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THE CURRENT STATE OF DEVELOPMENT OF INNOVATION ACTIVITY AT THE ENTERPRISES OF THE MANUFACTURING INDUSTRY

Abstract. *The article examines the level and dynamics of innovation activity in Kazakhstan, focusing on manufacturing enterprises. The authors analyze the existing theoretical approaches to the definition of “innovation activity”, study the state support of SMEs in this area, and analyze statistical data on innovation activity in medium- and high-tech sectors of the manufacturing industry in Kazakhstan.*

The study identifies some problems: low level of innovation activity of enterprises, the inefficiency of innovation expenditures, and many factors limiting the development of innovation activities, such as lack of demand for innovation, lack of financial resources, market uncertainty, and lack of qualified personnel.

The article offers some recommendations to improve the situation: the need for a systematic approach to the technological modernization of industries, open discussion of the results of state programs, adequate assessment of enterprises’ capabilities for innovative development, and setting target indicators.

Keywords: *Innovation activity, manufacturing industry, Kazakhstan, state support for SMEs, innovation cost efficiency.*

■ Introduction

The focus of most modern research is on favorable conditions for the creation and implementation of innovations, as well as the study of management mechanisms for the organization of all stages of the innovation process: from the idea to the final innovative product. At the same time, despite the fairly large number of studies devoted to innovation, it is necessary to note a gap in the methodology of organization of innovation activity in the sphere of entrepreneurship, in particular, in the approach for assessing its level.

The organization of effective innovation activity in the sphere of entrepreneurship is accompanied by several difficulties, which include problems of resource provision and organizational and managerial issues. The implementation of innovative programs and projects at enterprises is largely complicated by the incompleteness and imperfection of the existing toolkit for organizing innovation activities in medium- and high-tech industries of manufacturing industry, so the urgent task at present is the problem of improving this process to increase the maximum efficiency of all resources.

The relevance of the study is confirmed by the fact that modern challenges associated with digitalization, robotization of production facilities, and the introduction of Smart Manufacturing - “smart” production technology require an accelerated solution of problems in the sphere of innovation activity of medium- and high-tech enterprises of the manufacturing industry, search for optimal ways to organize this process.

Based on the above provisions, we can conclude that the most relevant areas of improvement of the system of the process of organization of innovation activity at enterprises of the manufacturing industry are the following: the development of a methodology for assessing the organization of innovation activity in entrepreneurship, assessment and analysis of the organization of innovation activity at medium- and high-tech enterprises of the manufacturing industry, building a roadmap for the effective organization of this process.

■ Literature review

In the context of globalization and the high uncertainty of raw material prices, the key driver of the socio-economic development of society is the productive innovation activities of enterprises. Innovation activities allow enterprises to strengthen their position and advance to new markets. The development of innovation activities can bring enterprises additional competitive advantages and promote the entry of manufactured products into foreign markets in conditions where the scale of production in the domestic market is limited.

Undoubtedly, the effectiveness of the innovation activity of enterprises depends to a large extent on the effective management and organization of this process. State support and measures to stimulate innovation activity in Kazakhstan over the past decade have increased, however, the production of innovative products remains low. All this indicates the ineffectiveness of the methods and tools of management and organization of innovation activity in entrepreneurship, which determines the need to find ways to improve them.

In order to identify ways to improve the mechanisms of organization of innovation activity in the sphere of entrepreneurship, it is necessary to analyze the theoretical provisions and developments of leading scientists in this branch of knowledge.

