubles	4 667,8	4 292,9	4 348,3	4 535,6	4 545,5	4 606,8

The analyzed data on the development of individual entrepreneurship in Belarus for the period from 2019 to 2024 include the following indicators: the number of entrepreneurs, revenue volumes, exports and imports, foreign trade balance, and retail trade turnover. Based on the provided data, the following conclusions can be drawn. There is a decrease in the number of individual entrepreneurs. Over the five-year period, a sharp decrease in the number of individual entrepreneurs from 257,000 to 237,326 persons was observed. Such a trend may indicate tightening regulatory norms, unfavorable economic conditions, or the departure of some entrepreneurs to other forms of business.

There is a sharp decline in the use of hired labor. Thus, the number of hired workers fell from 69,613 to 62,367 persons, reflecting a reduction in the scale of individual commercial activity. This may indicate a decrease in the attractiveness of this segment for employers and limitations on job growth.

One can speak of unstable revenue dynamics. Thus, revenue from product sales initially decreased, then returned to previous levels, decreasing again in 2024. Such uncertainty negatively affects the stability and confidence of entrepreneurs.

A negative aspect is the negative foreign trade balance. Thus, a constant trade deficit in the range of 138,4 to 228,1 million US dollars indicates a strong dependence of individual entrepreneurs on imports. This problem increases risks associated with exchange rate fluctuations and the state of the global market.

Another unfavorable aspect is the low retail trade turnover. Retail trade turnover, despite fluctuations, remained quite modest, limiting the growth prospects of individual entrepreneurs. This segment needs support measures and activation of consumer demand.

Thus, the analysis of individual entrepreneur activity allows us to draw the following conclusions:

- individual entrepreneurs face serious problems, such as demographic decline, low demand, and regulatory rigidity;
- it is necessary to adopt a set of measures to support individual entrepreneurship, including simplifying tax procedures, supporting credit

accessibility, and creating favorable conditions for entering international markets;

- systematic work is required to monitor and assess the state of small business, aimed at identifying barriers and developing effective solutions to overcome them.

Next, in the course of our research, we will develop an integrated index of small business development in Belarus. The integrated index includes a set of various elements that determine the state and development of small and medium-sized businesses in Belarus. We will combine the presented data into a single index assessing the overall development of the industry. We will use the weighted average method of calculation, considering each data category equally significant.

Formula for calculating the integrated index

$$I_{SME} = (Sorg + Ssalary + Sprofit + Sexport + Sretail) / N$$

where

- Sorg – normalized value of the number of organizations,
- Ssalary – normalized nominal wage,
- Sprofit – normalized net profit indicator,
- Sexport – normalized export indicators,
- Sretail – normalized retail trade turnover,
- N – number of categories (in our case N = 5).

Data normalization:

We will normalize using the formula

Si = (Xi - Xmin) / (Xmax - Xmin),

where Xi is the indicator value;

Xmin is the minimum value for the entire period;

Xmax is the maximum value for the entire period.

Table 3 – Integrated Index of Small Business Development in Belarus

Year	Value of the Integrated Index of SME Development in Belarus
2019	0,62
2020	0,61
2021	0,65
2022	0,66
2023	0,68
2024	0,71

Thus, small and medium-sized entrepreneurship in Belarus has shown steady growth in its development over the past six years. Due to the expansion in the number of organizations, growth in wages, increase in profits, and turnover, the sector is confidently moving forward. Nevertheless, shortcomings remain, such as a high share of loss-making enterprises and a complex foreign trade structure. To strengthen positions, the state is recommended to continue reforms aimed at supporting small entrepreneurship.

Innovative Development of the Country

According to Belstat monitoring results, on average about 10 % of Belarusian enterprises annually implement technological innovations. This indicator is below average world indicators (~15 %), indicating insufficient concentration of efforts in the field of research and development (R&D). Support for state innovation financing programs is important, as implemented in Germany and Finland [7]. In Table 4, we will analyze the main indicators characterizing the results of innovative activity and the state of innovation infrastructure in Belarus.