At different times, scientists have researched the essence of the innovation activity of the enterprise, which led to various interpretations of this concept. Thus, the interpretation of the concept of innovation activity can be found in the fundamental work of the founder of innovation theory J. Schumpeter - in "Theory of Economic Development" (1912), in the work of a prominent management theorist P. Drucker - "Theory of Business" (1994), in the book of American economist B. Twiss "Management of Innovations" (1989), in the scientific work of Hungarian scientist B. Santo - "Innovation as a Means of Economic Development" (1990), in the book of German scientist B. Santo - "Innovation as a Means of Economic Development" (1990). Santo - "Innovation as a Means of Economic Development" (1990), in the book of German scientist G. Mensch - "Technological Path: Innovations Overcome Depression" (1975), in the work of American management theorist K. Christensen, the founder of the theory of economic development. Christensen, the founder of the theory of "Subversive Innovation" - "The Innovator's Dilemma" (1997), in the studies of the founders of the theory of economic systems K. Fukuda, K. Watanabe, R. Ayres, in the developments of the authors of the theory of the triple helix G. Itskovich and L. Leydesdorf [1-6].

Oslo Manual suggests: "Innovation activities include any organizational, scientific, technological, financial, and commercial activities, the results of which lead to the creation and implementation of innovations". It is also noted that innovation activities include research and development not related to the preparation of innovations. There are 4 types of innovations: process, product, organization, and marketing [7].

Frascati Manual highlights: "The result of innovation is innovation, in the form of an improved or new product (technology, technological process), a new approach to services implemented in practice" [8].

■ Materials and methods

The following methods were used in writing the scientific article: a review of scientific literature from Scopus and Web of Science databases, content analysis of the content of the concept

of “innovation activity”, bibliometric analysis, systematization and synthesis, comparative analysis, trend analysis, case study method, graphical methods of data visualization, analytical tables, calculation of statistical indicators, analysis of program and regulatory documents (applied performance analysis), methodology for assessing the effectiveness of mechanisms to stimulate innovation activity, methodology for assessing the effectiveness of mechanisms to stimulate innovation activity, methodology for assessing the effectiveness of mechanisms to stimulate innovation activity, methodology for assessing the effectiveness of mechanisms to stimulate innovation activity, methodology for assessing the effectiveness of mechanisms to stimulate innovation activity.

■ Results and Discussion

World economic crises and the global pandemic Covid-19 primarily hurt SMEs. In this regard, supporting and stimulating the activities of SMEs is of particular importance and relevance in modern conditions, since the decline in entrepreneurial activity leads to a decrease in tax revenues to the country’s budget, job losses, and the lagging of manufacturing enterprises in the field of creation and implementation of innovations [9].

Currently, one of the sought-after measures of state support for SMEs in the manufacturing industry is the guarantee programs from the Damu DIF, such as:

1. “Business Roadmap-2025” (loans up to 1 billion tenge).
2. Programmes for entrepreneurs of Astana city “Astana Business 1 and 2” (loans up to 100 million tenge, not more than 8.5 % rate).
3. “Economy of Simple Things” (loans up to 1 billion tenge).
4. Damu-Optima Programme (loan amount up to KZT 180 million).
5. Enbek program (development of productive employment, loan amount depending on the region from 6,500 to 8,000 MRP).
6. Guarantees on microcredits (loans up to 20 million tenge).

In order to evaluate the lending programs, let us investigate the role of manufacturing in SMEs (Figures 1, 2)

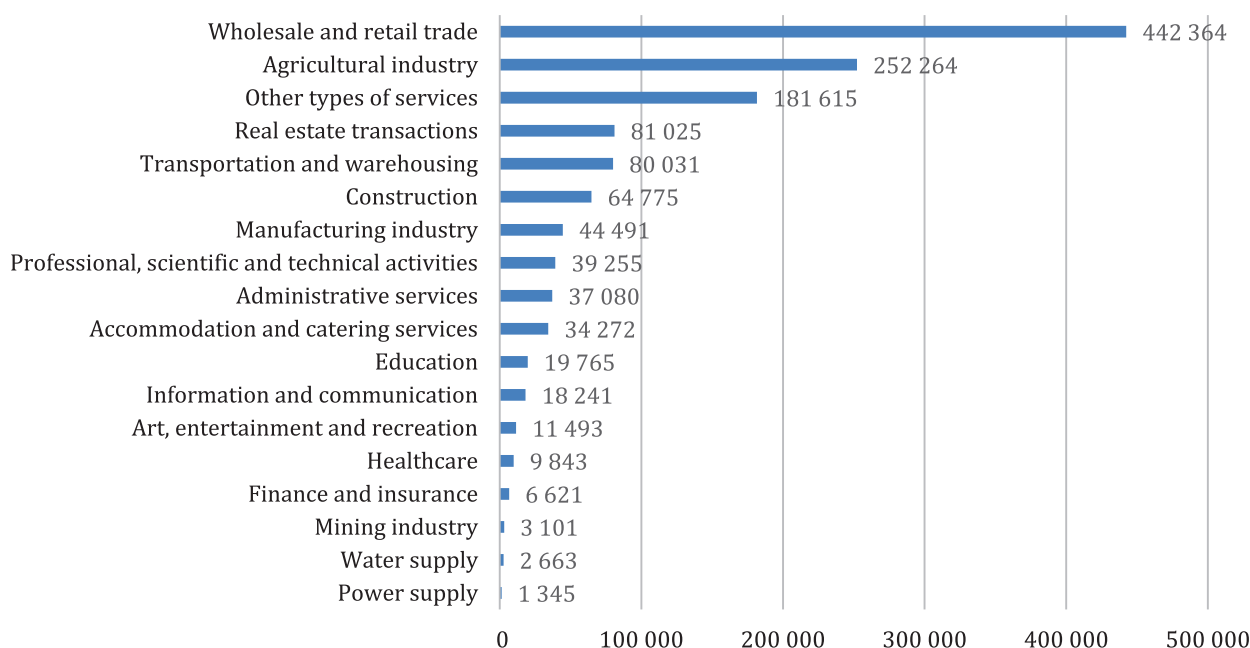


Figure 1 - Operating SMEs in Kazakhstan for 2023, units.
 Note - Compiled on the basis of the data of Damu FRP

In 2023, the total number of operating SMEs in Kazakhstan is 1330244 units. The share of manufacturing in 2023 is 44,491 thousand units of operating SMEs or 3.3 percent of the total

number of SMEs. In 2023, the smallest share of SMEs in Kazakhstan's industry was in the mining industry – 3,101 units, water supply – 2,663 units, electricity supply – 1,345 units. The largest number of MBS subjects is concentrated in the wholesale and retail trade sector – 442,364 units, and agriculture – 252,264 units.

At the end of 2023, the number of people employed in SMEs in the country totaled 3448727. The share of manufacturing production accounts for 272,508 thousand people employed in SMEs or 7.9 percent of their total number. For comparison, one small and medium-sized enterprise of manufacturing production in Kazakhstan employs an average of 6 people, while in mining and electricity supply – 11 people, and the water supply – 7 people. One enterprise of wholesale and retail trade and agriculture employs, on average, 2–5 people in construction.

In 2023, the total output of SMEs in the country totaled 32387 billion tenge. The share of manufacturing industry enterprises is 3998 billion tenge or 12.3% of the total SMEs. One enterprise in the manufacturing industry accounts for an average output of 90 million tenge per 1 employed person – 14.6 million tenge. Similar indicators in other sectors of the economy are as follows: mining industry – 602 million tenge per 1 enterprise, 55.5 million tenge per 1 employed person; in electricity supply – 350 million tenge per 1 enterprise, 32.1 million tenge per 1 employed person; water supply – 87 million tenge per 1 enterprise, 6.2 million tenge per 1 employed person.