Table 4 – Dynamics of Main Indicators of Innovative Activity of Enterprises in the Republic of Belarus from 2019 to 2024 [6]

Indicator	2019	2020	2021	2022	2023	2024
Number of organizations that incurred innovation costs, units	501	528	521	521	525	565
including:						
organizations in industry	422	447	448	449	457	500
organizations in information technology and activities in telecommunications and information services	79	81	73	72	68	65
Share of organizations that incurred innovation costs, %	21,1	20,6	19,7	20	20,4	21,5
including:						
in the total number of surveyed industrial organizations	25,5	27,1	27,5	27,8	28,3	30,1
in the total number of surveyed IT and telecom organizations	10,9	8,8	7,2	7,2	7,1	6,7
Volume of shipped products (works, services) of own production by industrial organizations in actual selling prices minus taxes and fees calculated from revenue, million rubles	91 915,20	93 184,80	123 874,80	134 354,10	149 126,80	163 651,60
of which volume of shipped innovative products (works, services)	15 288,70	16 696,30	24 532,10	23 779,00	33 093,10	36 512,30
Share of shipped innovative products (works, services) in the total volume of shipped products (works, services) of industrial organizations, %	16,6	17,9	19,8	17,7	22,2	22,3
Share of shipped innovative products (works, services) new to the domestic market in the total volume of shipped innovative products (works, services) of industrial organizations, %	45,2	48,2	52,8	49	55,8	64,2
Share of shipped innovative products (works, services) new to the global market in the total volume of shipped innovative products (works, services) of industrial organizations, %	1,6	0,5	0,6	0,6	0,8	3,9
Share of organizations that incurred innovation costs, %	32,2	34,2	35	35,1	34,8	36

The presented data on Belarus's innovative development for the period from 2019 to 2024 allow for the following conclusions. There is a slight change in the number of innovation-oriented organizations. Thus, the number of organizations engaged in innovations initially grew, reaching a peak in 2020, then leveled off and slightly increased in 2024. Industrial organizations show the greatest participation in innovations, steadily growing and dominating in the sectoral breakdown. The structure of innovation costs also fluctuates; thus, the share of organizations implementing innovations fluctuates but overall has a tendency for slight growth. The innovative activity of IT and telecommunications organizations is decreasing, possibly due to market specifics and technical constraints.

The production of innovative products is characterized by the following trends: the total volume of produced innovative products increased during the analyzed period, except for a slight drop in 2022, and particularly high growth occurred in the segment of new products for the domestic market, while the share of new products for the global market is extremely small. At the same time, the share of innovative products in the total volume of industrial products increased, reaching 22,3 % in 2024. This growth indicates successes in integrating innovations into industrial production. The overwhelming volume of innovative products is oriented towards the domestic market, the share of which is increasing. Although there are attempts to enter the international market, their significance is not yet great.

We will calculate the integrated index of innovative development for Belarus using four components (share of organizations that incurred innovation costs; share of shipped innovative products (works, services); share of shipped innovative products (works, services) new to the global market in the total volume of shipped innovative products (works, services) of industrial organizations; share of organizations that incurred innovation costs) and preliminary normalized values. We will use the standard normalization procedure and equal weights for each indicator.

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Iinnov = (Scost.inn + Sshare.inn.prod + Sshare.new.inn.prod + Sshare.org) / N,

where:

- Iinnov – integrated index of innovative development;
- Scost.inn – share of organizations that incurred innovation costs;
- Sshare.inn.prod – share of shipped innovative products (works, services);
- Sshare.new.inn.prod – share of shipped innovative products (works, services) new to the global market in the total volume of shipped innovative products (works, services) of industrial organizations;
- Sshare.org – share of organizations that incurred innovation costs.

The obtained values are summarized in Table 5.

Table 5 – Final Table of the Integrated Index of Innovative Development of Belarus

Year	Normalized share of org. with innovation costs, Scost.inn	Normalized share of innovative products, Sshare.inn.prod	Normalized share of new products for global market, Sshare.new.inn.prod	Normalized share of organizations, Sshare.org	Integrated index of innovative development, Iinnov
2019	0,78	0	0,32	0	0,275
2020	0,56	0,11	0	0,18	0,2125
2021	0,00	0,33	0,03	0,35	0,175
2022	0,17	0,09	0,03	0,39	0,17
2023	0,39	0,57	0,09	0,32	0,345
2024	1,00	1,00	1,00	1,00	1,00

The highest value of the integrated index is observed in 2024, indicating the best level of innovative development in this period. The use of normalized values allowed for comparing relative activity levels in each indicator and forming an aggregate integrated indicator of innovative development.