Table 1 - Loans granted by the HLB and Damu DFI to manufacturing enterprises (MEs)

Name	Years						Modification 2023/2013	
	2013	2015	2017	2019	2021	2023	+/-	%
Loans issued through STBs, billion tenge	4102	5778	8375	9351	10819	15203	11101	270
Loans issued to OP enterprises through the BWU, billion tenge	375	600	938	1563	1153	1691	1316	350
CDB loans to the OP enterprise, KZT billion	33	26	61	216	340	350	317	960
Share of OPs in loans of HLBs, %	9,1	10,4	11,2	16,7	10,7	11,1	2	-
Number of projects supported by Damu DIF, units.	334	464	592	1248	1393	2022	1688	505
Amount of loans issued by DAF Damu to OP entities, total	35,8	181,5	226,1	230,8	198,3	240,6	204,8	572

Note - Compiled on the basis of the data of Damu FRP

In total, from 2013 to 2023, the Damu DIF supported 13,308 projects in the manufacturing industry for a total loan amount of 2.2 trillion tenge. In 2023, manufacturing enterprises (7,004 units) that received financial support from the Damu SWF will produce goods worth 3,862 billion tenge. Output by the size of enterprises is as follows: large enterprises – 37 percent, medium enterprises - 32 percent, and micro and small enterprises – 31 percent. In 2023, the manufacturing industry enterprises supported under the Fund's financial programs (7,004 units) paid taxes totaling 228 billion tenge. For 2016-2023, the taxes paid by the manufacturing industry enterprises, which received assistance from the "Damu" DIF, totaled 1,045 billion tenge. In 2023, this indicator was 228 billion tenge, of which large enterprises accounted for 36% of all tax payments, medium - 32%, and micro and small - 32%. In 2023, 116,554 people were employed in manufacturing enterprises supported under the Damu DIF programs. 5 percent of the jobs were provided by large enterprises, medium enterprises 19 percent, and micro and small enterprises 76 percent.

Thus, the socio-economic effect of the implementation of state programs to support OP enterprises through the Damu DIF is as follows: increase in output in 2023 by 979% compared to 2016; increase in tax payments in 2023 by 511% compared to 2016; 116,554 people are employed.

Next, it is necessary to analyze the indicators of innovation activity of enterprises in the manufacturing industry (Table 2).

Table 2 - Dynamics of innovation activity of manufacturing industry enterprises in Kazakhstan

Name	2013	2015	2017	2019	2021	2023	Modification 2023/2013 years	
							+/-	%
Number of enterprises, units.	4 848	4 660	3272	4440	4377	4 216	-632	-13
having innovations, units.	186	296	348	540	596	606	420	225
Level of innovation activity, %	3,8	6,4	10,6	12,2	13,6	14,4	10,6	-
Volume of innovative products produced, million tenge	693754,8	1236001,2	498806	253288	628050	818854,6	125099	18
Volume of realised innovative products, mln tenge	76202,2	178111,7	423086	241124	662839	764047,1	687844	902
Share of innovative products in GDP, %	4,08	4,38	1,39	0,62	1,15	1,18	-2,9	-
Costs of innovations, mln tenge	27819,7	101246,5	166605	425332	617421	248405	220585	792

According to the Bureau of National Statistics ASPR RK in 2023 statistical observation covered 4216 enterprises of the manufacturing industry of Kazakhstan. Of these, in 2023, 606 enterprises carried out innovative activities, that is, the innovation activity of manufacturing enterprises was 14.4%, and in 2013 this indicator was 3.8%. In 2023, the number of enterprises with innovation compared to 2013 increased by 420 units.

It should be noted that Kazakhstan is significantly behind the leading economies of the world (Germany – 70%, Canada - 65%, Belgium – 60%, France, Finland – 55-57%), and the majority of Eastern and Central European countries – 30-40% [10].

In 2023, the volume of innovative products produced by enterprises of the manufacturing industry compared to 2013 increased by 18% and amounted to 818854.6 million tenge. For the same period, the volume of sold innovative products by the manufacturing industry enterprises increased by 902% and amounted to 687844 million tenge.

The data in Table 3 show an increase in the volume of innovative products (goods, services) from 2013 to 2023 in all medium- and high-tech sectors of the manufacturing industry. A significant increase in the volume of produced innovative products during the analyzed period was demonstrated by the enterprises for the production of coke and petroleum products (87.7 times), for the production of motor vehicles (155 times), and for the production of other vehicles (81 times).

Name	2013	2015	2017	2019	2021	2023	Modification 2023/2013	
							+/-	many times over
Production of coke and refined products	1775	4525,4	23630	3034,1	104537	155613	1538381	87,7
Production of basic pharmaceutical products	651,5	1385	706,7	1937,5	878,4	730,6	79,1	1,1

Manufacture of rubber and plastic products	1260,4	3322,6	6080,3	4306,5	4459,7	6248,7	4988,3	5,0
Production of other non-metallic mineral products	3206,5	20895,3	37618,8	54560,9	36220,8	48991,9	45785,4	15,3
Metallurgical industry	40674	90146	161454	18321	252063	150221	109546	3,7
Manufacture of fabricated metal products, except tyres and equipment	1459,5	3293,9	1374,7	774,2	733,8	2196	736,5	1,5
Production of chemical industry products	6765,1	8665,2	23284	20135,6	21374,4	31938,9	25173,8	4,7
Manufacture of computers, electronic and optical products	2082,1	3380	580,4	16468,8	6537,2	6224,5	4 142,4	3,0
Manufacture of electrical equipment	1999,3	4966,2	8681,6	5989,6	8498,3	9200	7200,7	4,6
Manufacture of machinery and equipment not included in other categories	1474,3	11846,3	23896	8991,2	5934,6	9835,9	8361,6	6,7
Manufacture of motor vehicles, trailers and semi-trailers	1700,2	6190,6	25083,1	22250,4	90587,5	263183,3	261483,1	154,8
Production of motor vehicles	513,4	40,4	64205,6	57899	45348,8	41469,7	40956,3	80,8
Repair and installation of machinery and equipment	403,5	104,2	11633,5	598,3	1013,7	3396,2	2992,7	8,4

Note - Compiled according to the data of the BNS ASPR RK

It should be noted that the share of innovative products produced by manufacturing enterprises in Kazakhstan in 2023 was 1.18% and decreased by 2.9 p.p. compared to 2013. In some years, the share of innovative products in the country's GDP slightly exceeded 0.6%. In our view, the main reason for the low share of innovative products produced by manufacturing enterprises in Kazakhstan lies in the low efficiency of innovation costs.

In 2023, innovation costs increased by 792% compared to 2013, totalling 248405 million tenge (in 2013 – 27819 million tenge).

In 2023, the cost-effectiveness of innovation by manufacturing enterprises in Kazakhstan was only 3.3 tenge. It means that 1 tenge invested by the manufacturing industry enterprises of Kazakhstan to implement innovation in 2023 paid off only by 3.3 tenge. In 2019 and 2020, the loss of innovation activity of enterprises of the manufacturing industry of Kazakhstan for the period under review was maximum, the cost-effectiveness of innovation implementation decreased to 0.6 and 0.3 tenge, that is, one invested tenge brought in these years a loss of 60 and 30 tiyn respectively. The total losses from innovations implemented by Kazakh enterprises in 2019 and 2020 totaled 2.1 billion tenges. These processes were caused by the tenge devaluation in 2013 and 2018, as equipment and materials for innovations were purchased abroad. In the period from 2013 to 2020, several state programs to support the manufacturing industry (GPFIR, GPIIR-1, programs from the "Damu" DIF) were implemented, which led to an increase in the cost-effectiveness of innovation implementation by Kazakhstan's manufacturing enterprises from 2021.

The conclusions about the low cost-effectiveness of innovation expenditures by manufacturing enterprises in Kazakhstan suggest that such activity depends on state support programs and actualizes the search for factors limiting it.

Thus, according to entrepreneurs, the most significant factors limiting innovation activity are lack of demand for innovation, lack of financial resources, earlier innovations hinder the implementation of innovation activities, high innovation costs, uncertainty of market demand for innovative products, and lack of manpower.