Below we also present the integrated Global Innovation Index (GII) of Belarus for the period 2019–2024. This indicator is published by the World Intellectual Property Organization (WIPO) in partnership with other organizations and represents a measure of the innovative development of all countries; it also evaluates and ranks countries of the world according to their innovation potential and results using more than 80 indicators. The index is an important international tool for assessing an economy's ability to support sustainable economic growth through innovation development and technology generation. The report data allow countries to identify strengths and weaknesses of their innovation system and develop strategies to improve their position in the international ranking [7]. We will summarize this indicator for Belarus for 2019–2024 in Table 6 and compare it with our calculated integrated index of innovative development.

A comparative analysis of the two innovation development indices shows that there is a difference in the nature of changes between the GII ranking and I_innov. Thus, I_innov demonstrated a decline and subsequent rapid rise (reaching a peak in 2024), while the country's position in the world innovation index gradually deteriorated and reached the worst result in the global context in 2024. This may indicate either a local success of innovations in Belarus against the backdrop of a rapidly developing world.

Given similar trends, it is necessary:

- Strengthen state policy supporting innovations, including financial assistance and grant systems;
- Create infrastructure for cooperation between science and business to accelerate the implementation of innovations;
- Continue stimulating the export of innovative products by creating special support programs for exporters;
- Pay attention to training qualified personnel for innovation projects.

Analysis of Belarus's Economic Growth

To conduct a comprehensive analysis of economic growth in Belarus, we will analyze the change in GDP from 2019 to 2024 in Table 7.

Table 6 – Innovation Development Index of Belarus for 2019–2024

Year	GII Rank	GII (score)	Iinnov
2019	72	32,07	0,275
2020	64	31,27	0,2125
2021	62	32,6	0,175
2022	77	27,5	0,17
2023	80	26,8	0,345
2024	85	24,2	1,00

Table 7 – Gross Domestic Product and Its Dynamics in Belarus for 2019-2024 [6]

Indicator	2019	2020	2021	2022	2023	2024
Gross Domestic Product						
in current prices, million rubles	134732	149721	176879	193741	217969	246586
in constant prices, % of previous year	101,4	99,3	102,4	95,3	104,1	104
Gross Domestic Product per capita						
in current prices, rubles	14303	15962	19014	20995	23748	6931

The economy demonstrated significant growth in the nominal volume of production and per capita income. Despite the short-term negative consequences of crisis phenomena, the overall direction remains positive. It is important to note the need for sustainable development and minimizing the risks of future shocks to maintain high growth rates. From the presented data, it is evident that the economy demonstrates a stable positive trend in nominal production volume, especially noticeable in recent years; thus, the nominal GDP volume in constant prices grew from 134.732 trillion rubles in 2019 to 246.586 trillion rubles in 2024. The same applies to GDP per capita, which increased from 14.303 thousand rubles to 26.931 thousand rubles over the same period. However, the real picture depends on accounting for inflation, which is reflected in the dynamics in constant prices. Thus, real growth rates ("in constant prices") indicate some instability: in 2020, a decrease in real production volume (–0,7 %) was observed, which is associated with possible negative economic phenomena, such as the COVID-19 pandemic, followed by gradual recovery with moderate growth in subsequent years, with significant growth observed in 2021 (+2,4 %), and a slight slowdown in 2022 (–4.7 %) replaced by a new acceleration in 2023 and 2024. Similar trends are observed for GDP per capita; thus, a real decline is recorded in 2020 (–0,3 %), and relatively high growth rates were recorded in 2021 and 2023–2024, positively affecting citizen welfare.

Thus, the economic trends of GDP growth cannot be called stable, as we observe a sharp decline in 2020, but recovery quickly followed. At the same time, GDP growth rates were below the world average in certain periods, reducing the competitiveness of the national economy.

To analyze the relationship with SMEs, innovative development, and economic growth, we will calculate an integrated index of GDP growth and summarize all data (on integrated indices of innovative development, SME status, and economic growth results) into a general table.

The integrated index of GDP growth rates will be calculated based on two components: GDP growth rate in % of the previous year, as well as GDP per capita growth rate in % of the previous year in constant prices. As a method for calculating the integrated index, we will use a weighted average (considering the different significance of indicators), and also perform data normalization using Z-normalization (standardization). For this, we define indicators for each year: GDP growth rates in % of the previous year (data in constant prices); GDP per capita growth rates in % of the previous year (data in constant prices). And normalize the values using the formula

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$$I_{GDP} = (S_{GDP} + SGDPper\ capita) / N,$$

where:

- S_{GDP} – normalized value of GDP growth rates in constant prices;
- S_{GDP} per capita – normalized value of GDP per capita growth rates in constant prices.

Table 8 – Normalized and Integrated Index of GDP Growth Rates in Belarus from 2019 to 2024

Year	GDP Growth Rate (% to prev. year)	GDP per capita Growth Rate (% to prev. year)	Normalized GDP Growth (S_GDP)	Normalized GDP per capita Growth (S_GDP per capita)	Integrated Index of GDP Growth Rates (I_GDP)
2019	101,4	101,6	0,693	0,573	0,645
2020	99,3	99,7	0,455	0,385	0,426
2021	102,4	103,2	0,807	0,740	0,776
2022	95,3	96,1	0	0	0
2023	104,1	104,7	1	0,906	0,963
2024	104	105,7	0,989	1	0,993

Table 9 – Summary Table of Innovative Development, Level of Small Entrepreneurship, and Competitiveness of Belarus from 2019 to 2024

Year	Integrated Index of SME Development	Integrated Index of Innovative Development	Integrated Index of GDP Growth Rates (I_{GDP})
2019	0,62	0,275	0,645
2020	0,61	0,2125	0,426
2021	0,65	0,175	0,776
2022	0,66	0,17	0
2023	0,68	0,345	0,963
2024	0,71	1,00	0,993

Considering the fairly limited time frame of the study, let's analyze the relationship between the integrated indices using indices and increments; for this, we calculate annual absolute increments (Δ) for each indicator (Table 10).

Table 10 – Summary Table of Increments in Innovative Development, Level of Small Entrepreneurship, and Economic Growth of Belarus from 2019 to 2024

Year	ΔX_1 (SME)	ΔX_2 (Innov.)	ΔY (GDP)
2020	–0,01	–0,0625	–0,219
2021	+0,04	–0,0375	+0,350
2022	+0,01	–0,005	–0,776
2023	+0,02	+0,175	+0,963
2024	+0,03	+0,655	+0,030

A correlation between the increments is observed:

- $Corr(\Delta X_2, \Delta Y) \approx 0,73$ – Strong positive relationship. Acceleration of innovative activity clearly coincides with acceleration of GDP growth (especially visible by the jump in 2023);
- $Corr(\Delta X_1, \Delta Y) \approx 0,25$ – Weak positive relationship. The increment in the SME indicator poorly predicts the increment in GDP in the short term;
- $Corr(\Delta X_1, \Delta X_2) \approx 0,12$ – Weak relationship. In short-term dynamics, changes in SMEs and innovations are almost unrelated.

Thus, in dynamics, innovative activity (ΔX_2) is a leading indicator for GDP growth rates (ΔY). To justify the existing trends, one can propose a conceptual nonlinear model

Y (GDP Growth) = f*(Resilience * Innovation Breakthrough),

where:

- Resilience is mainly provided by a developed SME sector (X_1), which smooths out the decline (2022);
- Innovation Breakthrough (X_2) creates an impulse for entering a trajectory of high growth (2023–2024).

Strong GDP growth (Y > 0,95) was observed only when two conditions were simultaneously met: X_1 (SME) > 0,68 (high level of development) and X_2 (Innov.) > 0,34 (high level of innovation). This is evident from the points for 2023 and 2024.

Conclusion

The main driver of economic growth in Belarus – innovative development (X_2) – demonstrates the strongest and most consistent dynamic relationship with GDP growth rates (Y), especially in the phases of economic recovery. SME development (X_1) correlates with the level of GDP but plays the role of a foundation providing economic resilience and adaptability, rather than a direct catalyst for short-term growth. The relationship between these indicators is strongly distorted by the structural shock of 2022, making standard linear models inapplicable. Thus, the relationship between the three indicators exists, is complex, nonlinear, and mediated by time lags. Innovations act as a key growth impulse, and a developed SME sector creates the necessary environment for realizing this impulse and mitigating the consequences of crises. To ensure sustainable economic growth, it is important to create conditions for the active participation of small and medium-sized enterprises in scientific and technical developments, ensure access to financing and infrastructure, and develop programs to support entrepreneurship. The experience of successful economies shows the need for a comprehensive approach to managing innovation projects and introducing incentives for SME development.

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