■ Conclusions

It follows from the analysis of the innovation activity of manufacturing enterprises in Kazakhstan that medium- and high-tech sectors play a significant role and are still insufficient in the national economy. It should be noted that there are gaps in statistical data on medium- and high-tech industries in Kazakhstan due to incomplete information. Within the framework of the GPFIIR, GPIIR-1, and support programs from the Damu DIF, the state is taking measures to stimulate innovation, import substitution, development of manufacturing enterprises, and improvements in some parameters.

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СОВРЕМЕННОЕ СОСТОЯНИЕ РАЗВИТИЯ ИННОВАЦИОННОЙ ДЕЯТЕЛЬНОСТИ НА ПРЕДПРИЯТИЯХ ОБРАБАТЫВАЮЩЕЙ ПРОМЫШЛЕННОСТИ

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Аннотация. В статье исследуется уровень и динамика инновационной активности в Казахстане, фокусируясь на предприятиях обрабатывающей промышленности. Анализируются существующие теоретические подходы к определению понятия «Инновационная деятельность», изучаются государственная поддержка МСБ в данной сфере и проводится анализ статистических данных по инновационной активности в средне- и высокотехнологичных секторах обрабатывающей промышленности Казахстана.

Исследование выявляет ряд проблем: низкий уровень инновационной активности предприятий, неэффективность затрат на инновации, а также ряд факторов, ограничивающих развитие инновационной деятельности, таких как отсутствие спроса на инновации, недостаток финансовых ресурсов, неопределенность рынка и нехватка квалифицированных кадров.

Статья предлагает ряд рекомендаций по улучшению ситуации: необходимость системного подхода к технологической модернизации отраслей, открытое обсуждение результатов госпрограмм, адекватная оценка возможностей предприятий к инновационному развитию и постановка целевых индикаторов.

Ключевые слова: инновационная деятельность, обрабатывающая промышленность, Казахстан, государственная поддержка МСБ, эффективность затрат на инновации.

ӨНДЕУ ӨНЕРКӘСІБІ КӘСІПОРЫНДАРЫНДА ИННОВАЦИЯЛЫҚ ҚЫЗМЕТТІ ДАМУ ТУДАҢ ҚАЗІРГІ ЖАҒДАЙЫ

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Аңдатпа. Мақалада Қазақстандағы инновациялық белсенділіктің деңгейі мен динамикасы зерттеліп, өңдеуші өнеркәсіп кәсіпорындарына назар аударылады. «Инновациялық қызмет» ұғымын анықтаудың қолданыстағы теориялық тәсілдері талданады, осы саладағы ШОБ-ты мемлекеттік қолдау қарастырылады және Қазақстанның өңдеуші өнеркәсібінің орта және жоғары технологиялық секторларындағы инновациялық белсенділік бойынша статистикалық деректер талданады.

Зерттеу бірқатар проблемаларды анықтайды: кәсіпорындардың инновациялық белсенділігінің төмен деңгейі, инновацияларға жұмсалған шығындардың тиімсіздігі, сондай-ақ инновациялық қызметтің дамуын шектейтін бірқатар факторлар, мысалы, инновацияларға сұраныстың болмауы, қаржылық ресурстардың жетіспеушілігі, нарықтың белгісіздігі және білікті кадрлардың жетіспеушілігі.

Мақалада жағдайды жақсарту бойынша бірқатар ұсыныстар беріледі: салаларды технологиялық жаңғыртуға жүйелі тәсілдің қажеттілігі, мемлекеттік бағдарламалардың нәтижелерін ашық талқылау, кәсіпорындардың инновациялық дамуға мүмкіндіктерін барабар бағалау және мақсатты көрсеткіштерді белгілеу.

Түйін сөздер: инновациялық қызмет, өңдеуші өнеркәсіп, Қазақстан, ШОБ-ты мемлекеттік қолдау, инновацияларға жұмсалатын шығындардың тиімділігі.